UNIVERSITY OF CALIFORNIA SAN DIEGO

Women's Scientific Tools: Scientific Material Practices in the Works of Margaret Cavendish, Jane Barker, and Charlotte Smith

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy

in

Literature

by

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2020

The dissertation of Carolin Boettcher is approved, and it is acceptable in quality and form for publication on microfilm and electronically:

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University of California San Diego

2020

DEDICATION

Für meine Familie.

EPIGRAPH

Invention, it must be humbly admitted, does not consist in creating out of void, but out of chaos; the materials must, in the first place, be afforded; it can give form to dark, shapeless substances, but cannot bring into being the substance itself.

Mary Shelley

TABLE OF CONTENTS

LIST OF FIGURES

ACKNOWLEDGEMENTS

This dissertation could not have been completed without the continued support and mentorship of the people around me, who believed in me and in my project, even when there wasn't a real project to believe in yet. They saw some merit in bringing women and scientific tools together, and I am thankful that they did.

First, I want to express my deep gratitude to my committee co-chair and advisor Sal Nicolazzo. Without her support, I could not have finished this dissertation, or even found the tiny thread that would be spun into this project. She introduced me to Jane Barker's *A Patch-Work Screen for the Ladies* and pointed me towards the recipes within the text, which formed the starting point of my dissertation. Her work on eighteenth-century literature continues to be a source of inspiration. She always pushed me to make better and bigger claims in my writing, and I cannot thank her enough for it.

Similarly, I want to thank my other co-chair and advisor, Margaret Loose, from the bottom of my heart. She strengthened my interest in the intersection of literature and science. Her graduate seminar on pseudoscience was particularly forming for me and sparked my interest in the way language is used to present science. Her continual support and feedback on my writing have strengthened my work and made me a more confident writer. Her excitement about my research pushed me forward even when I found it difficult to write. I couldn't be more grateful to her.

I also want to thank the rest of my committee for their help and encouragement over the last six years. Todd Kontje helped me when I first started at UCSD as a graduate student and had to translate my German transcripts, and we bonded over the fact that he often visited the small

town next to my hometown in Germany. His feedback and help have been immensely appreciated, and being his student as well as teaching for him have been a pleasure. Similarly, I would like to thank Deborah Hertz, who has provided welcome feedback on my writing and offered a historian's perspective where I only looked at things from a literary perspective. Her course on European history has given me the opportunity to engage with scholars of a field closely aligned with mine but yet so far away. Lastly, I want to thank Oumelbanine Zhiri, who has graciously agreed to step in as a committee member at the very last minute, and I couldn't appreciate it more. The feedback she has given me on my coursework has opened up my view of literary works and their canon.

Additionally, I have received help in particular from the Lewis Walpole Library at Yale University, where I have had the opportunity to do research on both recipes and natural history with the help of a travel grant in the 2019-2020 academic year. I want to thank Nicole Bouché, the director of the Lewis Walpole Library, for giving me a warm welcome in Farmington, CT, and making me feel right at home. Similarly, Kristen McDonald and Scott Poglitsch have made the work in the reading room entertaining and stimulating as we discussed natural history and the crossover between science and literature. They have been tremendously helpful in finding sources and handling the materials. I also want to express my gratitude to Susan Walker, Tom Charette, and Michelle Privée for making my time in Farmington and the stay in the eighteenth-century house adjacent to the library as smooth as possible. I also want to thank Melissa Bailes for introducing me to a wider variety of natural history in the Romantic period and for taking me to lunch as I got myself situated. My stay at the Lewis Walpole Library has been a great experience, and I hope to return someday to expand upon my research.

I am deeply thankful to my academic "family" I have found in the Revelle Humanities Program at UCSD. I have learned more about teaching from Stephen Cox and Antony Lyon than I could have ever imagined, and I am sure to take their lessons with me wherever I go. Jessica Guttenberg, Deanna Wolf, and Alexandra Vargas have ensured that everything work-related was handled with care, and without them, I don't think I would have had such an enjoyable experience in the writing program. But the Humanities program has given me more than just professional experience. I have found my family away from home there. Words cannot express how grateful I am to be able to call Kailey Giordano, Matt Hall, Kalliopi Kefalas, Frances King, Waverly Tseng, Geoffrey West, and Tatiana Zavodny my friends. A simple "thank you" will have to suffice to show you how much your support and friendship means to me. I hope we never lose sight of each other. Similarly, there are no words to describe how much Sam Marrazzo's friendship has meant to me over the years since that first day at Clark University. Without your support and belief in me, I do not think I could have done this. Thank you.

Finally, my love goes to my family who, while far away, are always close to my heart. Without the support of my parents, Heike and Georg Böttcher, I could not have done any of this. They always believed in me, even when I failed, and I hope I make them proud. *Ich habe euch lieb*. While there are too many people to name here, I want to express my love and gratitude for my siblings, Bianca Jasper and Mario Naujocks, who have always shown me love and I cherish every moment. Oscar Böttcher is the small, but bright light guiding me through this process, and I can't wait to see what the world has in store for you. Without all of you, I couldn't have done any of this.

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ABSTRACT OF THE DISSERTATION

Women's Scientific Tools:
Scientific Material Practices in the Works of Margaret Cavendish, Jane Barker, and Charlotte Smith

by

Carolin Boettcher

Doctor of Philosophy in Literature

University of California San Diego, 2020

Professor Margaret Loose, Co-Chair
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While the influence of language on the literariness of scientific writing during the British Enlightenment has been established in recent scholarship, this dissertation focuses on the opposite direction of this relationship in the ways the material engagements of scientific tools and instruments has influenced and is reflected in women's writing both at the beginning of the eighteenth century and at the end of it. The materiality of the tools themselves plays into both the content and form of Margaret Cavendish's *The Description of a New World, Called The Blazing*

World, Jane Barker's *A Patch-Work Screen for the Ladies*, and Charlotte Smith's botanical poetry. At the heart of the argument are the ways in which women writers engage with the material-discursive practices of the microscope, the recipe, and the herbarium in their own production, mediation, and storage of knowledge and weave these practices into their writings and narratives. Cavendish, Barker, and Smith repurpose and reuse the materiality of these tools in their works, structuring form and content around them. Doing so also meant reinterpreting the information and knowledge generated through the tools. Seeing the connections between the materiality of the tools and instruments and the various modes of knowledge production and aesthetics that might seem to be completely disparate at first glance—the aesthetics and structural integrity of the recipe in the textile fiction of *A Patch-Work Screen for the Ladies* are one example—can actually produce completely new kinds of knowledge. Women, often taking on the role of managers of the household in the seventeenth and eighteenth centuries, had to find creative ways to store and explore their knowledge due to a lack of formal, institutional support. The material processes of mediating and storing knowledge through these tools play significant roles in these female-authored texts, being either the direct sources of criticism as in *The Blazing World* or influencing the form of the literary text as in *A Patch-Work Screen for the Ladies* and *Beachy Head*.

INTRODUCTION

Women's Scientific Tools

In the 1740s, Eliza Haywood prints a letter signed by *Philo-Naturæ* in *The Female Spectator*, in which the author endorses women's use of microscopes "which will show us such magnificent Apparel, and such delicate Trimming about the smallest Insects." He appeals to women's sense of fashion when he advocates for the use of "the Glasses which afford us so much Satisfaction [and which] are as portable as a Snuff-Box." *Philo-Naturæ* encourages women to use microscopes because "all those Curiosities, which are discoverable by the naked Eye, are infinitely short of those beyond it:—*Nature* has not given to our Sight the Power of discerning the Wonders of the minute Creation:—*Art*, therefore, must supply that Deficiency."[1] *Philo-Naturæ* gives advice that is readily taken up as the Female Spectator responds, "our little Society…will not go unfurnished with Microscopes, and other proper Glasses, in order to make those Inspections he recommends."[2] Microscopic observation has been transferred to the realm of women's pastimes and entertainment that will ensure and reinforce women's virtue and make them able to converse with and hold the interest of suitable men that they are supposed to entice into marriage. Even Robert Hooke had observed a similar attitude towards the microscope by the end of the seventeenth century. He writes, "I hear of none that make any other Use of that Instrument, but for Diversion and Pastime, and that by reason it is become a portable Instrument, and easy to be carried in one's Pocket."[3] The microscope offers a first glimpse into the

[1] Eliza Fowler Haywood, *Selections from The Female Spectator*, ed. Patricia Meyer Spacks (Oxford; New York, NY: Oxford University Press, 1999), 191.

[2] Haywood, 197.

[3] Robert Hooke, "Discourse Concerning Telescopes and Microscopes," in *Philosophical Experiments and Observations* (London, 1726), 261.

connection between certain natural philosophical and scientific tools and women in the eighteenth century. In particular, it is the microscope's own materiality that becomes the subject of discussion for both *Philo-Naturæ* and Robert Hooke.

During the eighteenth century, the literary and scientific worlds were closely connected, each materially influencing the other in its emergence of new methods and new genres. Scholars have shown the immense influence literariness had on the advent of scientific writing in the British Enlightenment.[4] This moment of literariness, however, also implies the process of mediation that establishes what Tita Chico calls "doubleness" of scientific writing being self-aware of its dual connection to "referent and sign that produces a way of knowing to reconcile the material and the imaginative."[5] While the influence of language on the literariness of scientific writing during the British Enlightenment has thus been established, the focus of this dissertation lies on the opposite direction of this relationship in the ways the material engagements of scientific tools and instruments has influenced and is reflected in women's writing both at the beginning of the eighteenth century and at the end of it. The materiality of the tools themselves plays into both the content and form of Margaret Cavendish's *The Description of a New World, Called The Blazing World*, Jane Barker's *A Patch-Work Screen for the Ladies*, and Charlotte Smith's botanical poetry. In particular, I look at the modes of material interaction of the tools at hand with the knowledge being produced. I will focus on women's writing during the eighteenth century and how the use of scientific tools—the microscope, the recipe, and the herbarium—materially shaped both the aesthetics and the contents of their writing. At the heart of the argument are the ways in which women writers engage with the material-discursive

[4] For a discussion of the connection between literariness and scientific writing in the eighteenth century, Tita Chico, *The Experimental Imagination: Literary Knowledge and Science in the British Enlightenment* (Stanford, CA: Stanford University Press, 2018).

[5] Chico, *Experimental Imagination*, 134.

practices of these tools in their own production, mediation, and storage of knowledge and weave them into their writings and narratives. The material processes of mediating and storing knowledge through these tools play significant roles in these female-authored texts, being either the direct sources of criticism as in *The Blazing World* or influencing the form of the literary text as in *A Patch-Work Screen for the Ladies* and *Beachy Head*.

The tools in question in this dissertation were relatively easy to access by women in the eighteenth century. The microscope quickly developed into a woman's accessory in the early parts of the century as shown earlier, the recipe was a staple in the management of the household, and the herbarium formed one way for women to more professionally engage with a mode of scientific inquiry available to them at the end of the eighteenth century and the beginning of the nineteenth century. These tools have found their ways from the laboratory into the household, or the other way around in the case of the recipe. The expansion of a tool's specific usage and application to other, initially unintended uses forms the backdrop to the argument about the tool's material influence on the process of storage and mediation of knowledge. The representation of this expansion, which can span from household management to the representation of a woman's virtue in women's writing, reaches its peak in its literary application in these texts. The material intersection between literature and science in these particular cases reflects the broad applications of scientific tools and instruments in both the seventeenth and eighteenth centuries. As "an idea cannot travel without being embodied,"[6] the materiality of both the scientific tools themselves as well as the literary writings of Cavendish, Barker, and Smith becomes the central focus of the presentation of knowledge. The connection to women's writing, in particular, emerges in the ubiquity of scientific inquiry in both the

[6] Simon Werrett, *Thrifty Science: Making the Most of Materials in the History of Experiment* (Chicago, IL: University of Chicago Press, 2019), 3.

household and laboratory, as well as the fashionable accessories and appropriate scientific inquiries for women.

Repurposing scientific tools and instruments in the household forms also the first step in the repurposing of their modes of knowledge production and their material contribution to the figuration and presentation of said knowledge. As Simon Werrett argues, the household in the seventeenth and eighteenth centuries functioned as a significant site of experimentation with regard to natural philosophy, especially for natural philosophers without access to larger sites of experimentation. This significance of the household in the production of knowledge also reflects a change in the way homes were built between the sixteenth and eighteenth centuries. The home in the eighteenth century "remained an open-ended, ambiguous space, in which it was not yet entirely determined how space should be divided and which activities belonged to which room."[7] One of the reasons for focusing on tools and space in their various use cases emerges when combining the epistemological character of knowledge production with the material realities of how knowledge is produced in the first place. Within this setting of the household as a central location for scientific experimentation, repurposing natural philosophical tools and instruments for new experiments shows both the longevity of and care for material possessions and the influence of these material possessions on the production and acquisition of knowledge. Because maintenance and care for the actual material of the scientific tools and instruments involved a lot

[7] Werrett, *Thrifty Science*, 45. Werrett is largely interested in the repurposing of scientific instruments, tools, and spaces in his work, which I extend to the literary sphere, into which particularly female authors in the eighteenth century extend the material involvement of the scientific tools to the epistemological realm. Steven Shapin has argued before about the home as a site of experimentation in Steven Shapin, "The House of Experiment in Seventeenth-Century England," Isis 79, no. 3 (1988): 373–404. Similarly, Alix Cooper has argued for a more sustained attention to the domestic sphere in the production of scientific knowledge in the seventeenth and eighteenth centuries in Alix Cooper, "Homes and Households," in *The Cambridge History of Science*, ed. Katharine Park and Lorraine Daston, vol. 3: *Early Modern Science* (Cambridge: Cambridge University Press, 2006), 224–37. A more recent overview of the domestic space in scientific experimentation can be found in the collection of essays in Donald L. Opitz, Staffan Bergwik, and Brigitte Van Tiggelen, eds., *Domesticity in the Making of Modern Science* (London: Palgrave Macmillan UK, 2016), https://doi.org/10.1057/9781137492739.

of work, the entire household was usually tasked with separate parts of taking care of these tools and spaces, with women most likely being deeply involved in these activities.[8]

The process of repurposing and reusing materials and tools in various sets of circumstances always also meant reinterpreting the information and knowledge generated through the tools. Seeing the connections between the materiality of the tools and instruments and the various modes of knowledge production and aesthetics that might seem to be completely disparate at first glance—the aesthetics and structural integrity of the recipe in the textile fiction of *A Patch-Work Screen for the Ladies* are one example—can actually produce new kinds of knowledge than they would have in their intended purpose. Women, often taking on the role of managers of the household in the seventeenth and eighteenth centuries, had to find creative ways to store and explore their knowledge due to a lack of formal, institutional support. In this situation, they often used knowledge and information practices that were readily available to them in their chores and pastimes to create their stores of knowledge. They observed nature through microscopes and magnifying glasses they could carry on their person as fashionable accessories; they collected and shared recipes with friends and acquaintances; and they collected and illustrated plants they encountered on their walks through their gardens and the countryside. Microscopes, recipes, and herbaria proved to be available to women exactly because they were deemed, beyond their initial philosophical and scientific purposes, useful for women in their own creation of networks of knowledge and in running their households.

[8] Werrett, *Thrifty Science*, 87. For the contribution of women to the natural philosophical and scientific inquiries conducted in the household, see also Patricia Fara, *Pandora's Breeches: Women, Science & Power in the Enlightenment* (London: Pimlico, 2004). Patricia Fara has, for example, studied at length the women behind the men throughout the sixteenth, seventeenth, and eighteenth centuries and shown how vital they actually were to the scientific discoveries that were attributed to the men in their lives.

The widespread nature of the tools in question here and repurposing them for other usages makes the shift to literary treatments of their material engagements with knowledge production easier for women writers. Caught at the intersection of scientific work and their own unique situations as women not fitting into the mold they should fit into—Margaret Cavendish devised her own natural philosophy and was the first woman to visit the Royal Society in London; Jane Barker was an unmarried, Catholic woman fending for herself; and Charlotte Smith used her writing to keep herself and her children afloat—these women writers incorporate the materiality of the microscope, recipe, and herbarium into their literary works. Influencing both the content and form of these women's writings, the scientific tools fully emerge as what Karan Barad terms "ontoepistemological."[9] Their materiality is transposed to and entangled with the knowledge these women writers produce and engage with in their literary works. Repurposing these scientific tools in literary works, then, offers the reader a vision of the entangled character of materiality and knowledge, science and literature, and women and the natural world. As a consequence of the various use cases of the microscope, the recipe, and the herbarium, I have also chosen to use the term "tool" to describe them rather than the term "instrument." Where instrument often implies dedicated, limited purposes,[10] tool emphasizes the material process to get from one point to the other and offers a broader category of understanding that mirrors the varied character of the tools under investigation in this dissertation. Tools helped people on a material level—they improved people's lives. Cavendish, Barker, and Smith incorporating these tools into their literary works bring their poetry and narratives back to the material grounding of the natural world around them. Their works create and highlight the

[9] Karen Michelle Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007).

[10] Werrett, *Thrifty Science*, 6.

materiality of the tools themselves and their contribution to the knowledge they create and offer to people.[11] They do so to show their own engagement with and understanding of the natural world as well as the entangled character of knowledge and its material expressions.

Women writers' engagement with the material world did not emerge in a vacuum. Instead, the literary works in this dissertation develop out of a changed relationship with the natural world coming out of the Renaissance. In fact, the emphasis on the material world and how people can use it to improve their lives during the Enlightenment and the Romantic period is a direct consequence of the evolution of scientific thinking during the early modern period and the Renaissance. The change from deductive to inductive reasoning after Francis Bacon goes hand in hand with the focus on the material reality.[12] Lived reality and dealing with one's physical and material boundaries becomes the central focus for women in the eighteenth century.[13] This focus on the material lives of women in the scholarship of the last few decades

[11] David Alff makes a similar argument about improvement projects in the seventeenth and eighteenth centuries that emerged as "a kind of writing that sought to realize itself through action" in David Alff, *The Wreckage of Intentions: Projects in British Culture,1660-1730* (Philadelphia, PA: University of Pennsylvania Press, 2017), 58. The women writers at the heart of this dissertation do something similar in their materiality-turned-aesthetic and presentation of material knowledge—whether they actually support the tool itself or oppose it entirely because of its materialism—in that they turn the materiality of knowledge into the centrals claims of their writings as they pertain to natural philosophy and science.

[12] For more general discussions of the shifts in natural philosophy after Francis Bacon in the seventeenth century, see Steven Shapin, *Never Pure: Historical Studies of Science as If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority* (Baltimore, MD: Johns Hopkins University Press, 2010), and Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton, NJ: Princeton University Press, 2011). For a more specific discussion about Margaret Cavendish and Francis Bacon, see Todd Andrew Borlik, "The Whale under the Microscope: Technology and Objectivity in Two Renaissance Utopias," in *Philosophies of Technology: Francis Bacon and His Contemporaries*, ed. Claus Zittel et al. (Leiden; Boston, MA: Brill, 2008), 231–49.

[13] For a discussion of the lived reality of women in the eighteenth century, see Chloe Wigston Smith, *Women, Work, and Clothes in the Eighteenth-Century Novel* (Cambridge: Cambridge University Press, 2013). Chloe Wigston Smith furthermore argues for a stronger focus on the actual material objects that women work with and that shape their lives instead of focusing largely on women leaving these objects behind in "Gender and the Material Turn," in *Women's Writing, 1660–1830: Feminism and Futures*, ed. Jennie Batchelor and Gillian Dow (London: Palgrave Macmillan, 2016), 159–78. For another overview of women and their engagement with the material world around them, see Jennie Batchelor and Cora Kaplan, eds., *Women and Material Culture, 1660–1830* (London: Palgrave Macmillan UK, 2007), https://doi.org/10.1057/9780230223097. For a more global perspective which spans a larger timespan, see the collection by Maureen Daly Goggin and Beth Fowkes Tobin, eds., *Women and Things, 1750–1950: Gendered Material Strategies* (New York, NY: Routledge, 2016).

reveals, on the one hand, the importance of the material objects women interacted with, and, on the other hand, it also points to a larger cultural connection between the emergence and consolidation of the new science in the seventeenth and eighteenth centuries and the literary excursions of women's writing.

Situating Cavendish, Barker, and Smith within this context of transposing the lived, material reality as it relates to natural philosophy and science into their writings offers a reading of these texts within a framework of knowledge that parallels epistemology and ontology as inseparable and entangled with each other. The focus on new materialism in the last few decades arose in many cases out of an interest in the relationship between women writers and their engagements with the natural world around them.[14] Cavendish, Barker, and Smith provide their readers with an understanding of the natural world that proposes an entanglement between epistemology and ontology that favors or elevates neither one of them. Their representations of the materiality of the microscope, the recipe, and the herbarium and its contribution to the knowledge being produced underline the interaction and equality to both thought and materiality in the process of doing so. They fall under a branch of new materialism that recognizes the agency of the material world without infusing it with vitalist notions itself, as doing so would imply a preexisting epistemological category.[15]

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[14] For general overviews of new materialism, see Liedeke Plate, "New Materialisms," in *Oxford Research Encyclopedia of Literature* (Oxford: Oxford University Press, 2020), https://doi.org/10.1093/acrefore/9780190201098.013.1013; and Christopher N. Gamble, Joshua S. Hanan, and Thomas Nail, "What Is New Materialism?," *Angelaki* 24, no. 6 (November 2, 2019): 111–34, https://doi.org/10.1080/0969725X.2019.1684704. Gamble, Hanan, and Nail identify various strands in new materialism that are not compatible with each other. They argue that the framework needs to be more defined in order to be productively used in the humanities. Ultimately, they argue in support of performative new materialism that avoids anthropocentric worldview that posits matter as secondary to human exceptionalism. For further discussions about the connections between materialism and feminism, see Stacy Alaimo, *Undomesticated Ground: Recasting Nature as Feminist Space* (Ithaca, NY: Cornell University Press, 2000); Stacy Alaimo, *Bodily Natures: Science, Environment, and the Material Self* (Bloomington, IN: Indiana University Press, 2010); Stacy Alaimo and Susan J. Hekman, eds., *Material Feminisms* (Bloomington, IN: Indiana University Press, 2008).

[15] For discussions of this performative new materialism, see Barad, *Meeting the Universe Halfway*; Vicki Kirby, *Quantum Anthropologies: Life at Large* (Durham, NC: Duke University Press, 2011); and Vicki Kirby,

A new materialist understanding of the ties between women's writing in the seventeenth and eighteenth centuries and scientific tools and practices opens up an avenue that has so far only been hinted at in the scholarship. While *The Blazing World*, *A Patch-Work Screen for the Ladies*, and *Beachy Head* have been brought into conversations of natural philosophy and literary works, the materiality of the tools themselves influencing their content and form has not been the focus. Making the tools' materiality central to my argument, however, opens up a more refined understanding of women's engagement with the natural world around them as well as their social networks in relation to the production and acquisition of knowledge. Positing the microscope, the recipe, and the herbarium, while very distinct tools at separate ends of the eighteenth century, as part of the material production of these literary texts offers a contextualization of women engaging with a field from which they were largely, professionally barred—natural philosophy—and their understanding of the reciprocal nature of literature and science. Karen Barad writes about scientific tools and instruments that "apparatuses are not mere instruments or devices that can be deployed as neutral probes of the natural world, or determining structures of a social nature, but neither are they merely laboratory instruments or social forces that function in a performative mode."[16] Where the influence of literary knowledge on scientific work and its representations in the seventeenth and eighteenth centuries has been shown, I want to further establish the entangled nature of literature and science in this time period by presenting readings of these three women writers' works that highlight the opposite direction: natural philosophy and science directly influencing the literary output of Cavendish, Barker, and Smith through material

"Matter out of Place: 'New Materialism' in Review," in *What If Culture Was Nature All Along?*, ed. Vicki Kirby (Edinburgh: Edinburgh University Press, 2017), 1–25. Vitalist understandings of materialism sidestep the problem of matter, as Gamble, Hanan, and Nail point out. The biggest proponent of vitalist new materialism is Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke University Press, 2010); Elizabeth Grosz, *The Incorporeal: Ontology, Ethics, and the Limits of Materialism* (New York, NY: Columbia University Press, 2017), https://doi.org/10.7312/gros18162.

[16] Barad, *Meeting the Universe Halfway*, 142.

practices. Just as Tita Chico argues that the tools of literature—metaphor, imagery, rhetorical devices—influence and shape the representations of scientific knowledge in the British Enlightenment,[17] I argue that the tools of natural philosophy and science influence women's writing in particular because of these women's materialist understanding of the natural world and through the materiality of the tools' practices. Ultimately, Cavendish, Barker, and Smith complete the cyclical relationship between material scientific practices and literary language when they employ the literariness of scientific knowledge to present their own ideas of the world.

The Relationship between Literature and Science

While the connection between science and literature across both the early modern period and the eighteenth century has been established,[18] this dissertation aims to deepen the understanding of this relationship through a focus on the material engagement of women writers with practices of natural philosophy and science. One of the main topics of engagement between literature and science or literature and natural philosophy is the literariness of the presentation

[17] Chico, *The Experimental Imagination*, 25–32.

[18] Karen Bloom Gevirtz, for example, establishes a connection between early novels of women writers and the epistemological categories established in natural philosophy in *Women, the Novel, and Natural Philosophy, 1660–1727* (New York, NY: Palgrave Macmillan, 2014). Most recently Tita Chico has argued for the influence of literary language on the establishment of science in the British Enlightenment in *The Experimental Imagination*. Another instance of the emphasis on the connection between science and literature is the collection by Howard Marchitello and Evelyn Tribble, eds., *The Palgrave Handbook of Early Modern Literature and Science* (London: Palgrave Macmillan, 2017). The following list is by no mean exhaustive, but other studies of the relationship between literature and science are, for example: Marjorie Nicolson, *Science and Imagination* (Ithaca, NY: Great Seal Books, 1956); Robert C. Leitz and Kevin Lee Cope, eds., *Imagining the Sciences: Expressions of New Knowledge in the "Long" Eighteenth Century* (New York, NY: AMS Press, 2004); Frédérique Aït-Touati, *Fictions of the Cosmos: Science and Literature in the Seventeenth Century*, trans. Susan Emanuel (Chicago, IL: University of Chicago Press, 2011); Juliet Cummins and David Burchell, eds., *Science, Literature and Rhetoric in Early Modern England* (New York, NY: Routledge, 2016), https://doi.org/10.4324/9781315243689; Helen Thompson, *Fictional Matter: Empiricism, Corpuscles, and the Novel* (Philadelphia, PA: University of Pennsylvania Press, 2017). Also see Joseph Drury, *Novel Machines: Technology and Narrative Form in Enlightenment Britain*, First edition (Oxford; New York, NY: Oxford University Press, 2017).

and representation of scientific knowledge. In the other direction, from science to literature, the scholarship often focuses on the epistemological relationship between scientific and philosophical knowledge finding its way into literary texts in the seventeenth and eighteenth centuries. Even though the relationship between literature and science has thus been the subject of sustained scholarship throughout the last few decades, there needs to be a more detailed look at the material-discursive practices of natural philosophy and science as they are incorporated into women's writing of the seventeenth and eighteenth centuries to investigate the material relationships between literature and natural philosophy further.

The relationship among the language of science, literary works, and the material world natural philosophers and writers engage with also underpins this present study. I round out this relationship by adding the material objects through which one arrives at scientific knowledge as models for the epistemological and ontological characters of the literary works of Margaret Cavendish, Jane Barker, and Charlotte Smith. Scientific writing as a representation of the material world self-consciously references its own mediation as information moves between the material world and the knowledge we collect about it. Expressed through the literariness of scientific language in the seventeenth and eighteenth centuries, scientific knowledge thus depends on its own representation to be accessible. However, material scientific practices, in turn, also shape the ways in which literary texts could experiment with and incorporate scientific knowledge into their narrative and form. The microscope, the recipe, and the herbarium at the heart of this dissertation find their ways into *The Blazing World*, *A Patch-Work Screen for the Ladies*, and *Beachy Head*.

All three tools in this dissertation play a significant role in the development of natural philosophy from the end of the early modern period to the Romantic period. They shaped the

discourse about natural philosophy and its project more generally but also showed the shortcomings of the production of knowledge and its material foundation. The recipe and the herbarium, in particular, are marked by their own versatility in use because they do not fall into rigid structures. The microscope, despite its downfall towards the end of the seventeenth century and the beginning of the eighteenth century, never actually fell completely out of use before its establishment as a control tool in the early nineteenth century.[19] The microscope took on a central role both in natural philosophy and literature in the last few decades of the seventeenth century and the first forty years of the eighteenth century. As such, the microscope, propelled to fame by Robert Hooke's *Micrographia* (1665), offers a glimpse of the subvisible world. Caught between criticism of uselessness and being too small to have any impact, the knowledge generated by microscopic and other optical observation quickly became a source for satire similar to the satirical treatment of the natural philosophers who were caught in this observation of the minutest details. Nevertheless, the microscope became almost ubiquitous in its use as more and more portable versions were designed, and women actually used them as fashionable accessories by the mid-eighteenth century.

More variable than the microscope in its use and application, the recipe and the herbarium do not become the subjects of satire in the same way. As I argue in this dissertation, they are still tools that influence both the form and the content of literary works through their material engagement with the world around them. The recipe had always been a tool on the cusp of domestic and natural philosophical use from the early modern period on. Only by the mid- to late eighteenth century did the recipe become firmly established within the field of cookery.

[19] For the rise of the microscope towards the end of the eighteenth century and the early nineteenth century, see Jutta Schickore, *The Microscope and the Eye: A History of Reflections, 1740-1870* (Chicago, IL: University of Chicago Press, 2007).

Before that, however, recipe collections included everything from culinary recipes to medical recipes to instructions on how to plant certain fruits and vegetables. Often, the entire household contributed to recipe collections and rich networks of knowledge exchange underpinned the management of the household through such collections. As a tool, the recipe was highly variable and followed only few standard regulations regarding its format. Jane Barker's *A Patch-Work Screen for the Ladies* employs the recipe collection as an underlying metaphor for the formal aspects and contents of the novel. Barker makes use of the various applications of the recipe—both in a professional and a domestic setting—and its materiality takes on a textile dress to simultaneously also obscure and elevate the more professional and medical aspects.

Similarly, the herbarium straddles the divide between the professional and lay application of its structure. The herbarium was most professionally used by people such as Carl Linnaeus and Sir Hans Sloane. However, because of the ease of drying plants and accessing those plants in the first place, women could have their own smaller herbaria at home. Additionally, the herbarium acts as the most materially self-conscious of these three tools as it directly connects its material object with the knowledge it produces. As such, reading Charlotte Smith's poetry through the herbarium as a scientific tool in the Romantic period and connecting it to new materialism as well as Lucretian materialism presents the reader with an epistemology that is grounded in its material reality, manifesting itself in each moment through a combination of knowledge and materialism and the interaction between the human and the nonhuman worlds. The three tools in this dissertation are not necessarily more important than other tools in the eighteenth century; however, they all have in common their connection to and interaction with the material world. It is exactly this materialism that we see play out in the writings of Margaret Cavendish, Jane Barker, and Charlotte Smith.

Women's Writing and Science

Based on their literary output, women writers establish themselves in the seventeenth and eighteenth centuries. In particular, the growth in the number of women's writers publishing their works during this time coincides with the institutionalization and specialization of natural philosophy. Karen Bloom Gevirtz, for example, argues that women's novelistic construction of the self goes hand in hand with the discoveries in natural philosophy in the latter decades of the seventeenth century and the first three decades of the eighteenth century.[20] Her work in particular focuses on narrative representations of the self, but her argument is part of a longer trajectory about the relationship between women, science, and literature. Her argument builds on the connection between the advent of women's writing in the seventeenth and eighteenth centuries and the codification of natural philosophy and science.[21] While women were always in some way connected to the development of natural philosophy and science during the seventeenth and eighteenth centuries—even if only to be used as metaphors by the men who supposedly were at the forefront of natural philosophy—the recent decades have shown that women also found themselves at the juncture of literature and science in unique and material ways.

[20] Karen Bloom Gevirtz, *Women, the Novel, and Natural Philosophy, 1660–1727*. Gevirtz's argument in the chapter "The Detached Observer" (101–26) goes along with the argument that both Lynch and Gallagher provide in that women writers "play" the marketplace and seem to take themselves out of their writing (i.e., they are absent). Gevirtz focuses on the claim to objectivity that followed the members of the Royal Society such as Isaac Newton and Robert Boyle. According to Gevirtz, the women writers she investigates also act as "detached observers" in their writings while constructing the self of their characters.

[21] In particular, Londa Schiebinger has paved the way for the discussion of the relationship between science and gender, see Londa L. Schiebinger, *The Mind Has No Sex?: Women in the Origins of Modern Science* (Cambridge, MA: Harvard University Press, 1989); Londa L. Schiebinger, *Nature's Body: Gender in the Making of Modern Science* (Boston, MA: Beacon Press, 1993); and Londa L. Schiebinger, *Has Feminism Changed Science?* (Cambridge, MA: Harvard University Press, 1999). Similarly, Carolyn Merchant has established the connection between women and nature in the emergence of science as we understand it today in Carolyn Merchant, *The Death of Nature* (New York, NY: HarperOne, 2019). See also Carolyn Merchant, *Science and Nature: Past, Present, and Future* (New York, NY: Routledge, 2018).

As mentioned above, women were able to both shape and explore more practical aspects of scientific inquiry as managers of the household.[22] In response to this close relationship between women and scientific material practices in the household, it is important to engage with the influence of natural philosophy and how it materializes in women's literary output. The recipe, as the most domestic of the three tools at the heart of this dissertation, exemplifies this relationship most clearly. Women kept the recipe collections comprising medical and culinary recipes as a support system for the household, especially in rural regions. The recipe collection, however, was also a staple for natural philosophers interested in chemistry, for example. The recipe and its collections become almost ubiquitous tools in the management of the household and the early work in natural philosophy throughout the seventeenth century.[23] The practical application of scientific findings or even making new discoveries through experimentation in the household shows the influence women could potentially have on the practicalities of science in their everyday lives. Being witness to and assisting in experiments being conducted in the household, women had clear access to the tools and their material configuration as a source for literary inspiration.

However, women in the seventeenth and eighteenth centuries did not only come into contact with natural philosophy and science within the domestic sphere. Instead, they also engaged with new trends of knowledge production in a more public setting as well. Aphra Behn,

[22] The connection between women and the material world has been the subject of recent studies, such as Smith, *Women, Work, and Clothes in the Eighteenth-Century Novel*; and Smith, "Gender and the Material Turn"; Batchelor and Kaplan, *Women and Material Culture, 1660–1830*.

[23] For discussions on the recipe in the early modern period, see Elaine Leong, *Recipes and Everyday Knowledge: Medicine, Science, and the Household in Early Modern England* (Chicago, IL: University of Chicago Press, 2018); Elaine Leong, "Collecting Knowledge for the Family: Recipes, Gender and Practical Knowledge in the Early Modern English Household," *Centaurus* 55, no. 2 (2013): 81–103, https://doi.org/10.1111/1600-0498.12019; Elaine Leong, "'Herbals She Peruseth': Reading Medicine in Early Modern England," *Renaissance Studies* 28, no. 4 (2014): 556–78, https://doi.org/10.1111/rest.12079. For a larger overview, see also Michelle DiMeo and Sara Pennell, eds., *Reading and Writing Recipe Books, 1550–1800* (Manchester: Manchester University Press, 2013).

in *The Emperor of the Moon* (1687), for example, offers a critical view of experimental philosophy that almost directly mirrors Margaret Cavendish's criticism. Dr. Baliardo's obsession with the observations of the empire on the moon through his ridiculously-shaped, twenty-foot long telescope offers the theatergoers a similarly biting assessment of experimental philosophy like Cavendish's treatment of the bear-men in *The Blazing World*.[24] Margaret Cavendish was thus not the only female author during the Restoration period to satirize both experimental philosophy itself and the tools inherent to this work. Part of a larger trend of writers lampooning the craze for experimental philosophy in the latter half of the seventeenth century and the beginning of the eighteenth century, Cavendish falls into line with authors such as Thomas Shadwell and his play *The Virtuoso* (1676), beginning a long line of satirical treatment of experimental philosophy that reaches well into the eighteenth century with, for example, Jonathan Swift's *Gulliver's Travels* (1726). Women writers during this time period appear to have an easier time engaging with the materiality of scientific practices through a literary context instead of trying to break into the field of natural philosophy itself.

In the recent decades, Margaret Cavendish, Jane Barker, and Charlotte Smith have become the subject of more sustained scholarly discussions that situate them within the literary canon of the eighteenth century in women's writing before bringing them to more widespread conversations. Cavendish's work bridges the border between the early modern period and the beginnings of early eighteenth-century literary and philosophical work. *The Blazing World*, in conjunction with *Observations upon Experimental Philosophy*, offers the reader a precursor to what would later become science fiction and paved the way for Mary Shelley's *Frankenstein* (1818). As a divisive figure in the seventeenth century both in her philosophy and her literature,

[24] Aphra Behn, *The Emperor of the Moon*, in *The Rover and Other Plays*, ed. Jane Spencer (Oxford; New York, NY: Oxford University Press, 2008), 283.

Margaret Cavendish takes on a special role in the study of seventeenth-century women's writing. From poetry in *Poems & Fancies* (1653) to philosophical and fictional prose as in the texts central to this dissertation, Cavendish has a body of work that positions itself within the conversations of natural philosophers as simultaneously part of and distinct from them. As one of the more prolific writers in the seventeenth century, Cavendish has become a staple in both literary and philosophical scholarship dedicated to her over the last few decades.[25]

Barker's work, in contrast, has particularly been an object of study because of its experimental form and her connection to science and natural philosophy. However, the form of *A Patch-Work Screen for the Ladies* has not yet been brought into conversation with the scientific material practice of recipes and recipe collections at the time. The recipes in Barker's novel have often been glossed over and not viewed as vital material components of the narrative structure itself in the *Patch-Work Screen*. As I have previously stated, the role of recipes and recipe collections in the process of knowledge production in the early modern period and the eighteenth century have in recent times become the subject of sustained studies; Barker's text offers the reader insight into the material-discursive practices of natural philosophy and science as they can be fictionalized and become the central metaphor of a fictional text. Barker's work has, through its experimental nature, created its own space within eighteenth-century studies.

Particularly within the early eighteenth century, Barker's *Galesia Trilogy* stands out as simultaneously going with and against the grain of amatory fiction. Jane Barker firmly established herself within the ranks of such authors as Aphra Behn, Delarivier Manley, and Eliza

[25] Some of the works written about Margaret Cavendish and her work are: Anna Battigelli, *Margaret Cavendish and the Exiles of the Mind* (Lexington, KY: University Press of Kentucky, 1998); David Cunning, *Cavendish* (New York, NY: Routledge, 2016); Emma L. E. Rees, *Margaret Cavendish: Gender, Genre, Exile* (Manchester: Manchester University Press, 2004); Lisa T. Sarasohn, *The Natural Philosophy of Margaret Cavendish: Reason and Fancy During the Scientific Revolution* (Baltimore, MD: Johns Hopkins University Press, 2010); Brandie R. Siegfried and Lisa T. Sarasohn, eds., *God and Nature in the Thought of Margaret Cavendish* (New York, NY: Routledge, 2016), https://doi.org/10.15713/ins.mmj.3.

Haywood whose novels and dramas often centered around stories of seduction in which both men and women could be seen as manipulative characters.[26] Galesia's story starts out glaringly similar to other amatory fiction in the first part of the trilogy, *Love Intrigues: or, the History of the Amours of Bosvil and Galesia* (1713). However, in the *Patch-Work Screen*, the second installment of the trilogy, Barker offers Galesia as a character who, in the face of disappointment and possible spinsterhood, finds solace in the combination of natural philosophy and domestic work both literally and metaphorically in the text of the *Patch-Work Screen*.

Similar to Cavendish and Barker, Charlotte Smith has moved into the focus of literary scholarship in the last few decades, especially in terms of studies of early Romantic writing and the overlap between science and literature at the end of the eighteenth and beginning of the nineteenth centuries. Smith's later poetry, situated within British Romanticism,[27] offers a distinct view of women's Romantic engagement with the natural world. In particular, however, Smith's poetry shows a distinct affinity for botany that was exemplary for the early Romantic period between about 1790 and 1810. Smith's most direct influence in botanical poetry was Erasmus Darwin, even though, in her own engagement with botany, she was less interested in the sexual

[26] For discussions of amatory fiction and its role in women's writing, see Rosalind Ballaster, *Seductive Forms: Women's Amatory Fiction from 1684 to 1740* (Oxford: Clarendon Press, 1998); Barbara M. Benedict, "The Curious Genre: Female Inquiry in Amatory Fiction," *Studies in the Novel* 30, no. 2 (1998): 194–210; Toni Bowers, *Force or Fraud: British Seduction Stories and the Problem of Resistance, 1660-1760* (Oxford; New York, NY: Oxford University Press, 2011); Paul Kelleher, *Making Love: Sentiment and Sexuality in Eighteenth-Century British Literature* (Lewisburg, PA: Bucknell University Press, 2015). For a more recent discussion of the role of erotic fiction in the early eighteenth century, see also Toni Bowers, "Erotic Love," in *The History of British Women's Writing, 1690 - 1750*, ed. Ros Ballaster, vol. 4 (London: Palgrave Macmillan UK, 2010), 201–14. For a particular discussion of Aphra Behn's amatory fiction, see Margarete Rubik, "Excess and Artifice: The Depiction of the Emotions in Aphra Behn's Amatory Fiction," *Women's Writing* 27, no. 3 (2020): 377–92, https://doi.org/10.1080/09699082.2020.1748821.

[27] For discussions of Charlotte Smith's place in British Romanticism, see, for example, Stuart Curran, "Charlotte Smith and British Romanticism," *South Central Review* 11, no. 2 (1994): 66–78, https://doi.org/10.2307/3189989. Jacqueline M. Labbe, *Charlotte Smith: Romanticism, Poetry and the Culture of Gender* (Manchester: Manchester University Press, 2003); Jacqueline M. Labbe, *Writing Romanticism: Charlotte Smith and William Wordsworth*, 1784-1807 (London: Palgrave Macmillan, 2011). For a more general discussion of women poets of the Romantic period, see the collection of essays in Lilla Maria Crisafulli and Cecilia Pietropoli, eds., *Romantic Women Poets: Genre and Gender* (Leiden: Brill, 2007).

nature of botany. Instead, she finds herself at the crossroads of Darwin's poetry and that of Anna Seward, Darwin's biographer and Smith's competitor.[28] Described by William Wordsworth as the first Romantic poet, Charlotte Smith takes on a central role in Romantic poetry and *Beachy Head* alongside other, shorter poems of hers that deal explicitly with a view of the natural world in which botany and a more scientific understanding of the plant life surrounding the lyrical persona in each poem take on a central role.

Reading Margaret Cavendish's, Jane Barker's, and Charlotte Smith's works with an eye to the materiality of the scientific tools that underlie the production of these narratives and poems reveals the cyclical dynamic between natural philosophical and scientific knowledge and literary expression. Not only did early modern and eighteenth-century natural philosophy betray its own literariness, but, in turn, the literary output of these three women writers demonstrates the influence the material practices of natural philosophy and science had on both the content and the form of their works. While these three authors offer by no means a comprehensive account of the influence of the materiality of scientific tools and practices on literary writing, they provide the reader with insight into the intricate relationships between natural philosophy and literature. This material influence beginning in the seventeenth century with Margaret Cavendish and moving through to the early eighteenth century in Jane Barker's work also becomes visible in Charlotte Smith's poetry in the Romantic period.[29] Despite the move towards a strengthened

[28] For a further discussion of Anna Seward's work, see, for example, Norma Clarke, "Anna Seward: Swan, Duckling or Goose?," in *British Women's Writing in the Long Eighteenth Century*, ed. Jennie Batchelor and Cora Kaplan (London: Palgrave Macmillan UK, 2005), 34–47, https://doi.org/10.1057/9780230595972_3; Claudia T. Kairoff, *Anna Seward and the End of the Eighteenth Century* (Baltimore, MD: Johns Hopkins University Press, 2011). For the connection to Erasmus Darwin, see Sam George, "Carl Linnaeus, Erasmus Darwin and Anna Seward: Botanical Poetry and Female Education," *Science & Education* 23, no. 3 (2014): 673–94, https://doi.org/10.1007/s11191-014-9677-y; and Noel Jackson, "Rhyme and Reason: Erasmus Darwin's Romanticism," *Modern Language Quarterly* 70, no. 2 (2009): 171–94, https://doi.org/10.1215/00267929-2008-036.

[29] Particularly Barker and Smith also take on a distinct role in the history of women's writing in the eighteenth century as they made their living by writing literary works and publishing them. Both were keenly aware of the economic impacts writing had on their lives. See Deidre Lynch, *The Economy of Character: Novels, Market*

focus on women writers in the context of natural philosophy and science in the eighteenth century, the literary application of scientific practices in both the content and form needs to be investigated further. This dissertation aims to highlight the reciprocal character of knowledge production through material means in both natural philosophy and literature.

Chapter Overview

In Chapter 1 of this dissertation, the microscope acts as the central scientific tool influencing both Margaret Cavendish's philosophical and literary works in *Observations upon Experimental Observation* and *The Blazing World*. Cavendish's distaste for experimental philosophy and optical tools such as the microscope and the telescope becomes most apparent in these conjoined works. In *Observations*, Cavendish lays out her own philosophy of materialism in response to experimental philosophy, and she shows through her engagement with optical instruments and tools experimental philosophers used that the microscope's prosthetic function only resulted in exacerbating the shortcomings of human senses. After situating Cavendish's works within the history of the microscope—one marked by a rapid rise and a just as rapid fall—I show that the materiality of the microscope takes on a special role in both *Observations* and *The Blazing World* because the microscope is, along with the telescope, the only experimental tool directly mentioned and engaged with in these texts. I argue in this chapter that Cavendish deploys the material interference of the microscope in *Observations upon Experimental Philosophy* and *The Blazing World* to bolster her own conception of materialism. The central

Culture, and the Business of Inner Meaning (Chicago: University of Chicago Press, 1998) and Catherine Gallagher, *Nobody's Story: The Vanishing Acts of Women Writers in the Marketplace, 1670-1920* (Berkeley, CA: University of California Press, 1995). Both Lynch and Gallagher point to the economic aspects that influence women's writing in the eighteenth century. Their characters are often plagued by the financial hardships they face, and, for Gallagher, this goes even further to codifying one's existence through the signifier of the language.

arguments against the microscope that emerge in Cavendish's writing are the material-discursive influence of the microscope on the information gathered about the natural world and the triviality of the objects in the subvisible world. Magnifying insects, for example, materially changes them for Cavendish in these texts and actually makes them more dangerous. Ultimately, I argue that Cavendish views the material interference of the microscope as a threat to established order, both on a political and a social level.

In Chapter 2, Jane Barker's *A Patch-Work Screen for the Ladies*, the second installment of the *Galesia Trilogy*, takes center stage. I offer a new material outlook that presents the recipes as integral parts of the narrative with regard to the form of the experimental novel. At first glance, the recipes appear to be disconnected from the rest of the narrative and only provide the reader with domestic anecdotes that do not expand the experimental character of the narrative. However, in conjunction with the patchwork aesthetic of the novel itself, the recipes take on a deeper meaning. I argue that the patchwork underlying the novel is not only a sartorial metaphor but also takes on the form and aesthetics of a recipe collection of the seventeenth and eighteenth centuries. I bring the *Patch-Work Screen* into conversation with research on the history of the recipe both within a domestic context and with an eye towards the connection to natural philosophy and, in particular, medicine. Because of its episodic character, the *Patch-Work Screen* is not only a sewn-together collection of poetry and short stories embedded within a frame narrative, but it also serves as an expandable collection of knowledge. Barker addresses such topics as medicine, natural philosophy, romantic relationships, engagement with the natural world, and economics in one case. In this chapter, I argue that the recipe collection, with its broad scope of topics and its multiplicity of authorship, offers an alternative interpretive framework for the *Patch-Work Screen*. Additionally, using the recipe and the recipe collection as

frameworks for the novel situates Barker's work firmly at the intersection between domestic and scientific work on a formal level that mirrors the content of the *Patch-Work Screen*, and Barker herself as an authority figure within the medical field.

In the final chapter of this dissertation, I argue that Charlotte Smith's interest in professional botany is expressed through the material qualities of the herbarium in *Beachy Head* and other poems. In Smith's poetry, the material figuration of botanical knowledge presents the reader with a less sterile composition of knowledge than the dried plant specimens mounted on sheets of paper could offer, and yet, Smith takes part in the professional setting of natural history and botany in particular in her poetry. The power of her poetic figuration of said knowledge rests in the combination of verse and prose notes, which often reference Latin binomials and works of natural history. Situating Smith's poetry within the entanglement of epistemology and ontology present in Karen Barad's new materialism as well as Lucretian materialism, I argue that Smith's material engagement with the natural world manifests itself in the combination of the verse and notes and demonstrates her understanding of humanity being part of the natural world without dominating it. Rather, both nature and humanity find themselves in an entangled relationship that materializes in each given moment without providing any hierarchy to either one of them. The nonhuman and human worlds of Charlotte Smith's poetry are materially entwined with each other, and, through her poetry. Smith crafts a literary herbarium that takes on the material qualities of traditional herbaria while also denying human dominance of the natural world.

CHAPTER 1

"Like a High Heel to a Short Leg:"

Microscopes, Materialism, and the Threats to Political and Social Order in Margaret Cavendish's *Observations upon Experimental Philosophy* and *The Blazing World*

The rise and fall of the microscope as a tool and scientific instrument between 1660 and 1740 reflect most vividly the fraught relationship between observation as a new epistemic category, heralded by Frances Bacon and subsequently the Royal Society, and the material grounding of knowledge. Almost immediately from its inception, the microscope faced criticism even while it was used to gather as much knowledge and information about the natural world as possible. In the preface to his era-defining text on the microscope, *Micrographia* (1665), Robert Hooke writes about his objects of study being "either *exceeding small Bodies*, or *exceeding small Pores*, or *exceeding small Motions*."[1] Focusing on the subvisible world, Hooke connects observation explicitly to the material world around him when he writes, "it is now high time that [the Science of Nature] should return to the plainness and soundness of *Observations* on *material* and *obvious* things."[2] This insistence on the observation of material phenomena sets the tone for natural philosophy in the early period of the Royal Society, for whom Hooke was a Curator.[3] His work on microscopy was simultaneously met with adoration and disdain. Only a year after the publication of *Micrographia*, Margaret Cavendish famously writes in *Observations upon Experimental Philosophy* (1666/1668) that "magnifying glasses are like a high heel to a short

[1] Robert Hooke, *Micrographia, or, Some Physiological Descriptions of Minute Bodies Made by Magnifying Glasses with Observations and Inquiries Thereupon* (London, 1665), f2v.

[2] Hooke, *Micrographia*, b1r.

[3] For an overview of the connection between the microscope, Robert Hooke, and the Royal Society, see B. J. Ford, "The Royal Society and the Microscope," *Notes and Records of the Royal Society of London* 55, no. 1 (2001): 29–49, https://doi.org/10.1098/rsnr.2001.0124.

leg, which if it be made too high, it is apt to make the wearer fall, and at the best, can do no more than represent exterior figures in a bigger, and so in a more deformed shape and posture than naturally they are."[4] The grotesque simile Cavendish evokes in this passage is representative of her attitude towards microscopes, telescopes, and any other optical instruments natural philosophers might use. According to her, these instruments and tools merely distort the information passed through them, when we should not possess this knowledge in the first place. Microscopes only "represent" the object without providing any information about the "interior form and motions of a Creature" (*Observations*, 52). Despite Cavendish's own fascination with "the vanishingly small," such as atoms and microcosms, she utterly rejects the utility of the microscope in the quest for understanding the natural world.[5] Where Robert Hooke sees stability in the process of information and knowledge gathering through the microscope, Cavendish instead perceives the microscope as a hindering block, one that will make you stumble and fall instead.

This difference in attitude towards the microscope that Hooke and Cavendish embody here emerged out of two separate issues. On the one hand, the microscope itself takes on an intermediary, material agency that functions as a disruptor in the work of natural philosophers. On the other hand, the exceedingly small objects observed through the microscope were often equated with trivial matters. Visual observation was one of the major components of natural philosophy during the Restoration period and quickly entered the literary world. Through her

[4] Margaret Cavendish, *Observations upon Experimental Philosophy*, ed. Eileen O'Neill (Oxford; New York, NY: Cambridge University Press, 2001), 52. All subsequent references are to this edition and abbreviated as *Observation*.

[5] Wendy Beth Hyman, "Seeing the Invisible under the Microscope: Natural Philosophy and John Donne's Flea," *Philological Quarterly* 98, no. 1–2 (2019): 159. Hyman presents poets' interest in the subvisible world in the early modern period and its conception alongside the advancements in natural philosophy. For a larger overview of the connection between poetics and scientific inquiry, see Claire Preston, *The Poetics of Scientific Investigation in Seventeenth-Century England* (Oxford, New York, NY: Oxford University Press, 2015).

characters in *The Description of a New World, Called The Blazing World* (1666/1668) and her philosophical writings, Margaret Cavendish reveals the weaknesses of visual observation and discovery that has been touted as the basis for male domination of the natural world since Francis Bacon.[6] Cavendish uses microscopic observation and the subsequent material disruptions as devices influencing her narrative about fragile power relationships being laid bare by who gazes on whom or what and through what means these visual observations are conducted. She highlights the uncertainty of gazing through another material object to assert her arguments about the dangers of visual power structures: the fraught relationship between subject and object, observer and observed is revealed through the microscope's agency in the process of observation.[7] Cavendish makes the voyeuristic character of the microscope in addition to its material existence central to her literary creation; the microscope disrupts established power hierarchies, endangering both the observer and the observed.

Margaret Cavendish's caricature of the microscope served as one of the first criticisms of the tool, which would only increase well into the eighteenth century. Because of the microscope's focus on the "minute particulars," or trivial matters of the world, the microscope was quickly relegated to the entertainment of women and *virtuosi*.[8] By the 1740s, the microscope

[6] For discussions of the New Science being used in the service of male natural philosophers dominating the female natural world, see, for example, Carolyn Merchant, *The Death of Nature* (New York, NY: HarperOne, 2019); and Carolyn Merchant, *Autonomous Nature: Problems of Prediction and Control from Ancient Times to the Scientific Revolution* (New York, NY: Routledge, 2015). For more detailed discussions about gender and the connections between natural philosophy and science and women, see Londa L. Schiebinger, *The Mind Has No Sex?: Women in the Origins of Modern Science* (Cambridge, MA: Harvard University Press, 1989); Londa Schiebinger, *Has Feminism Changed Science?* (Cambridge, MA: Harvard University Press, 1999); and Londa L. Schiebinger, *Nature's Body: Gender in the Making of Modern Science* (Boston, MA: Beacon Press, 1993).

[7] For a discussion of the gaze and its power structures in eighteenth-century literature, see, for example, Rivka Swenson, "Optics, Gender, and the Eighteenth-Century Gaze: Looking at Eliza Haywood's Anti-Pamela," *The Eighteenth Century* 51, no. 1–2 (2010): 27–43, https://doi.org/10.1353/ecy.2010.0006; Manushag N. Powell, "See No Evil, Hear No Evil, Speak No Evil: Spectation and the Eighteenth-Century Public Sphere," *Eighteenth-Century Studies* 45, no. 2 (2012): 255–76.

[8] For a discussion of the long-lasting effects this attention to minute details has throughout the literary world of the eighteenth century, see Tita Chico, "Minute Particulars: Microscopy and Eighteenth-Century Narrative," *Mosaic* 39, no. 2 (2006): 143–61. See also Tita Chico, "Putrefaction as Optical Technology,"

only serves as a tool for polite knowledge that can be used to make conversation with potential future spouses, as seen in *Philo-Naturæ*'s letter to *The Female Spectator* mentioned in the introduction of this dissertation. Thus, Cavendish was by no means the last person to ridicule experimental philosophers who worked closely with optical tools in general and the microscope in particular.

Overall, microscopic observation in the seventeenth and eighteenth centuries had to contend with the triviality of the objects, the relationship between observer and observed, and the push for observation to be the founding block of the Royal Society's project when it often focused on the indiscriminate collection of knowledge and information instead. When the observation leads to revolutionary or new knowledge, men claim ownership of the act of observation. Women, on the other hand, are only allowed to inhabit the role of observer when the knowledge they can gather from their observation is not new or revolutionary; as a result, the microscope can be relegated to a female pastime because, by the early eighteenth century, natural philosophers are convinced that it cannot reveal anything revolutionary about nature anymore. Only once the knowledge microscopes can yield has been deemed entirely trivial can women properly—and virtuously—use this tool.[9] The tense relationship between the microscope and the production of knowledge is compounded by its characterization as a "polite science," suitable for women to partake in scientific endeavors. Microscopic observation produces knowledge that is

Configurations 25, no. 2 (2017): 145–64, https://doi.org/10.1353/con.2017.0010. For a further discussion of the intersection of optics and literature in the seventeenth century, see Erin Webster, *The Curious Eye: Optics and Imaginative Literature in Seventeenth-Century England* (Oxford: Oxford University Press, 2020).

[9] The gendered practices of observation in literature of the late seventeenth and eighteenth centuries have been pointed out repeatedly, see Elizabeth Gargano, "Utopian Voyeurism: Androgyny and the Language of the Eyes in Haywood's *Love in Excess*," *Eighteenth Century Fiction* 21, no. 4 (2009): 513–34, https://doi.org/10.1353/ecf.0.0076; Juliette Merritt, *Beyond Spectacle: Eliza Haywood's Female Spectators* (Toronto: University of Toronto Press, 2004); Swenson, "Optics, Gender, and the Eighteenth-Century Gaze"; Matthew J. Rigilano, "Embodying the Invisible: Materiality and Subjectivity in Cavendish, Manley, and Haywood," *The Eighteenth Century* 57, no. 1 (2016): 71–93, https://doi.org/10.1353/ecy.2016.0002.

deemed trivial and unreliable by natural philosophers. Cavendish, however, draws attention to the dangers inherent in this kind of observation, complicating its assessment as a "polite science" fit for women in particular or anyone in general.

Cavendish uncovers these tensions in the use of the microscope by employing two key characteristics that heighten the material disruptions of the microscope. The first of these characteristics is that microscopic observation is inherently solitary and material; and secondly, the observation needs to be expressed through verbal or illustrative means in order to be made intelligible to other people. Cavendish employs these characteristics of using the microscope in natural philosophy to lay bare the material influence of the tool itself on the production of knowledge. The observation, thus, always reveals more about the observer and her interaction with the microscope itself than it does about the observed object. For Margaret Cavendish, the material agency of the microscope opposes any progress being made by experimental philosophers in the project of the New Science. Cavendish conceives of her *Observations upon Experimental Philosophy* and *The Blazing World* as direct responses to the experimental philosophers of the Royal Society and, in particular, against Robert Hooke and his *Micrographia*. It is in the materiality and agency of the microscope that Cavendish sees the dangers for political and social authority.

The Material Microscope

From its heyday in the latter half of the seventeenth century, to its role as mere entertainment, and finally to its firm place in the sciences as a tool of knowledge creation and control, the microscope has seen the full spectrum of applications within natural philosophy and the sciences as well as in social circles. The microscope's entertainment value became a central

focus from the earliest time of its rise in natural philosophy: Samuel Pepys writes, for example, in his diary entry for 14 August 1664, "after dinner up to my chamber and made an end of Dr. Power's booke of the Microscope, very fine and to my content, and then my wife and I with great pleasure, but with great difficulty before we could come to find the manner of seeing any thing by my microscope."[10] For Pepys and his wife, the microscope functions as a tool to while away time together, but not much more. The history of the microscope has thus been fraught with advancing the microscope's importance and spurning it as a tool that does not provide any details beyond the superficial, exterior nature of the observed object. Similarly, the historiography of the microscope has shifted as well, only agreeing on the initial prime of microscopic observation in the latter four decades of the seventeenth century. Beyond that, historians of the microscope offer vastly different interpretations of this tool throughout the eighteenth century.

Compared to the telescope, the microscope did not experience a roaring welcome on the stage of natural philosophy in the early seventeenth century. Instead, its use exploded in the 1660s with the help of Robert Hooke and other European natural philosophers and instrument makers.[11] The historiography of the microscope as a scientific instrument and microscopy in general demonstrates the twists and turns in the microscope's uses and reputation.[12] Largely,

[10] Samuel Pepys, "Sunday 14 August 1664," in *The Diary of Samuel Pepys*, accessed October 3, 2019, https://www.pepysdiary.com/diary/1664/08/14/.

[11] The five most well-known microscopists in the seventeenth century were Robert Hooke (1635–1703), an English natural philosopher and early member of the Royal Society; Marcello Malpighi (1628–1694), an Italian biologist and physician who laid the foundations for microscopical anatomy, histology, and embryology; Jan Swammerdam (1637–1680), a Dutch biologist whose work on insects revealed their anatomy and different life phases; Nehemiah Grew (1641–1712), and English plant anatomist and physiologist whose *Anatomy of Plants* (1682) proved to be foundational for the study of plant anatomy; and Antonie van Leeuwenhoek (1632–1723), a Dutch microscopist and microbiologist who started out as a draper with an increasing interest in lens-making, leading to his work on microbes.

[12] For discussions of the history of the microscope and microscopy, see Marian Fournier, *The Fabric of Life: Microscopy in the Seventeenth Century* (Baltimore, MD: The Johns Hopkins University Press, 1996); Catherine Wilson, *The Invisible World: Early Modern Philosophy and the Invention of the Microscope* (Princeton,

these twists and turns can be traced back to the uncertainties that went hand in hand with microscopic observation and which are at the heart of the criticism underlining Cavendish's work. Questioning the hierarchy between observer and observed, spectator and spectacle, and revolutionary and trivial knowledge became centers of attention in the study of microscopic observation and among natural philosophers themselves. Cavendish adds to this conversation how the material agency of the microscope fits into and changes these relationships in *Observation upon Experimental Philosophy* and *The Blazing World*. Microscopy flourished in the last decades of the seventeenth century, but its decline and reduction to a "polite science," as "virtually everyone could be an able microscopist," largely hinged on the agency of the microscope itself influencing the observations in a detrimental and distorting way.[13] In contrast to this stance of the eighteenth century, it is actually the recognition of the microscope's material agency that resulted in the microscope's rise as an instrument used to "enhance the accuracy of measurements" and "improve the performance of the observer" from the early nineteenth century onward.[14]

Microscopists during the Restoration period had to defend their tool against simultaneous charges of distortion of the observed object and the triviality of the object itself. In their quest to accumulate more and more knowledge, natural philosophers of the seventeenth and eighteenth centuries "opened up a veritable empire of observation," in which "scientific observation was

NJ: Princeton University Press, 1995); and Jutta Schickore, *The Microscope and the Eye: A History of Reflections, 1740–1870* (Chicago, IL: The University of Chicago Press, 2007).

[13] Schickore, *The Microscope and the Eye*, 35, 11.

[14] Ian Hacking, "Do We See through a Microscope?," *Pacific Philosophical Quarterly* 62, no. 4 (1981): 310. Hacking takes a similar approach to Jutta Schickore when it comes to the evaluation of the microscope and its more recent uses in the sciences. This approach foregrounds the microscope as a tool to measure accuracy and calibrate other instruments and tools. They see the foundations of the microscope as it is used today being laid in the early nineteenth century while simultaneously paying tribute to the early history of the microscope in the seventeenth and eighteenth centuries.

theorized and practiced, disseminated and celebrated with missionary-like enthusiasm."[15] In the networks of observation that emerge in the early modern period and in the eighteenth century, the challenges faced by the microscope are both revealed and exacerbated. Observation has to traverse the boundaries between solitary, individual and communal, collective production of knowledge. It is in this crossing and blurring of boundaries through the literal microscope that Margaret Cavendish sees the dangers to the absolute power of the observer over the process of observation. By moving the visual representation through the lens and across this boundary, microscopic observation did not only deform the object, but it also magnified an object that was utterly trivial according to Cavendish. "Microscopy's obsession with small things is precisely its downfall," writes Tita Chico, and microscopists had to resort to presenting their work as an "epistemological elevation of the particular."[16] Scrutiny of minute details of trivial objects can have unforeseen consequences that instead change the relationship between the observer and the observed according to Margaret Cavendish in *Observations upon Experimental Philosophy* and *The Blazing World*. The accusation of experimental philosophers' findings being trivial and changed through microscopic observation exacerbates the problem of power in the triangular relationship of observer, microscope, and observed.

Margaret Cavendish's indictment of both the microscope and its experimental philosophers had already been anticipated by Robert Hooke in his *Micrographia*. Where Cavendish argues that the microscope's agency challenges the relationship between observer and observed, Hooke insists on the mastery of the observer over the observed. He lays out the

[15] Lorraine Daston, "The Empire of Observation, 1600–1800," in *Histories of Scientific Observation*, ed. Lorraine Daston and Elizabeth Lunbeck (Chicago, IL: The University of Chicago Press, 2011), 83.

[16] Chico, "Minute Particulars," 145–46. She also writes about James Thomson's *The Seasons*, "although these organic bodies seem to be knowable through the magnification of the microscopic glass, Thomson includes a sharp warning about the figurative, epistemological, and even ontological implications of such scrutiny." Chico, "Putrefaction as Optical Technology," 155.

meticulous steps one has to take in properly using the microscope to understand the subvisible world. He writes, "that there should be a *scrupulous* choice, and a *strict examination*, of the reality, constancy, and certainty of the Particulars that we admit." He emphasizes that "the most severe, and most impartial diligence, must be imployed." In the quest for true knowledge, "the most *vulgar* Instances are not to be neglected, but above all, the most *instructive* are to be entertain'd." Hooke draws the reader's attention to the diligence and constancy of observation when he writes that "the footsteps of Nature are to be trac'd, not only in her *ordinary course*, but when she seems to put her shifts, to many *doublings* and *turnings*, and to use some kind of art in indeavouring to avoid our discovery."[17] Peering into the subvisible world will lay bare all the secrets that nature tries to hide from human observation. Observing and collecting more data will yield results that have previously been ascribed to the occult because of nature's undiscoverable "shifts," "*doublings* and *turnings*." Hooke's description implies a power dynamic between humans and nature as the observer hunts the observed, coy and hiding her secrets from the hunter. The subject-object relationship in Hooke's description of observation already uncovers the competition for power between nature and her observer, a competition that is exacerbated by "eighteenth-century visual theory, [in which] the 'object' of that gaze is *not* the one who is seen but the one who sees."[18] Observation thus enters an arena in which the observer and observed struggle for dominance and agency, and Robert Hooke wasn't alone in wanting to assert the observer's dominance in subduing the natural world. Thomas Sprat, in *The History of the Royal Society* (1667), equally identifies observation as paramount in dominating nature.[19] Always before the backdrop of the material world around them and their engagement with this

[17] Hooke, *Micrographia*, a2r.
[18] Rivka Swenson, "Optics, Gender, and the Eighteenth-Century Gaze", 29.
[19] Thomas Sprat, *The History of the Royal-Society of London for the Improving of Natural Knowledge* (London, 1667).

materiality, writers and artists throughout the late seventeenth and early eighteenth centuries take up this struggle of domination in both satirical and non-satirical ways, with the microscope often being the central scientific tool alongside the telescope.[20]

In contrast to Hooke's portrayal of the microscope making this domination possible, Margaret Cavendish argues that the material agency of the microscope itself denies this domination and actually threatens, on the one hand, the absolute political power of the observer as we can see in *The Blazing World* and, on the other hand, the material understanding of the natural world Cavendish promotes in *Observations Upon Experimental Philosophy*. The microscope and other "artificial instruments" function more like "deluders, rather than true informers" according to Cavendish (*Observations*, 99). Microscopes thus threaten the power dynamic between observer and observed by representing an image that does not exist in reality. In doing so, microscopes also expose their own limitations for Cavendish. She writes, for example, about the senses in particular and why they shouldn't be heralded the way they are by experimental philosophers in the seventeenth century: "the truth is, our exterior senses can go no further than the exterior figures of creatures, and their exterior actions: but our reason may pierce deeper, and consider their inherent natures, and interior actions" (*Observations*, 100). The microscope—along with other sensory tools experimental philosophers might have employed—proved to be simultaneously a threat to political power in the relationship between observer and observed and a weakness with regard to understanding the interior motions of the natural world.

[20] Tita Chico has written repeatedly and extensively about the ubiquitous nature of the microscope in literature, particularly in satire in the late seventeenth and early eighteenth centuries. See Chico, "Minute Particulars," 144; Tita Chico, *The Experimental Imagination: Literary Knowledge and Science in the British Enlightenment* (Stanford, CA: Stanford University Press, 2018). Literary works of the time period that make observation and its attendant tools central to their satirical narratives are, for example, Aphra Behn's *The Emperor of the Moon* (1687) and Jonathan Swift's *Gulliver's Travels* (1726). See in particular the chapter "Immodest Witnesses" in Chico, *The Experimental Imagination*, 44–75.

For Cavendish, the artifice of the microscope distorts the observed object despite only being able to represent its exterior, but this distortion is exactly the downfall of the microscope in her eyes.

Cavendish's own stance towards materialism opens up her criticism of the microscope as a tool being used in experimental philosophy. As a materialist herself, Cavendish sets herself apart from mechanistic materialism prevalent in seventeenth-century natural philosophy, especially when connected to political theory such as in Thomas Hobbes's *Leviathan*, for example. While Cavendish's theory of matter "emphasized unity," it simultaneously insists on "a hierarchy of different kinds of matter" that "can be arranged in order to avoid disorder and achieve a harmonious state of nature or society."[21] In Cavendish's hierarchy, animate matter ranks higher than inanimate matter, with animate matter itself being divided further into rational and sensitive matter. Always blended, animate and inanimate matter turn into "a single, continuous self-subsistent organism" in Cavendish's theory of matter.[22] The microscope itself, then, cannot reveal the mixture of animate and inanimate matter to the observer. Instead, it only ever reveals the exterior of the observed object in a changed manner. Even worse, the microscope—along with other tools and instruments of experimental philosophy—cannot be a source of reason about the natural world because of its reliance on sensory perception. Cavendish writes, for example, that "sense, which is more apt to be deluded than reason, cannot be the

[21] Lisa T. Sarasohn, *The Natural Philosophy of Margaret Cavendish: Reason and Fancy During the Scientific Revolution* (Baltimore, MD: Johns Hopkins University Press, 2010), 101. For further discussions of Cavendish's materialism, see David Cunning, *Cavendish* (New York, NY: Routledge, 2016); Stewart Duncan, "Debating Materialism: Cavendish, Hobbes, and More," *History of Philosophy Quarterly* 29, no. 4 (2012): 391–409; Colin Chamberlain, "Color in a Material World: Margaret Cavendish against the Early Modern Mechanists," *The Philosophical Review* 128, no. 3 (2019): 293–336, https://doi.org/10.1215/00318108-7537283; Stephen Hequembourg, "The Poetics of Materialism in Cavendish and Milton," *Studies in English Literature, 1500-1900* 54, no. 1 (2014): 173–92; Misty G. Anderson, "Tactile Places: Materializing Desire in Margaret Cavendish and Jane Barker," *Textual Practice* 13, no. 2 (1999): 329–52, https://doi.org/10.1080/09502369908582344; Deborah A. Boyle, *The Well-Ordered Universe: The Philosophy of Margaret Cavendish* (Oxford: Oxford University Press, 2018); and Anne M. Thell, "'[A]s Lightly as Two Thoughts': Motion, Materialism, and Cavendish's Blazing World," *Configurations* 23, no. 1 (2015): 1-33,132.

[22] Eileen O'Neill, "Introduction," in Cavendish, *Observations*, xxvii.

ground of reason, no more than art can be the ground of nature" (*Observations*, 49). She grounds her assessment here in the subordination of sensitive motions of matter to rational ones. Rational motions are the only ones not to be "encumbered with any other parts of matter, but moving in their own degree" (*Observations*, 150). Rational matter and its motions arise as Cavendish's highest form of perception and creative force—it is in this rational matter that she situates the faculties of fancy and imagination, which she will explore in *The Blazing World*. The microscope and its experimental philosophers are found at exactly this juncture. In its trajectory, "experimental and mechanic philosophy cannot be above the speculative part, by reason most experiments have their rise from the speculative, so that the artist or mechanic is but a servant to the student" (*Observations*, 49). Because in experimental philosophy all knowledge emerges from sensory perception and matter in general rather than from rational matter, Cavendish sees the source of any knowledge garnered from it already tainted by the fallibility of sensory perception.

Situating Margaret Cavendish's work on and aversion to the microscope in *Observations upon Experimental Philosophy* and *The Blazing World* within her own materialism opens the possibility of exploring the material agency as one of the reasons for Cavendish's dislike of the tool. The issue she finds with the microscope in particular lies in the entanglement of the tool within the discursive practices of the observation of the minutest details. Her own conception of materialism prefigures some of the new materialist ideas Karen Barad and Vicky Kirby have most recently proposed.[23] Cavendish's understanding of nature as "a self-moving, and

[23] See Karen Michelle Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007); Vicki Kirby, *Quantum Anthropologies: Life at Large* (Durham, NC: Duke University Press, 2011); Vicki Kirby, "Matter out of Place: 'New Materialism' in Review," *in What If Culture Was Nature All Along?*, ed. Vicki Kirby (Edinburgh: Edinburgh University Press, 2017), 1–25.

consequently a self-living and self-knowing infinite body, divisible into infinite parts" (*Observations* 125), anticipates the idea of performative materialism that Barad proposes. Simultaneously, however, this conception also emerges as the crux of Cavendish's fight against the tools of experimental philosophers. The microscope's own material agency within the coupled works of *Observations upon Experimental Philosophy* and *The Blazing World* displaces the observer's rational power in the relationship with the observed and instead confounds the observer herself.

Cavendish's materialism and her presentation of the microscope in *The Blazing World* and *Observations* embody a performative new materialism that places epistemology and ontology in an entangled and interdependent state.[24] In particular, Barad's understanding of scientific instruments and tools as discursive practices highlights the problem for Margaret Cavendish.[25] As the microscope magnifies the objects on the other side of the lens, it lays bare the inability of the observer to create an ontological subject-object relationship with the observed material. This discrepancy of distinction unveils the impossibility of drawing "inherent boundaries" for objects—both animate and inanimate—as objects with such boundaries are instead "material-discursive phenomena."[26] Objects only emerge into their material boundaries in the moment of "intra-action" between the several material processes. Looking through the microscope, then, constitutes a new phenomenon in each instance. For Cavendish, the louse and flea she observes through the microscope at the Royal Society—an experience she fictionalizes in *The Blazing World*—become entirely new entities from the ones she already knows. Instead, the microscope's own interference in the process of observation changes the insects from being

[24] Christopher N. Gamble, Joshua S. Hanan, and Thomas Nail, "What Is New Materialism?," *Angelaki* 24, no. 6 (2019): 122, https://doi.org/10.1080/0969725X.2019.1684704.

[25] Barad, *Meeting the Universe Halfway*, 133ff.

[26] Barad, *Meeting the Universe Halfway*, 153.

barely observable to monstrous creatures comparable in size to humans. The microscope has turned the minutest details into actual material threats for Cavendish as a person.

It is no wonder then that Cavendish chose a simile reliant on the influential materiality of the microscope in *Observations upon Experimental Philosophy*. The high heel of the microscope in conjunction with the sense's short leg will cause the observer to stumble and fall over without ever increasing the knowledge gleaned from microscopic observation. For Cavendish, it is clear that because of the material agency of experimental instruments and tools, "art, for the most part, makes hermaphroditical, that is, mixt figures, partly artificial, and partly natural" (*Observations*, 51). The observation through the microscope leads to an object that is not actually the natural object itself. Instead, it has become Frankenstein's creature, only existing by virtue of the microscope's interference in its material manifestation. Cavendish goes on to write,

> a louse by the help of the magnifying glass appears like a lobster, where the microscope enlarging and magnifying each part of it, makes them bugger and rounder than naturally they are. The truth is, the more the figure by art is magnified, the more it appears misshapen from the natural, insomuch as each joint will appear as a diseased, swelled and tumid body, ready and ripe for incision.
> (*Observations*, 50)

Once the microscope—or any type of magnifying glass—becomes the apparatus by which natural philosophers make observations, it is actually the observed object itself which is changed. As a consequence of the object changing its boundaries, the observer changes her attitude towards the object as well. Cavendish considers the results of microscopic observations to be completely separate phenomena that do not provide an accurate depiction of the natural world because of "the several reflexions, refractions, mediums and positions of several lights" that change the resulting image of the observed object (*Observations*, 51). The microscope's own materiality engenders distinctive material-discursive phenomena that often cause the observer to stumble and fall over the heel that is too high for a short leg.

The microscope's agency within the observation itself not only influences the boundaries and material reality of the observed object but also those of the observer herself. When the material apparatus actively engages with both nature and the process of knowledge production—which Cavendish certainly agrees with—then that opens up avenues for nature to actively engage with science and culture. Thus, Barad's assessment of the entangled states of epistemology and ontology touch every area of human engagement with the natural world and find expression in Cavendish's work as well. However, looking at nature as interacting with culture and having some form of agency threatens our understanding of our own agency.[27] Uncovering the entanglement between humans and the natural world, this performative new materialism offers a new perspective on Margaret Cavendish's distrust of the microscope and its material agency. By regarding the microscope as an entity that influences the observation in such a way that it actually transforms both the observer and the observed, we can see that it is Cavendish's own materialism that leads to her skepticism towards experimental philosophy. She writes in *Observations upon Experimental Philosophy*, "I do not say, that no glass presents the true picture of an object: but only that magnifying, multiplying, and the like optic glasses, may, and do oftentimes present falsely the picture of an exterior object; I say, the picture, because it is not the real body of the object which the glass presents, but the glass only figures or patterns out the picture presented in an by the glass, and there mistakes may easily be committed in taking copies from copies" (*Observations*, 50-51). Through their own material constitution, microscopes do not only merely represent pictures of an object but rather change our perception of it. What Cavendish deems only a picture of the actual object becomes, in turn, through the exchange

[27] See Vicki Kirby, *Quantum Anthropologies*, 71–72. Kirby argues that the linguistic turn was in fact the factor that neutralized this threat of not understanding our own agency when facing the natural world as it closed us off from nature itself.

across networks of knowledge in the late seventeenth century its own material manifestation of knowledge about the observed object. The mistakes and manifestations of microscopic observation do not only hinder an accurate representation of the natural world but also unlock the possibilities for questioning authority by doing so.

Not only does this unease about the relationship between humans and the natural world result in Cavendish's perception of the microscope as a tool of experimental philosophers that serves as nothing more than a deceiver of the observer, but it also lays bare her materialism that is all-encompassing. Everything is matter and composed of both animate and inanimate matter. As such, it is no wonder that the microscope itself would interact with the process of mediation. In mediating knowledge, the microscope, along with the telescope, shifts, obscures, and highlights said knowledge. For Cavendish, this means that the microscope also presents the observer with an object that is not actually the natural object she set out to study. Instead, the visual perceived through the microscope is a mere figuration of the natural object. It is in this moment, that Cavendish reveals the stumbling block for experimental philosophers: the materiality of the microscope changes nature in such a way that nature becomes a mixture of artifice and nature. Artifice cannot reveal knowledge about nature; only reason can do so according to Margaret Cavendish.[28] The material disruption the microscope causes in the relationship between observer and observed is at the heart of Cavendish's criticism and falls squarely into her conception of materialism as all-encompassing and not in need of human interference.

[28] Susan James, "'Hermaphroditical Mixtures': Margaret Cavendish on Nature and Art," in *Early Modern Women on Metaphysics*, ed. Emily Thomas (Cambridge: Cambridge University Press, 2018), 31–48, https://doi.org/10.1017/9781316827192.003.

Through the Glass

The solitary experience of actually looking through the microscope arises as one of the major characteristics of microscopic observation in the tool's struggle to defend its own use and importance in the seventeenth century. This struggle is defined and compounded by the materiality of the microscope. Simple and compound microscopes available in the latter half of the seventeenth century and early eighteenth century only allowed one person at a time and under specific circumstances to look through them. Because this solitary experience creates an opening for criticism of the produced knowledge, one has to actually consider the act of looking through the microscope and how this act influences the information gathered rather than reduce the microscope and other optical instruments to their prosthetic functions. Ian Hacking argues about the modern uses of the microscope that "we do not in general see *through* a microscope; we see with one."[29] Hacking's assessment of the microscope is strikingly reminiscent of both Margaret Cavendish's conception of materialism and the performative new materialism of Karen Barad. The microscope is not merely a passive instrument in the process of microscopic observation; instead, it actively participates in and modifies the observed object to a certain extent. Through the lens of the microscope, the manner of observation is fundamentally changed, resulting in phenomena that are entirely distinct from both the observer and the observed, continually reconstituting themselves.

Not only does the entire microscope itself affect the phenomenon of observation, but instead the lens in particular takes on a special role in microscopic observation in the seventeenth century. The materiality of the lens itself forms simultaneously the barrier and the opening through which the actual phenomena can manifest. Ian Hacking writes about the microscope,

[29] Hacking, "Do We See through a Microscope?," 319.

"looking through a lens was the first step in technology. Then came peering through the tube of a compound microscope, but looking 'through' the instrument is immaterial."[30] Here, he qualifies the earlier statement about seeing *with* the microscope rather than merely *through* it. It is exactly the process of observing with the microscope that speaks to the materialism of microscopic observation in the seventeenth century and Margaret Cavendish's conception of it in particular. The microscope itself becomes an extension of the observer, and the lens contained within it acts as the invisible matter whose agency creates the phenomenon of observation. As part of the toolkit of experimental philosophy, the microscope actively intrudes on the observational process. However, it is through experimentation itself that the tool's agency emerges: "to experiment is to create, produce, refine and stabilize phenomena."[31] The microscope not only offers the observation of phenomena but instead shapes and modifies each phenomenon itself. It is particular the lens—the material object itself that magnifies what is on the other side of it—which changes the mode of observation.

However, it is not only the active manipulation of the observed object that is a thorn in Margaret Cavendish's conception of the microscope; rather, it is also what she considers overreliance on instruments and tools on the part of natural philosophers. While the microscope of the late seventeenth century defies the reduction to a prosthesis, the image of the microscope as an attachment to the human keeps reappearing—as in Cavendish's simile of the heel and short leg, for example. The microscope's simultaneous status as both part of the scientific phenomenon and outside of the human body makes its use so precarious for Cavendish. She emphasizes the dangers of the microscope's literal intrusion on the gathered information and the

[30] Ian Hacking, *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science* (Cambridge; New York, NY: Cambridge University Press, 1983), 205.

[31] Hacking, *Representing and Intervening*, 228.

subsequent disruption of the hierarchy between observer, microscope, and observed. Because of the lens's interruption and modification of the visual observation and subsequent "intra-action" of observer, tool, and observed, the microscope takes on an active participation that changes the object on the other side of the lens. In *Observations upon Experimental Philosophy*, Cavendish writes, for example, "and per chance, if a louse or flea, or such like insect, should look through a microscope, it would be as much affrighted with its own exterior figure, as a young beautiful lady when she appears ill-favoured by art" (201-02). The image the microscope creates is so distorted that the louse and the flea would not be able to recognize themselves. Instead, the image induces fear and appears to be more like a funhouse-mirror representation than a true, objective magnification of the observed object.[32] Relying too much on a tool such as the microscope results in a vision that is only tangentially related to the observed object.

The danger for Cavendish in microscopic observation lies not only in the distorted representation of the observed object but also in the overstepping of boundaries that the lens actually blurs and obscures. For Cavendish, observation to such a magnitude and such exterior detail as the microscope offers on the one hand only leads to futile attempts at understanding nature. She goes on to write about lenses in *Observations upon Experimental Philosophy*,

> I do not say this, as if optic glasses could not present the true figure of an original; for if they do not exceed the compass of natural dimensions, they may; but when they endeavour to go beyond them, and do more than nature has done, they rather present monstrous, than truly natural figures. Wherefore those, in my opinion, are the best artist, that keep nearest to nature's rules, and endeavour not to know more than what is possible for a finite part or creature to know: for surely there is no better way to be rightly and truly informed of nature's works, than by studying nature's corporeal figurative motions, by the means of which study, they will practise arts (as far as art is able to be practised) more easily and successfully than they will do without it.
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> (*Observations*, 202)

[32] Ian Lawson, "Bears in Eden, or, This Is Not the Garden You're Looking for: Margaret Cavendish, Robert Hooke and the Limits of Natural Philosophy," *British Journal for the History of Science* 48, no. 4 (2015): 586, https://doi.org/10.1017/S0007087415000588.

Microscopes stand in for an attempt at reaching into the depths of nature that humans have no right to according to Margaret Cavendish. As finite creatures and part of nature ourselves, we can never grasp the infinity of nature that Cavendish conceptualizes in her work. Rather than working with the magnification of the microscope, natural philosophers should rely on the objects as nature presents them to us. Anything that goes beyond our perception as finite creatures turns monstrous by looking through the microscope's lens in Cavendish's understanding of the natural world. She emphasizes the material interference of the microscope in the process of observation as something detrimental to the goal of finding true knowledge of the natural world.

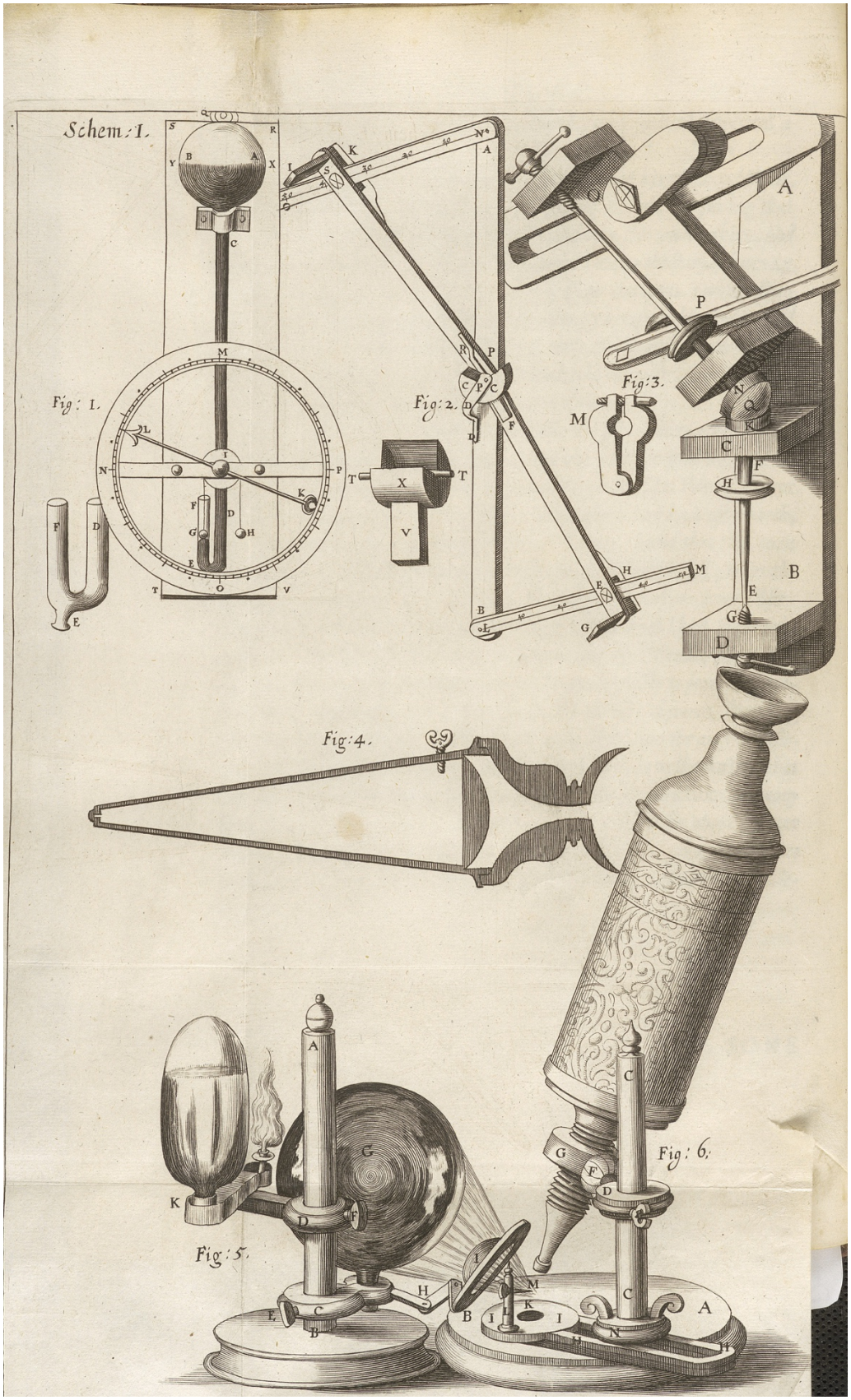

Figure 1: Robert Hooke, *Micrographia*, Schem. 1. US National Library of Medicine.

While natural philosophers thus relied on the microscope's prosthetic function of replacing and enhancing senses, Margaret Cavendish sees exactly this prosthetic function as the root of the problem. Only through artifice can our sense be improved, but Cavendish sees our senses as inherently flawed in the first place. Enhancing them would only exacerbate the shortcomings they naturally already have as she shows in *Observations upon Experimental Philosophy* and *The Blazing World*. The prosthetic conception of microscopic observation only intensifies the material interference of the tool itself. Where microscopes and other experimental tools and instruments were generally seen positively as "prostheses for thinking, and…as agents of change,"[33] Cavendish sees them as distracting toys that will never provide a true representation of the natural world because of their distorting character. For her, the prosthetic function of the microscope does not merely reveal its material interference in the process of observation but also engenders the problem of having a tool stand in for our rational capacities. Overreliance on the microscope can only ever lead to the breakdown of our attempts at attaining true knowledge of the natural world. Cavendish denies the accomplishments of microscopic observation because it surely fails to produce actual new knowledge. Creating and accessing new knowledge like that lies outside of the purview of finite human beings, and making use of tools that only exacerbate these shortcomings will not lead to any fruitful knowledge. Thus, anything that the microscope might reveal to the observer is nothing more than mere exterior—trivial—information and nothing about the interiority of the observed object, and the microscope merely serves as an inadequate and faulty replacement of something that has already existed before.

It is exactly this replacement that Cavendish so heavily criticizes in her *Observations*. Frédérique Aït-Touati sums up Cavendish's attitude towards microscopes and other optical

[33] David Wootton, *The Invention of Science: A New History of the Scientific Revolution* (New York, NY: Harper Perennial, 2016), 244.

instruments when she writes that they "could only increase, and not correct, the weakness of our senses."[34] Any fault or weakness in our senses would only be magnified by the microscope, but not corrected. Instead, humans should rely on their reason when wanting to discover new knowledge of the natural world. Scientific knowledge should be based on the sensory perceptions available to us and not artificially enhanced. Where our senses naturally end in their capacities, our rationality has to take over and fill in the blanks. Reason is the factor that lets us transcend our faulty sensory perceptions according to Cavendish as "the end of reason, is truth" ("To the Reader," *The Blazing World*, 123). The replacement of faulty or weak senses by artificial means can never reveal the true character of nature because it fails to hit the mark of what is actually at stake; for Cavendish, it is, on the one hand, not our place to make those kinds of observations and, on the other hand, these observations can never reveal the truth about nature. The prosthetic character of the microscope simultaneously reveals our own sensory shortcomings and the power Cavendish ascribes to our rational faculties. Because she already considers the senses to be potential stumbling blocks on our way to uncovering the true nature of the world, she sees the microscope in its role in experimental philosophy as an inflated hindrance.

The involvement of an artificial object always marks the microscopic information passed through the lens(es) of the microscope. This involvement manifests itself in the barrier between the object and subject of observation that needs to be both acknowledged and overcome by the observer. Easily overlooked, the glass lenses do not, at first glance, appear to amount to any kind of actual barrier between observer and observed—one can clearly look through them with only minor hindrances after all. Because of their magnification and focus, however, they do constitute

[34] Frédérique Aït-Touati, *Fictions of the Cosmos: Science and Literature in the Seventeenth Century*, trans. Susan Emanuel (Chicago, IL: University of Chicago Press, 2011), 176.

a barrier that literally changes and transforms the visual information passed through them. The relationship between subject and object, observed and observer is thus not immediate; looking *through* the barrier proves to be an integral part of this mode of observation, and it is exactly this part that marks the first step in complicating the relationship between observer and observed as both become part of one phenomenon in conjunction with the microscope itself. However, the microscope, through its interference in the genesis of the phenomenon, bounds both the subject and the object of observation in a momentarily fixed relationship.[35] Acknowledgement of and observation through these barriers that often conceal their own existence open up the space for interpretation and purposeful framing of the produced knowledge. While Cavendish does acknowledge the importance of the senses in our experience in the world, she highlights not only their fallibility and imperfection of the senses but also their variability. She writes in *Observations upon Experimental Philosophy* about the senses:

> some men…their perception of sight, taste, smell, touch, or hearing, is quicker to some sorts of objects, than to others, according to either perfection or imperfection, or curiosity, or purity of the corporeal figurative motions of each sense, or according to the presentation of each object proper to each sense; for if the presentation of the objects be imperfect, either through variation or obscurity, or any other ways, the sense is deluded. Neither are all objects proper for one sense; but as there are several senses, so there are several sorts of objects proper for each several sense. Now if there by such variety of several knowledges, not only in one creature, but in one sort of sense; to wit, the exterior senses of one human creature; what may there be in all the parts of nature?
>
> (*Observations*, 46-47)

The sheer number of possible interpretations of sensory information prove to be the cause for Cavendish's disdain for experimental philosophy and its reliance on tools which enhance our senses. Cavendish views sensitive perception as merely providing information about the

[35] Barad, *Meeting the Universe Halfway*, 181. Barad discusses the iterative configuration of the material realities of the world around us through intra-actions. In the case of Cavendish, the microscope fundamentally changes the material configuration of the phenomenon and thus the subject and object of the observation, while simultaneously also providing the situational boundaries for each part of the observation.

exteriority of the object to be perceived. Only rational perception can provide any information about the interiority of the observed objects as well as mitigate the fallibility and weaknesses of our senses.[36] The interference of the material microscope in the process of magnification lays bare and enhances the shortcomings of our own senses according to Margaret Cavendish. The lens within the tool itself embodies the complicated nature of observation embraced by experimental philosophers but disavowed by Cavendish because of its explicit figuration of the observed object.

In *The Blazing World*, accompanying *Observations upon Experimental Philosophy* in its various publications, Cavendish similarly makes no secret of her distaste for microscopes and telescopes and their literal intervention in the process of observation when the bear-men perform their work in front of the Empress. After the Empress instructs the bear-men to observe the skies, their "telescopes caused more differences and divisions amongst them, than ever they had before."[37] The Empress is perfectly aware of the mediating, intervening nature of optical instruments when she calls the telescopes "false informers" and "mere deluders," a claim she repeats when talking about microscopes. Similarly, she denies the bear-men's assessment that a drone-fly's head was in large parts made up of "a multitude of small pearls or hemispheres in a trigonal order," and "each of them was a perfect eye, by reason they perceived that each was covered with a transparent cornea, containing a liquor within them, which resembled the water or glassy humour of the eye." The Empress almost immediately dismisses the bear-men's—largely correct—analysis of their observation and reiterates that "perhaps their microscopes did not truly

[36] For a more in-depth discussion of Cavendish's understanding of knowledge and perception, see Deborah Boyle, "Margaret Cavendish on Perception, Self-Knowledge, and Probable Opinion," *Philosophy Compass* 10, no. 7 (2015): 438–50, https://doi.org/10.1111/phc3.12232.

[37] Margaret Cavendish, *The Blazing World and Other Writings*, ed. Kate Lilley, Reprint (London; New York, NY: Penguin Classics, 1994), 140. Subsequent references are to this edition, cited parenthetically as *BW*.

inform them" (*BW* 141-43). Looking through the telescopes and the microscope, the Empress considers them to distort information in such a way that this information actually leads them further away from the truth. The Empress views the glass barriers of the microscopes and telescopes as insurmountable rather than permeable and part of the process of knowledge production. The Empress sees exactly this figurative character of tools such as the microscope as the problem in any knowledge produced with their help. Margaret Cavendish employs the character of the Empress in *The Blazing World*—at least in the first part dedicated to the Empress's creation of the fictional equivalent of the Royal Society—to present her views of experimental philosophy as she has laid them out in *Observations upon Experimental Philosophy*. The Empress's dismissal of the bear-men's experimental philosophy is grounded in Cavendish's understanding of the material interference of the microscope in the observational process.

The Microscope's Power

Coupled with her understanding of the variability and subsequent fallibility of the human senses, Cavendish's fictional account of microscopy's failures in the Empress's eyes emerges most clearly as evidence of her own conception of materialism and politics resulting from her own understanding of natural philosophy and science. On the one hand, Cavendish sees experimental philosophy with its focus on sensory perception as fragmenting the social order.[38] On the other hand, her representation of an absolute ruler in *The Blazing World* highlights the possible arbitrariness of such a rule without reference to tradition or law.[39] Cavendish's disdain

[38] William White, "Science, Factions, and the Persistent Specter of War: Margaret Cavendish's *Blazing World*," *Intersect: The Stanford Journal of Science, Technology, and Society* 2, no. 1 (2009): 41.

[39] Lisa Walters, *Margaret Cavendish: Gender, Science and Politics* (Cambridge: Cambridge University Press, 2014), 141.

for the microscope as exemplified in *The Blazing World* highlights the social and political implications she sees in experimental philosophy, especially when experiments are also conducted in the service of an absolute ruler. Cavendish combines variability in perception and absolutism to demonstrate the detrimental effects both can have on the social and political order. In the episode in which the bear-men present her with their microscopes, the Empress struggles to reconcile her own understanding of the social and political hierarchy of the Blazing World with the lack of such a hierarchy implied in the use of the microscope. The microscopes—just like the telescopes immediately preceding them in the narrative—take on an agential role for the bear-men. In their description to the Empress, the bear-men describe their work with the microscopes: "for they did never delude, but rectify and inform their senses; nay, the world, said they, would be but blind without them, as it has been in former ages before the microscopes were invented" (*BW* 143). The active description of the microscope's agency in this passage reveals Cavendish's view of the material influence experimental tools have on the sensory perception of the world and the resultant representation of the knowledge of the world. Similarly, the objects observed through the microscope exert their own power over the observer when the Empress is shown a flea and a louse through the microscope. Again, Cavendish's use of active language implies agency of the insects as they rest under the lens of the microscope: the "creatures through the microscope appeared so terrible to her sight, that they had almost put her into a swoon" (*BW* 144). The creatures themselves have almost caused the Empress to faint in this episode, rendering her unable to fully present her own account of them in the narrative. The Empress's observation in *The Blazing World* falters at the most fundamental level of the relationship between subject, lens, and object. The Empress lacks the skills for observation through the lenses of the microscope and the telescope and thus sees optical instruments as nothing more than "false

informers" and "mere deluders." Their agency coupled with that of both the observer and the observed results in a non-hierarchical relationship akin to Barad's phenomena. In the Empress's view, all three parts of the observation—subject, object, and microscope—are full of agency, threatening the absolute power of the observer.

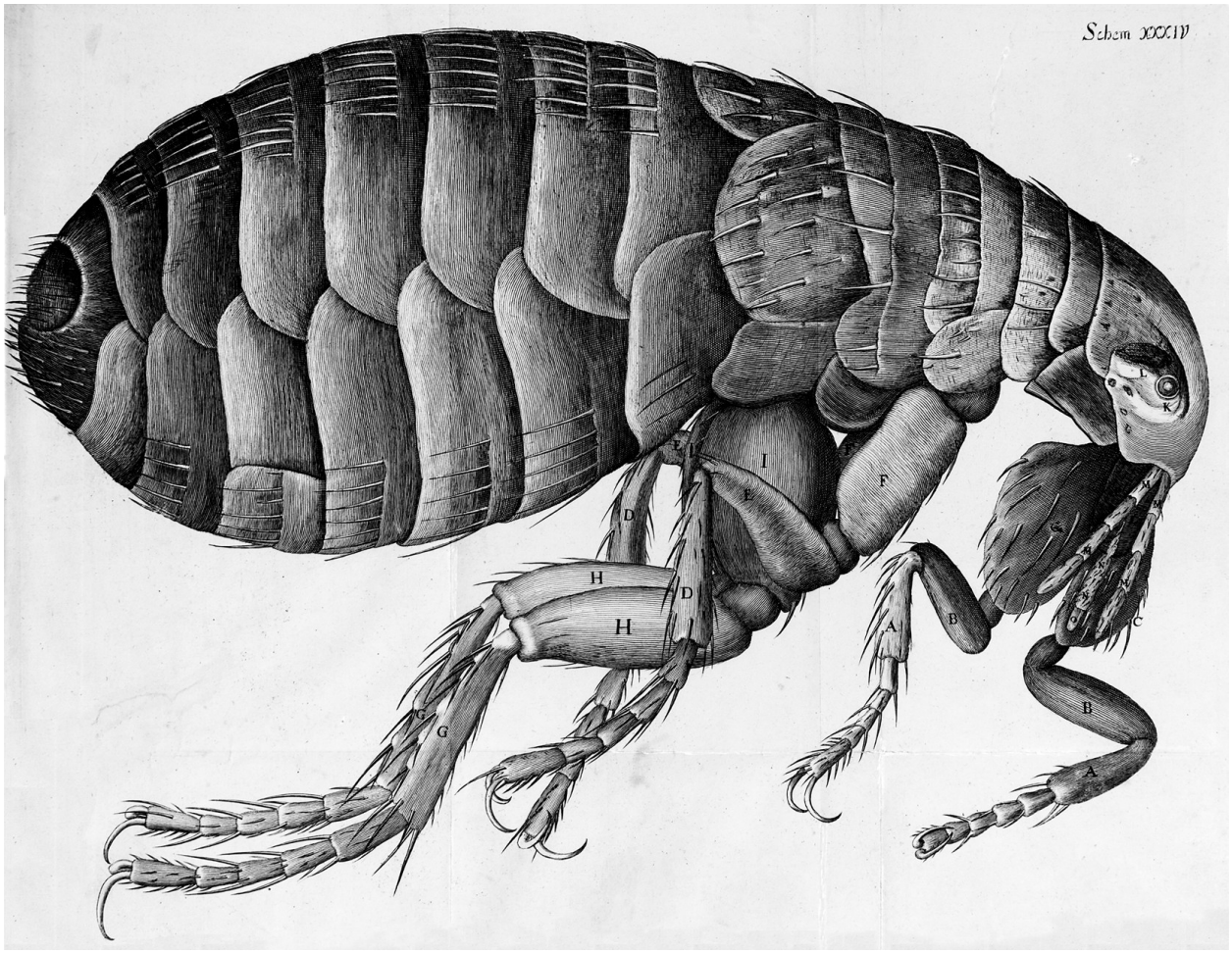

Figure 2: Robert Hooke, *Micrographia*, Flea. Wellcome Collection.

Cavendish's conception of natural philosophy influenced by her understanding of materialism and her conservative politics prove to be the source of her discomfort with microscopic observation because the microscope impedes and complicates a clear hierarchical relationship between observed and observer—the "false informers" and "mere deluders" add

something that the Empress cannot control to the equation while foregrounding the power held by the subject of the observation. In the microscopic observations of the bear-men, the insects exercise power over their observers without any recourse for the observer to change this relationship. For the Empress, the microscope poses a challenge to her absolute rule; for Cavendish herself the microscope materially interferes and configures the observed object. Confounding the relationship between all three parts of observation, the microscope infuses the observed object with more power, as when the insects command the Empress in such a fashion that she almost loses consciousness, than it would possess without the interference. While Cavendish criticizes the Empress as an absolute ruler who revels in having no checks placed on her in *The Blazing World*, she still does not disavow the power the Empress actually holds in the Blazing World. The materiality and agency of the microscope endanger the social and political order as much as the arbitrariness of an absolute ruler. After the bear-men have to answer in the negative to the Empress's question whether "their microscopes could hinder [the lice's] biting" (*BW* 144) the Empress attempts to reassert her own dominance in the situation and deems the microscopes useless toys that turn the lice into worse monsters than they already are. While the microscope becomes part of the phenomenon in observing the louse or the flea, it only has agency within this particular relationship. In *The Blazing World*, the observed insects and objects clutch to their power in the triangular relationship of power that materializes in Cavendish's fictional representation of microscopy.

While it may appear that the observed object's power within this visual relationship takes precedence for Cavendish, it is actually the microscope that emerges as the disturbance of the relationship of control between observer and observed. The microscope and its lenses exacerbate Cavendish's and the Empress's unease with microscopic observation. It is exactly the

microscope's agency that makes the information mediated through the microscope unreliable for both author and character. The agency Cavendish ascribes to the microscope becomes readily apparent in the language the Empress uses when discussing the bear-men's analyses and interpretations of their observations as well as the bear-men's language itself. "Perhaps their microscopes did not truly inform them," the Empress says to the bear-men after their interpretation of the fly's eye (*BW* 143). Similarly, the bear-men point out that "they only made microscopical inspections, and related the figures of the natural parts of creatures according to the presentation of their glasses" (*BW* 144). The microscopes "inform" the observer, and they give the observer a "presentation" of the object that is on the other side of the lens. When asking whether "they had not such sorts of glasses that could enlarge and magnify the shapes of great bodies," the Empress ascribes agency to "the magnifying quality of the glass" (*BW* 144). The most explicit usurpation of power by the microscope in the eyes of the Empress comes, however, when the narrator sums up the bear-men's work: "notwithstanding their great skill, industry and ingenuity in experimental philosophy, they could yet by no means contrive such glasses, by the help of which they could spy out a vacuum, with all its dimensions, nor immaterial substances, non-beings, and mixed-beings, or such that are between something and nothing" (*BW* 145). The glasses themselves keep the bear-men with all of their "skill, industry and ingenuity" from creating something that will actually reveal all of nature's secrets to the observer. The bear-men, the observers, are unable to subjugate the tools that mediate information to their will. Instead, the bear-men are the ones who have to, due to their own inability, submit to the microscope's agency in keeping some parts of nature hidden from their view.

The microscope takes such a central role in Cavendish's narrative because it is—alongside the telescope—the only experimental tool extolled by the Royal Society receiving such

an extensive treatment in *The Blazing World*. One reason for directing the focus on the microscope and other optical instruments was Cavendish's direct response to Robert Hooke's *Micrographia*.[40] As such, the power that both the microscope and the subject wield in this relationship threatens the agency and rule of the observer.[41] Rather than being a hierarchical relationship, it is one of equal power and agency that constantly needs to be renegotiated amongst the different parties. It is exactly this negotiation of the relationship that violates the Empress's ideologies as absolute ruler of the Blazing World—and Cavendish's own, very conservative politics and support of Charles II.[42] Initially, the Empress appears to take part in the new Baconian model of natural philosophy; but only so long as her position of power is not threatened by it. The Empress "having got a sovereign power from the Emperor over all the world, desired to be informed both of the manner of their religion and government," and she "erected schools, and founded several societies," in which "the bear-men were to be her experimental philosophers, the bird-men her astronomers, the fly-, worm- and fish-men her natural philosophers, the ape-men her chemists" (*BW* 134). The Empress's absolute power that is established with her ascension to this position is deeply entrenched in her thirst for knowledge. She needs "to be informed" by experts so that the knowledge itself is consolidated within her.

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[40] For a discussion of Cavendish's *The Blazing World* being a direct response to Robert Hooke's *Micrographia*, see Ian Lawson, "Hybrid Philosophers: Cavendish's Reading of Hooke's Micrographia," in *The Palgrave Handbook of Early Modern Literature and Science*, ed. Howard Marchitello and Evelyn Tribble (London: Palgrave Macmillan UK, 2017), 467–88, https://doi.org/10.1057/978-1-137-46361-6_22.

[41] Jen E. Boyle discusses the relationship between sovereignty and figurative motion in Cavendish's work in comparison with Thomas Hobbes's *Leviathan* in Jen E. Boyle, "Mediating Sovereignty in Thomas Hobbes and Margaret Cavendish," *Studies in English Literature, 1500 - 1900* 58, no. 1 (2018): 145–68, http://dx.doi.org/10.1353/sel.2018.0006.

[42] Al Coppola has established the connection between the spectacle of natural philosophy and politics in the presentation of the *virtuoso* of the late seventeenth century in Al Coppola, "Retraining the Virtuoso's Gaze: Behn's *The Emperor of the Moon*, the Royal Society, and the Spectacles of Science and Politics," *Eighteenth-Century Studies* 41, no. 4 (2008): 481–606; Al Coppola, *The Theater of Experiment: Staging Natural Philosophy in Eighteenth-Century Britain* (New York, NY: Oxford University Press, 2016). For further discussion of Margaret Cavendish's politics and how they influence her views on experimental philosophy, see Aït-Touati, *Fictions of the Cosmos*, 177–78.

The microscope throws a wrench in her conception of absolute sovereignty over the Blazing World. Suddenly, there are other elements that wield power over her.

The materially disruptive force of the microscope in *The Blazing World* offers Margaret Cavendish an exemplification of the unreliability and fallibility of knowledge gained through experimental methods. Much more so than the monstrous lice and fleas making the Empress swoon and almost faint ever could, the microscope challenges the Empress's absolute power over the Blazing World. Simultaneously, the Empress shows how the seventeenth-century microscope faces its own limitations of magnification and clarity of the images passed through the lens. Once the microscope has entered the experimental process of knowledge production, the narrative offers no recourse for the Empress to her regain that power or to make the knowledge generated from microscopic observation reliable. In response to this, the Empress instead highlights the absurdity of microscopic observation to discredit the use of the tool itself. After she recognized that the bear-men's microscopes were unable to "enlarge all sorts of objects," the Empress commands them to create lenses that "could contract [the shape or figure of an object] beneath its natural properties" (*BW* 144). The impracticality and philosophical uselessness of microscopic observation shrinking objects provide Cavendish—and the Empress—with opportunities of criticism that go beyond the microscope's material interference in the process of observation.[43] Ultimately, however, the combination of Cavendish's own materialism and the microscope's unsettling qualities in both *Observations upon Experimental*

[43] Hilda L. Smith, for example, situates Cavendish's distrust in microscopes in the lack of utilitarian applications of the epistemological process in Hilda L. Smith, "Margaret Cavendish and the Microscope as Play," in *Men, Women, and the Birthing of Modern Science*, ed. Judith P. Zinsser (DeKalb, IL: Northern Illinois University Press, 2005), 34–47; and Hilda L. Smith, "Women Intellectuals and Intellectual History: Their Paradigmatic Separation," *Women's History Review* 16, no. 3 (2007): 353–68, https://doi.org/10.1080/09612020601022246. Todd A. Borlik situates her distrust in the microscope's inability to capture objective—as much as that term can be used in the seventeenth century—knowledge in Todd Andrew Borlik, "The Whale Under The Microscope: Technology And Objectivity In Two Renaissance Utopias," in *Philosophies of Technology: Francis Bacon and His Contemporaries*, ed. C. Zittel et al. (Leiden: Brill, 2008), 231–50, https://doi.org/10.1163/ej.9789004170506.i-582.66.

Philosophy and *The Blazing World* result in a disavowal of any knowledge derived from microscopic observations.

As a consequence of Cavendish's portrayal of the microscope as both an epistemological and ontological tool, the microscope threatens the conservative world order that Cavendish envisions both for the Blazing World and the England that she wants to see under the rule of Charles II and his heirs. It is no wonder that Cavendish would see the microscope and experimental philosophy at large to be a threat to the absolute power of the king. After the English Civil War (1642–1651) and the Protectorate (1653–1659), which she spent in exile with her husband, Cavendish wished for a restoration of power to the rightful monarch, Charles II, and a return to the established order in England. The microscope in particular and experimental philosophy in general function in both *Observations* and *The Blazing World* as surrogates for questioning political order that threatens the stability of the state.[44] As a consequence, the Empress has no other choice but to tell the bear-men to destroy their telescopes—a fate the microscopes would have surely shared in the narrative. Only by agreeing to her stipulation "that their disputes and quarrels should remain within their schools, and cause no factions or disturbances in state, or government" are the bear-men able to keep their microscopes (*BW* 142). Cavendish recognized the close connection between experimental philosophy and imperial governments, and she fictionalized her solution to the possible and likely threats experimental philosophy posed to the empire in her eyes: contain the spread of arguments engendered by

[44] For a discussion of Margaret Cavendish's politics and how they influence her views on experimental philosophy, see Aït-Touati, *Fictions of the Cosmos*, 177–78. Within the context of Royalist politics in the seventeenth century, see For a discussion of women writers' engagement with Royalist politics at the end of the seventeenth century, see, for example, Hero Chalmers, *Royalist Women Writers, 1650-1689* (Oxford; New York, NY: Oxford University Press, 2004); Toni Bowers, *Force or Fraud: British Seduction Stories and the Problem of Resistance, 1660-1760* (Oxford; New York, NY: Oxford University Press, 2011); Deborah Boyle, "Fame, Virtue, and Government: Margaret Cavendish on Ethics and Politics," *Journal of the History of Ideas* 67, no. 2 (2006): 251–90; and William White, "Science, Factions, and the Persistent Specter of War."

natural philosophy or destroy of the tools and instruments. The non-hierarchical relationship between subject and object of visual observation laid bare by the microscope thus stands in for another kind of relationship that endangers absolute power in its entirety because no power is absolute at all.

The interference of the lens in the process of observation points to Margaret Cavendish's own conception of materialism. The figurative power of the microscope proves to be a challenge to Cavendish's understanding of the natural world as the magnifying lens creates a material representation of the natural world that is both natural and artificial. The artifice is the challenge here as Cavendish writes, "for art is not only gross in comparison to nature, but, for the most part, deformed and defective, and at best produces mixt or hermaphroditical figures, that is, a third figure between nature and art" (*Observations*, 53). Caught between being both natural and artificial, the figures created through the microscope's lens are incapable of acting as true, objective representations of the natural world. Cavendish's materialism resembles the "ontoepistemological" understanding of scientific phenomena that Karen Barad offers. On the one hand, however, her materialism lays bare the active involvement of the experimental tools within the observation and mediation of information. On the other hand, it reveals the limitations of human senses and experimentation. Cavendish offers the figurative power of reason—still within her conception of materialism—as the solution to these problems. The microscope—along with the telescopes of the bear-men—becomes the focal point of Cavendish's argument about disruptive force of experimental tools and instruments in *The Blazing World*.

Enthralling Triviality

As a consequence of the material-discursive practice of the microscope as Margaret Cavendish presents it in both *Observations upon Experimental Philosophy* and *The Blazing World*, the observed object exerts a kind of power over the observer that is captivating and fascinating. For seventeenth-century microscopists defending their field of inquiry, the subvisible world proves to be enthralling—so much so that they often lost sight of other things; for their critics, on the other hand, the knowledge generated through the microscope proves to be based on the most trivial, and sometimes useless, information possible. The minutest details made visible by the microscope offered insights that had previously been inaccessible to humans in the seventeenth century; despite widening the view of the world, however, microscopic observations were not viewed as revolutionary by most experimental philosophers or laypeople. In response to these dismissals of the knowledge the subvisible world offered, microscopists expanded their tool's utility and "conceptualized the minute particular as both a product of visual observation and subject to theoretical considerations, namely the natural philosopher's learning."[45] The importance of the observation does not merely rest on the subject of the observation but also on the methods that emerge as useful practices in natural philosophy. The microscopic observation of minute details that Cavendish portrays in *The Blazing World* is often tinged by its captivating force, one that makes the observer almost go insane by being enthralled by the smallest, most trivial piece of information. While the materiality of the microscope between the subject and the object of observation disrupts the existing power dynamics between them, the subsequent mesmerizing force of the observed objects causes conflicts both between the Empress and her experimental philosophers and among the bear-men themselves. The arising conflicts even

[45] Chico, "Minute Particulars," 144.

initially lead the Empress to order the bear-men to break their telescopes as these "glasses are false informers, and instead of discovering the truth, delude [the bear-men's] senses" (*BW* 141). The Empress views the disputes and arguments among the bear-men as a direct consequence of their use of optical instruments. Destroying the material tool itself will result in the removal of the conflict's cause—disputes about minute differences—and in a harmonious empire.

Ultimately, however, it is not the observed object—the louse or the flea itself—that captivates the observer according to Margaret Cavendish; rather, it is the monstrous re-configuration and re-presentation the microscope provides. The observer is enthralled by the result of the mixture of natural and artificial figures, by something that to Cavendish is unnatural. This material shift of the observed object goes hand in hand with magnifying the most trivial objects under the microscope and reveals the tension between the objects of study in microscopy and their purported revolutionary knowledge about the natural world. One of Margaret Cavendish's main criticisms of the microscope is that it "can do no more than represent exterior figures in a bigger, and so in a more deformed shape and posture than naturally they are" (*Observations*, 52). While "Hooke offers microscopy as a technology to apprehend interiority"[46] and thus as a revolutionary method of generating new knowledge, Cavendish offers the exact opposite view. The microscope in Cavendish's conception does not merely materially re-figure the observed object but also shifts the work of natural philosophy. She writes about microscopy: "for this art has intoxicated so many men's brains, and wholly employed their thoughts and bodily actions about phenomena, or the exterior figures of objects, as all better arts and studies are laid aside" (*Observations*, 51). The observation of the minutest details mesmerizes experimental philosophers to such a degree that they forget everything else. What Cavendish

[46] Chico, "Minute Particulars," 148.

deems an obsession with the most trivial aspects of the natural world actually exerts so much power over the observer that anyone peering through a microscope will forget about everything else.

The triviality and uselessness of microscopy's subjects along with the materiality of the microscope that Cavendish exposes in *Observations upon Experimental Philosophy* and *The Blazing World* serve to show the disruptions caused by the interference of the microscope itself in the process of observation. The trivial nature of microscopy's subjects in combination with its captivating force threatens the understanding of the natural world that Cavendish presents in her texts. Microscopy thus not only compromises the power dynamic between observer and observed through its material shifts but also through the magnification of the minutest, most trivial details. By presenting microscopy in this way, however, Cavendish reveals more about the characters in *The Blazing World* than about the objects under the microscope's lens. The information the bear-men gather from microscopic observation is not useful to any other character in *The Blazing World*.[47] Even for the bear-men, their optical instruments lead to information that their "telescopes caused more differences and divisions amongst them, than ever they had before" (*BW* 140). Unable to agree on the observations each bear-man had made through the telescope, the bear-men repeat the same procedure with the microscopes they present to the Empress. Thus, when offered to observe a flea through one of the microscopes, the Empress "desired to know whether their microscopes could hinder their biting, or at least show some means how to avoid them? To which they answered, that such arts were mechanical and below that noble study of microscopical observations" (*BW* 144). On the one hand, the Empress tries to find a utilitarian

[47] Tita Chico makes a similar argument in "Minute Particulars" and offers Cavendish as one of Hooke's largest critics, who focuses on the lack of utility of microscopic observations. Cavendish views the uselessness of microscopic observation as a source for disharmony that cannot be overcome. See Chico, "Minute Particulars," 151.

aspect in the observation itself, but she discovers that the material interference stops at the particular phenomenon of observation and does not extend to any other interaction between humans and fleas. On the other hand, the bear-men view any applicable knowledge derived from their observations through both the microscope and the telescope as beneath their station. Magnifying a single flea to monstrous sizes, the microscopes in *The Blazing World* only enlarge the triviality and uselessness of the bear-men's observation while offering no solutions to the problems causes by fleas.

The bear-men actually view the work against lice and fleas as beneath them because that would fall under other parts of natural philosophy. The narrator herself reiterates this fact, and the description of the bear-men's observations through both their microscopes and telescopes would, according to the narrator, "tire even the most patient reader, wherefore I'll pass them by" (*BW* 145). The microscopic observations are tiresome and useless to both the narrator and the Empress herself. The bear-men, however, view their "various glasses" as "employments for [their] senses, and subjects for arguments" (*BW* 142). They offer the bear-men employment because they provide a source for their arguments and disputes, which actually fill up their days. It is exactly these arguments based on useless and trivial information that causes discord among the subjects of the Blazing World. The microscope—along with the telescope—creates artificial knowledge with little to no applicability for the improvement for the Empress's subjects; instead, optic observation in general and microscopic observation in particular in *The Blazing World* offers the bear-men nothing but arguments and disputes. Anything but a harmonious state threatens the Empress's rule in her eyes; one of the reasons for wanting the bear-men to destroy their telescopes is their resultant arguments.

Additionally, Margaret Cavendish also objects to microscopic observation and its triviality because of the superficiality of the collected information. According to Cavendish, the only way we can gather information about the interiority of things is through reasoning and argumentation as reason is "a rational search and enquiry into the causes of natural effects" (*BW*, "To the Reader," 123). Microscopic observation does not provide any substantial information because it will only ever relate the "exterior figures of objects" and "are but superficial wonders" (*Observations*, 51). While she demonstrates that the Empress views microscopic observation as a threat to the world order she wants to establish in the Blazing World, Cavendish also uses the minute observations that the Empress makes at the behest of the bear-men to show that a wish for absolute rule can come from a place of compassion and concern for one's subjects. In response to observing the flea and the louse the bear-men offer the Empress for her observation through the microscope, the Empress "pities much those that are molested with them, especially poor beggars, which although they have nothing to live on themselves, are yet necessitated to maintain and feed of their own flesh and blood, a company of such terrible creatures called lice, who instead of thanks, do reward them with pains, and torment them for giving them nourishment and food" (*BW* 144). Instead of focusing on the interiority of the insects under the microscope—an impossible feat according to her philosophy—Cavendish uses this particular microscopic observation to establish, on the one hand, the Empress as a ruler who is concerned with her subjects' well-being and asking whether microscopes are helpful in fighting off lice and fleas, and, on the other hand, the inadequacy of the bear-men when they have to answer in the negative. The Empress is interested in the practical application of knowledge which is not made possible when tools such as the microscope do not reveal anything about the interiority of the object being observed but instead only exacerbate the triviality of the knowledge and information

about the object's exteriority. So while the microscope interferes materially with the process of observation, it cannot extend this material influence beyond the refiguration of the fleas and lice. Microscopic observation does not offer any material solutions to freeing the beggars from the fleas, which only weakens the utility of the scientific tool.

Beyond the threat to absolute political power that the microscope embodies, Cavendish's—and by extension the Empress's—criticism of microscopic observation is grounded in her view of the fallibility of the human senses. Connecting her criticism to the shortcomings of animal senses, the Empress asks the bear-men to lend the worm-men "some of their best microscopes." However, the bear-men "smilingly answered her Majesty, that their glasses would do them but little service in the bowels of the earth, because there was no light; for, said they, our glasses do only represent exterior objects, according to the various reflections and positions of light; and wheresoever light is wanting, the glasses will do no good" (*BW* 150). The artificiality of the microscope is not able to actually make up for the shortcomings of the senses the Cavendish identifies through the Empress. Rather, it only highlights them even further in this episode, which provides her with another reason to condemn the triviality of microscopic observation.

Beside interfering with the material process of observation, microscopes also rely on the light in which the observations are made. This reliance on outside light sources reveals another shortcoming of the microscope according to Cavendish's materialism. As a tool that should improve our perception of the world, the microscope actually never reveals anything truly invisible that would be worthy of being enthralling. Different light sources lead to different observations of minute details that might actually change the analyses and interpretations of the observer. The bear-men are perfectly aware of this and see no problem with the microscopes'

inability to serve any kind of purpose under the surface of the earth for the worm-men. The worm-men, however, immediately reply that they are "not blind, even in the bowels of the earth; for they could see the several sorts of minerals, as also minute animals, that lived there, which minute animal creatures were not blind either, but had some kind of sensitive perception that was as serviceable to them as sight, taste, smell, touch, hearing, etc. was to other animal creatures" (*BW* 150). The worm-men do not actually need to rely on something as unreliable as the sense of sight to make their observations of minute details, and the minute animals that live in the earth do not need to do so either. Their mode of observation is grounded in "some kind of sensitive perception" instead. Cavendish underlines the particularity and perfection of our senses—they all serve a specific purpose in our lives—but the microscope instead highlights their shortcomings. The bear-men attempt to enter a realm that they are not supposed to enter.

The limitations of the microscope in the observation of minute details are highlighted in this passage and ultimately lead to a strengthened criticism of the enthralling character of microscopic observation. Variations in the "optic sense" between those creatures that live above ground and those that live underground (*BW* 151). It is especially poignant that the Empress readily agrees with all of the worm-men's assessments, "which she thought the most rational that ever she had heard yet" (*BW* 151-52). Cavendish couples the dismissal of the microscope in this passage of *The Blazing World* with a narrative event that emphasizes the triviality of the entire endeavor of microscopic observation. The Empress almost immediately moves on from them, merely asking the worm-men if the minerals and minute animals underground were colorless. The quick appearance and disappearance of the minute animals in the conversation between the Empress and the worm-men points at the overall project of Cavendish's narrative: "*The Blazing World* demonstrates that the ontological status of the minute is commensurate with its size—

trivial; thus, microscopy's obsession with small things is precisely its downfall."[48] The bear-men in *The Blazing World* are obsessed with the observation of small things, but as soon as they cannot use the microscopes in their narrowly conceived realm, they fall short in the arguments they can provide for the Empress. Instead, *The Blazing World* reveals only the bear-men's vanity and uselessness because of their use of the material microscope.

Cavendish stresses her criticism of the bear-men's microscopic observation and its material triviality by repeatedly displaying their condescension towards the Empress, their absolute ruler. They merely submit to her political power, but when it comes to natural philosophy, she misunderstands their projects. Cavendish uses this condescension that the bear-men display as a substitute for her own experience visiting the Royal Society. When Margaret Cavendish was invited as the first woman to visit the newly founded Royal Society in 1667, not too many members of the Society were happy about her visit.[49] Cavendish already had a reputation for her extravagant dress and the people of London considered her to be a form of entertainment more so than a woman seriously interested in natural philosophy. Members of the Royal Society feared that, by inviting her, they would turn into the laughingstock of London and that they would not be considered as an independent body anymore but rather one that is beholden to noble ladies. While Samuel I. Mintz wrongly describes Cavendish as childlike and unable to comprehend the philosophical experiments that the Royal Society conducted in all of their weight, the exhibition of experiments as entertainment is the point of contention of Cavendish's visit. On the one hand, the fact that a woman is influential enough to garner an

[48] Chico, "Minute Particulars," 146.

[49] For an account of Margaret Cavendish's visit to the Royal Society, see Samuel I. Mintz, "The Duchess of Newcastle's Visit to the Royal Society," *The Journal of English and Germanic Philology* 51, no. 2 (1952): 168–76; Marjorie Hope Nicolson also briefly discusses Cavendish's visit to the Royal Society in Marjorie Nicolson, *Science and Imagination* (Ithaca, NY: Great Seal Books, 1956), 164, 183.

invitation to visit this eminently male society bothers many contemporaries. On the other hand, the philosophers are forced to cease their experiments and instead perform them. Cavendish, in part, views microscopic observation of minute details as trivial because that is how they were presented to her in 1665. Consequently, when the bear-men "smilingly answered her Majesty" repeatedly throughout the Empress's questioning of their observations, they reveal their own biases against the Empress's knowledge (*BW* 144, 150). While they recognize her power over them, as they "most humbly beseech your Imperial Majesty to spare our glasses, which are our only delight, and as dear to us as our lives," they do not actually agree with what she perceives to be a superior knowledge of natural philosophy (*BW* 142). Cavendish's bear-men thus serve as caricatures of the natural philosophers Cavendish encountered during her visit to the Royal Society and with whom she interacted throughout her life who would always dismiss her philosophical ideas.[50] The microscope always stays at the center of Cavendish's disdain with optical technologies, but she extends the criticism she levies against the microscope to the bear-men, which then also applies to the experimental philosophers of the Royal Society. They become examples of the manifestation of being enthralled by trivial and useless information.

Spectacle and politics are brought together and culminate at the most trivial of possible observations according to Cavendish and many others. It is no wonder then that Cavendish would be so critical of the microscope in her presentation of the bear-men. Robert Boyle himself, for example, was unhappy about the spectacle of Cavendish's visit and the focus on spectacular observations of the subvisible world in general. He writes, "but though with me, who love to measure Physical things by their *use*, not their *strangeness*, or *prettiness*, the partiality of others prevails not to make me over value these, or look upon them in themselves as other than

[50] For a discussion of the bear-men as caricatures of experimental philosophers, see, for example, Lawson, "Bears in Eden, or, This Is Not the Garden You're Looking for"; and Lawson, "Hybrid Philosophers.".

Trifles."[51] While they fundamentally disagree on how new knowledge should be created and acquired, Cavendish and Boyle do agree on one aspect of experimental philosophy: the knowledge created should be *useful* more so than merely spectacular. This is the crux of Cavendish's unhappiness with the microscope as an optical tool: simply observing the minutest details of the specimen, in her view, does not provide the observer with any information or knowledge on *how* and *why* the specimen functions on an interior level. Consequently, microscopic observation does not provide us with the knowledge of how to fight off lice and fleas, for example, or, as Ian Lawson puts it, "instead of getting lost in Hooke's mechanical micro-world of well-fed lice, we are free to reflect on the absurdity and tedium of his observations, and, what is more, we can reflect on the purpose and utility of mechanical natural philosophy."[52] The lack of utility of minute observations in Cavendish's eyes only heightens the ridiculous nature of the *virtuosi* of the Royal Society, and she uses the microscope in *The Blazing World* to offer the reader a glimpse of the observer's interiority.

The Articulation and Expression of Visual Knowledge

In inductive reasoning, articulation and expression of visual observation—whether in verbal descriptions or visual representations of the microscopic subjects—form a necessary step in the production of knowledge. Corroborating information proves to be crucial for a tool that is weighed down by its fight against its own triviality, but this process also marks the step in which most problematic views of the microscope in natural philosophy grow. It is here that the knowledge of the smallest details of the observed object needs to pass from visual to verbal (and

[51] Robert Boyle, *Experiments and Considerations Touching Colours First Occasionally Written, among Some Other Essays to a Friend, and Now Suffer'd to Come Abroad as the Beginning of an Experimental History of Colours* (London, 1664), n.p.

[52] Lawson, "Hybrid Philosophers," 478.

often back to visual) information. Thus, microscopists do not only have to contend with the mediation of the microscope itself, but as a consequence of the solitary observation of minute details, they have to mediate their own mediated observations to others who have made similar observations or, in many cases, never actually have made any of these observations for themselves. Looking through the microscope, microscopists had to transform the visual information into verbal information—often actually accompanied by visual representations of their observations[53]—mediating the visual information through verbal means. The process of mediation of knowledge through the microscope is thus complicated even further, but it also opens up the space for interpretation and comparison, which leads to more and more details and information being collected and shared amongst natural philosophers. In particular, this articulation of observations could be found in "the emergent epistemic genre of the *observationes*," for which one necessary part was "the creation of virtual communities of observers dispersed over time and space, who communicated and pooled their observations in letters and publications."[54] The virtual nature of these communities vastly influences the reliance on previously existing forms of presentation of knowledge. Literary language specifically lends itself to present information and knowledge in terms that are easily understood by a larger group of people, a claim that has most recently been made and supported by both Wendy Beth Hyman and Tita Chico.[55] Drawings and illustrations that form representations of the most regular version of the observed object along with verbal descriptions were shared amongst natural philosophers and people merely interested in microscopic observation. The convergence of literature and

[53] For a discussion of the visual representation of observations focused on the most regular representations, i.e. ignoring aberrations of plants for example, see Lorraine Daston, "Epistemic Images," in *Vision and Instruments: Art, Science, and Technology in Early Modern Europe*, ed. Alina Alexandra Payne (University Park, PA: The Pennsylvania State University Press, 2015), 13–35.

[54] Daston, "The Empire of Observation, 1600–1800," 81.

[55] Hyman, "Seeing the Invisible under the Microscope;" and Chico, *The Experimental Imaginationt*.

natural philosophy in microscopic observation is not surprising, considering "that well through the seventeenth century, microscopic observations partly replicated something stunningly close to the poets' view."[56] The use of analogies, metaphors, and similes proves to be useful in the verbal mediation of microscopic observation, and the microscopists at the end of the seventeenth century make ample use of it. Margaret Cavendish, while recognizing and admiring the value of literary language, provides a different insight into the dangers of articulating visual information based on her "ontoepistemological" nature of scientific phenomena: always refiguring and reconstituting themselves, these phenomena are constantly in motion and thus any information we can gather from them is momentary and fleeting.

Sharing the knowledge mediated through the microscope actually counteracts the problems that people like Margaret Cavendish, but also other natural philosophers, have identified in the microscope. The lenses can be faulty or only show a small area in focus, which makes the use of the microscope in the production of knowledge more challenging. The shift from visual to verbal information proves the revolutionary character of microscopic observation that many people actually overlooked: microscopists needed an entirely new language to describe those observations that were considered by many to be not be very revolutionary at all. However, it was this language that opened them up to even more criticism. When moving from visual to verbal information and "drawn away from observation of actuality into the realm of literary analogy, the natural philosopher looks at a flea for the first time through a microscope and sees not only iris and talon, but also the tiny heroes of paradox and metaphysical speculation. He sees pincers and proboscis, but he cannot resist evoking, too, the hymeneal conceit of the love poet."[57] While Hyman writes about John Donne's "The Flea" in her article, the argument

[56] Hyman, "Seeing the Invisible under the Microscope," 158.
[57] Hyman, "Seeing the Invisible under the Microscope," 175.

about the shift in language as being central to the revolutionary language needed is very much true for many different writings in natural philosophy. Similarly, Tita Chico, writes that "writers during this period understood the fictionality of objectivity and details, representing science as not only forged but also improved by the literary imagination."[58] Drawing on something that is known almost universally—literary language—marks a major component of the articulation and corroboration of observations through the microscope and the resulting knowledge. For Cavendish, however, this articulation of observation also means that their characters expose their own interiority to the other characters and the reader while ignoring the double-mediation of the materiality of the microscope.

Cavendish denies her characters any opportunity to articulate their observations in *The Blazing World*. She purposely refuses to provide any description of microscopic observation beyond the Empress's disgust with what she sees and articulate the monstrous reconfiguration of the observed louse and flea. While natural philosophers like Robert Hooke viewed their observations as marvelous or even beautiful, the Empress describes the louse and the flea she observes as "strangely-shaped creatures" and "monstrous creatures" (*BW* 144). She does not offer any more details of their appearances, while Hooke writes in the opening for "Observation LIII. *Of a* Flea:" "the strength and beauty of this small creature, had it no other relation at all to man, would deserve a description." He goes on to write of the flea's beauty that "the *Microscope* manifests it [the flea] to be all over adorn'd with a curiously polish'd suit of *sable* Armour, neatly jointed, and beset with multitudes of sharp pins, shap'd almost like Porcupine's Quills, or bright conical Steel-bodkins; the head is on either side beautify'd with a quick and round black eye."[59] Hooke turns the flea into a soldier, and in a similar fashion, he describes the louse in

[58] Chico, *The Experimental Imagination*, 2.
[59] Hooke, *Micrographia*, 210.

almost regal terms when he writes in "Observation LIV. *Of a* Louse:" "this is a Creature so officious, that 'twill be known to every one at one time or other, so busie, and so impudent, that it will be intruding it self in every ones company, and so proud and aspiring withal, that it fears not to trample on the best, and affects nothing so much as a Crown."[60] Hooke's language implies wonder and amazement at an insect that is this small to have such a character. The microscopic observations of the louse and the flea give Hooke better insight into the actual character of those things he observes through the microscope. However, instead of merely reproducing the figurative language of Hooke, Cavendish has both the Empress and the narrator completely eliminate any kind of representation of the visual observation at all and focuses on the materiality of the microscope instead. On the one hand, this leads to the impossibility of sharing and corroborating the knowledge produced through the use of the microscope. On the other hand, she prevents the knowledge from posing any threat to her absolute power.

Cavendish foregrounds the parasitic nature of lice and fleas to demonstrate the inherent dangers of microscopic observation of the most trivial insects as it does not reveal any knowledge of the interiority of lice and fleas. With the foregone conclusion of wanting to see the insects as monstrous, the Empress does exactly that. The narrator, though, entirely refuses to even share any information on what exactly the Empress saw through the microscope. However, this assessment is not based on any visual observation as the unnamed narrator goes on to say that "the description of all their parts would be very tedious to relate, and therefore I'll forbear it at this present" (*BW* 144). The different foci of Hooke's and Cavendish's descriptions rely heavily on fictionalized accounts that support their own claims about their findings—Hooke defends the microscope and the observation of the trivial, while Cavendish denounces them as

[60] Hooke, *Micrographia*, 211.

dangerous and refuses to provide any articulation of her observation. There is no way for the reader or even the bear-men to contend with the Empress's judgment. Withholding that knowledge affirms her own power and removes any power that either the subject or the microscope might hold over her or the people around her. As such, it makes it impossible to actually argue with the Empress about her judgments and assertions. Whenever she disagrees with the findings of the hybrid creatures, the Empress asserts her own dominance over them and their assessments before changing the topic relatively quickly. She does not give the bear-men a chance to refute her claims of their alleged contradictions "that black was made by want of reflection," but instead directs them to another projects when she tells them, "however, not to interrupt your microscopical inspections…let us see how vegetables appear through your glasses" (*BW* 143). Each instance of the Empress interrogating her hybrid creatures ends with her asking them to move on to another project or herself moving on to another group to question. The refusal to articulate her personal microscopic observation indicates the Empress's claim to absolute power. The expression of her observations would reveal her own interiority to the hybrid creatures, and she only does so as long as it serves her absolute rule. Once they start to dispute her claims, she denies them any further opportunity to do so. The Empress only articulates knowledge at which she could have arrived without microscopic observation so as not to threaten her own rule over the Blazing World.[61] Cavendish employs the Empress's refusal to share and corroborate knowledge collected from the use of various tools and instruments and to instead focus on argumentations with her own thoughts to show the Empress's absolute power

[61] The dismissive nature of the Empress's actions with regard to her natural philosophers extends to every part of her rule. For example, the Empress does not allow any disputation when it comes to the changes she has in mind for the religious life of the Blazing World. Instead, the Empress "consulted with her own thoughts, whether it was possible to convert them all to her own religion, and to that end she resolved to build churches, and make also up a congregation of women, whereof she intended to head herself, and to instruct them in several points of her religion" (*BW* 162). Her process of reasoning without any articulation of said reasoning thus becomes visible in every aspect of the Empress's rule in *The Blazing World*.

over the Blazing World—and Cavendish's absolute power over the fictional world of *The Blazing World*.[62]

Margaret Cavendish employs the microscope in *The Blazing World* and *Observations upon Experimental Philosophy* to expose the flaws in presenting visual observation as an instrument of power. They disrupt the concept of the gaze in showing its weaknesses in exerting power. Both texts highlight the influence of mediating forces between the subjects and objects of visual observation. For Cavendish, microscopes reveal threats to absolute power, whether political or social. They employ the three distinguishing characteristics of the use of the microscope to underline the valid criticisms of magnified observation. For Cavendish, the mediating force of the lenses and the necessary articulation of the observation lead to, on the one hand, distorting the information and, on the other hand, disclosing much more information about the observer's interiority. Cavendish portrays microscopic observation as a danger and threat to absolute political rule as it pertains to every part of civil life through the materiality of the microscope itself as well as the material refiguration of the observed objects. Cavendish views microscopy—and experimental philosophy in general—as incapable of uncovering any interiority of the subject of the observation. She is interested in portraying the microscope as a tool which works against its own best interest because its use can unearth nothing but insecurity in social relationships and the characters' lack of agency in the face of the enthralling nature of microscopic observation. Cavendish shows the dangers that microscopic observation can carry along with it, especially when it comes to the mediating barriers of the microscope, the

[62] For a discussion of the connection between absolute power, natural philosophy, and fiction, see Aït-Touati, *Fictions of the Cosmos*, 177–78; and Frédérique Aït-Touati, "Making Worlds: Invention and Fiction in Bacon and Cavendish," in *The Palgrave Handbook of Early Modern Literature and Science*, ed. Howard Marchitello and Evelyn Tribble (London: Palgrave Macmillan UK, 2017), 499, https://doi.org/10.1057/978-1-137-46361-6_23.

enthralling triviality of the observed subjects, and the articulation and expression of these observations. All three of these characteristics add moments of danger to the observer's absolute rule over the subject of his or her gaze, and Cavendish offers the full spectrum of applicable cases. Cavendish, in her conservative politics, emphasizes the threat experimental philosophy poses for the political and social order of Restoration England.

CHAPTER 2

Cooking Up Knowledge:

Domestic and Scientific Instruction through Recipes in Jane Barker's A Patch-Work Screen for the Ladies

While constructing the patchwork screen, the Lady in *A Patch-Work Screen for the Ladies* "bad [the Servant] go to her House-keeper, and tell her to get a Dish of the *Welsh* Flummery ready, which *Galesia* had taught her last night."[1] This short line establishes one of the novel's central themes here: recipes and instruction are intimately intertwined in Jane Barker's narrative. First, Galesia becomes the instructor, sharing her knowledge with the members of the household, and secondly, recipes are important enough in the *Patch-Work Screen* to interrupt the process of needlework that underlies the entire narrative as the leading metaphor. As a theme dominating the narrative, domestic crafts such as needlework are readily apparent in the title of the novel itself; the underlying focus on both medical and culinary recipes in a domestic setting, however, manifests itself in the inclusion of culinary recipes in verse as well as the poem praising Galesia's medical expertise. Just as the eponymous patchwork screen provides a structural guide for *A Patch-Work Screen for the Ladies*, so does the recipe genre provide Barker's narrative with a guide on two separate, but equally important, levels—the recipe itself and the recipe collection as a whole. The aesthetics of *A Patch-Work Screen for the Ladies* reveal the structural overlap between the "epistemic genres" of the recipe and the patchwork screen.[2]

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[1] Jane Barker, *A Patch-Work Screen for the Ladies*, in *The Galesia Trilogy and Selected Manuscript Poems of Jane Barker*, ed. Carol Shiner Wilson (Oxford; New York, NY: Oxford University Press, 1997), 143. Subsequent references are to this edition.

[2] Gianna Pomata, "Sharing Cases: The *Observationes* in Early Modern Medicine," *Early Science and Medicine* 15, no. 3 (2010): 197, https://doi.org/10.1163/157338210X493932. Pomata defines "epistemic genres" as such genres that present cognitive content in a traditional structure that is built around the presentation of this particular content. That Jane Barker's work needs to be situated within the discourse of natural philosophy and new

This intersection places Jane Barker firmly within the framework of women's domestic use of scientific tools and the domesticity of scientific inquiry in the late seventeenth and early eighteenth centuries. Female instruction in the domestic sphere thus merges with scientific inquiry in Barker's narrative on a material level within the patchwork screen itself.

The structural intersections between recipes and the patchwork screen not only point to the processes of constructing and conveying knowledge, but also to the materiality of these processes. Barker's focus on the materiality of the recipe in conjunction with its instructional capacities emerges in the *Patch-Work Screen* as Galesia and the Lady build the patchwork screen. The focus on knowledge's materiality reinforces Jane Barker's deep engagement with natural philosophy and the natural world around her. The importance of natural philosophy and materiality surfaces most explicitly in those poems and narratives in the novel that deal directly with natural philosophy and in the literal pieces of paper being sewn into the patchwork screen. Natural philosophy's emphasis on the material world and how to make use of it in the Enlightenment is a direct consequence of the evolution of scientific thinking during the early modern period and the Renaissance. The recipe itself toes the line between being a material and an immaterial tool that shows the process of mediation through signification—the recipe has to be written down or put into words in order to fulfill its mediating function. The recipe thus works as a recording and instructional scientific tool which only becomes material in its representational form when it is stored within a recipe collection. Exploration, acceptance, and transcendence of this unstable materiality of knowledge and the existence of one's physical and material boundaries are especially relevant for women in the eighteenth century and mark one of the central themes of *A Patch-Work Screen for the Ladies*. Scholarship on women's lived reality

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science has been shown by Kathryn R. King, *Jane Barker, Exile: A Literary Career, 1675-1725* (Oxford; New York, NY: Clarendon Press, 2000).

of the last few decades reveals, on the one hand, the importance of the material objects women interacted with and points, on the other hand, to a larger cultural connection between the emergence and consolidation of the new science at the turn of the century and the literary excursions of women's writing.[3]

Because they often took on a managerial role in the household, women both shaped and explored more practical aspects of scientific inquiry, such as the recipe and its collection.[4] Ultimately, the recipe proved to be the bridge between the household and scientific spaces. Women largely influenced the practical application of natural philosophy in their everyday lives, though not necessarily in an overtly philosophical manner. By looking at women's writing in conjunction with the development of natural philosophy, it becomes readily apparent that these practical applications of new observations take a hold in their works, bridging the gap between the domestic and the scientific. Because it is so frequently located in the household in the early modern period, natural philosophy is influenced and structured by the women in these households while being hidden behind the men who often took the credit for the work being done there. In the last few decades, women's roles have been investigated further and brought to the

[3] For a discussion of the lived reality of women in the eighteenth century, see Chloe Wigston Smith, *Women, Work, and Clothes in the Eighteenth-Century Novel* (Cambridge: Cambridge University Press, 2013). Smith furthermore argues for a bigger focus on the actual material objects that women work with and that shape their lives instead of focusing largely on women leaving these objects behind in "Gender and the Material Turn," in *Women's Writing, 1660–1830: Feminism and Futures*, ed. Jennie Batchelor and Gillian Dow (London: Palgrave Macmillan, 2016), 159–78. For another overview of women and their engagement with the material world around them, see Jennie Batchelor and Cora Kaplan, eds., *Women and Material Culture, 1660–1830* (London: Palgrave Macmillan UK, 2007), https://doi.org/10.1057/9780230223097. For a more global perspective which spans a larger timeframe, see Maureen Daly Goggin and Beth Fowkes Tobin, eds., *Women and Things, 1750–1950: Gendered Material Strategies* (New York, NY: Routledge, 2016).

[4] For a discussion of the recipe's role within the household and natural philosophy in the early modern period, see Elaine Leong, *Recipes and Everyday Knowledge: Medicine, Science, and the Household in Early Modern England* (Chicago, IL: University of Chicago Press, 2018); and Elaine Leong, "Collecting Knowledge for the Family: Recipes, Gender and Practical Knowledge in the Early Modern English Household," *Centaurus* 55, no. 2 (2013): 81–103, https://doi.org/10.1111/1600-0498.12019.

fore.[5] Women's recipe collections prove to be one of the sources we have to establish their role in the production of knowledge in the household. The recipe's versatility—practical and literary—turn it into a tool that lends itself as a material influence to their literary works. Its flexibility and call to long-established traditions, while contradictory at first glance, let the recipe as a genre reflect the uncertainties of the early English novel that is still looking for its defining formal qualities at the time that Jane Barker published *A Patch-Work Screen for the Ladies*, which takes an experimental approach to the novel form.[6] The material and structural influence of the recipe on Barker's narrative constitutes an additional layer beneath the overlying metaphor of the patchwork screen and textiles in general. Thus considering the recipe and recipe collections as underlying metaphors and guides as well adds to the generically experimental character of the *Patch-Work Screen*.[7] Even more so than the eponymous textiles, the recipe mirrors women's versatility in and engagement with different modes of the production of knowledge in their role as managers of the household and materially finds its way into the narrative itself.

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[5] Patricia Fara, *Pandora's Breeches: Women, Science & Power in the Enlightenment* (London: Pimlico, 2004).

[6] For discussions of the experimental character of *A Patch-Work Screen for the Ladies*, see, for example, Patricia Meyer Spacks, *Novel Beginnings: Experiments in Eighteenth-Century English Fiction* (New Haven, CT: Yale University Press, 2008), 18-20; Ioana Patuleanu, "'Deep Readings and Thin Screens: Narrative Kenosis in Jane Barker's A Patch-Work Screen for the Ladies,'" *Journal of Narrative Theory* 44, no. 2 (2014): 159–82, https://doi.org/10.1353/jnt.2014.0012; Victoria Joule, "'She Did but Take up Old Stories': Generic Fluidity and Women's Life Writing of the Early Eighteenth Century," *Bulletin of the John Rylands Library* 90, no. 2 (September 1, 2014): 47–66, https://doi.org/10.7227/BJRL.90.2.4; Alice Tweedy McGrath, "Unaccountable Form: Queer Failure and Jane Barker's Patchwork Method," *The Eighteenth Century* 60, no. 4 (2019): 353–73, https://doi.org/10.1353/ecy.2019.0028.

[7] For further discussions of the patchwork screen and textiles as major influences on Barker's novel see Samara Anne Cahill, "Novel 'Modes' and 'Indian Goods': Textilic Nationalism in *A Patch-Work Screen for the Ladies* and *The Lining of the Patch Work Screen*," *Studies in Eighteenth-Century Culture* 44, no. 1 (2015): 163–84, https://doi.org/10.1353/sec.2015.0016. The connection between needlework and writing in literary criticism of women's writing is established in Kathryn R. King, "Of Needles and Pens and Women's Work," *Tulsa Studies in Women's Literature* 14, no. 1 (1995): 77–93, https://doi.org/10.2307/464249 and Misty G. Anderson, "Tactile Places: Materializing Desire in Margaret Cavendish and Jane Barker," *Textual Practice* 13, no. 2 (June 1999): 329–52, https://doi.org/10.1080/09502369908582344. For the connection between textiles and the patchwork screen in Barker's novel, see also Smith, *Women, Work, and Clothes*, 70-8.

As household tools, recipe collections produced and collected by women serve as a blend between feminine practices and scientific thought. Because the recipe takes on such an integral role in women's lives and managing the household in the eighteenth century, acknowledgment of its influence on women's creative works needs to become more explicit. Considering the *Patch-Work Screen* beyond the textile framework underlying the novel opens up the possibility of demonstrating the recipe and recipe collections as simultaneously practical and aesthetic tools, just as the "patch-work screens function as useful material objects and also provide spaces for adornment." [8] Constantly reconstituting themselves, the recipe and the recipe collection incorporate various areas of knowledge production that also materialize in women's writing; instructional and creative, the recipe leaves room for interpretation and experimentation as it is shared among friends and acquaintances. The varied nature of the recipe and its collections work against the possible trap of women being limited to just one or two specific skills or tasks in their own knowledge acquisition and production. The knowledge transmitted through recipes was diverse and not confined to specific topics or areas of knowledge that were deemed feminine as "recipes, both medical and culinary, were the main medium for the recording and transmission of information and knowledge in pre-modern households."[9] The tradition from pre-modern households carries over into the eighteenth century, and the recipe's prevalence as a material tool to collect and mediate knowledge becomes apparent in Barker's narrative even though the appearance of recipes is limited even here. Thus blending creative output and scientific thought, Barker uses the instructional qualities and materiality of the recipe to underpin the narrative as a whole.

[8] Smith, *Women, Work, and Clothes*, 70.

[9] Leong, "Collecting Knowledge for the Family," 83. Leong is careful to point out here already that recipe collections are often the result of collaborative efforts across genders and generations. But the recipe comes to the forefront as a structural and aesthetic tool especially in women's literary writing.

The mixture of medical and culinary recipes both within manuscript recipe collections and *A Patch-Work Screen for the Ladies* shines a light on the possibility of aesthetic repurposing of incomplete and infinite, but materially bounded, knowledge production and scientific inquiry present in Barker's novel. The recipe during the Restoration and early eighteenth century functions as a bridge between more professional natural philosophers and laypeople. It demonstrates that "the cultural boundaries between the New Science and lay readers were also porous, which meant that writers who were not natural philosophers could pick up the ideas and discourse. As a result, natural philosophy appears in just about every genre available in the seventeenth century and catalyzed the development of others."[10] The lack of generic and aesthetic boundaries in both the seventeenth and early eighteenth centuries and the mutual influence of all kinds of writing—literary, philosophical, scientific—are a testament to the ubiquity of natural philosophy.[11] The generic overlap and imprecision found in recipe collections is also found in Barker's narrative in the inclusion of culinary recipes, the allusion to medical recipes, and the mixture of different literary genres which gives the novel the character of a miscellany. The incompleteness of the *Patch-Work Screen* intensifies the text's project of instruction that remains unfinished, and the mixing of different genres in the same manner that recipe collections mix culinary and medical recipes always hints at something more to come. Jane Barker's non-linear approach to structuring *A Patch-Work Screen for the Ladies* is reminiscent of domestic genres that are focused on taking care of the family and the household such as the manuscript recipe collection. Barker consciously repurposes these structures in her

[10] Karen Bloom Gevirtz, "Philosophy and/in Verse: Jane Barker's 'Farewell to Poetry' and the Anatomy of Emotion," in *The Future of Feminist Eighteenth-Century Scholarship: Beyond Recovery*, ed. Robin Runia (New York, NY: Routledge, 2017), 56, https://doi.org/10.4324/9780203702857-4. Additionally, Gevirtz writes about the collaborative aspect of Barker's *Patch-Work Screen* in Karen Bloom Gevirtz, *Women, the Novel, and Natural Philosophy, 1660–1727* (New York, NY: Palgrave Macmillan, 2014), 78-79.

[11] Tita Chico, *The Experimental Imagination: Literary Knowledge and Science in the British Enlightenment* (Stanford, CA: Stanford University Press, 2018), 25-32.

fictional narrative with an eye towards the natural philosophical approaches to writing to show how these approaches touched upon all kinds of writing. The material contexts of the patchwork screen and the recipe collection serve as the underlying structure of *A Patch-Work Screen for the Ladies* to show the entangled relationship between the materiality of knowledge production and its literary applications.

The Natural Philosophy of Recipes

The two main spaces in which to find the recipe are the laboratory and the household. Within the space of the laboratory in the seventeenth and eighteenth centuries, the recipe is used as a tool to record processes in the exploration of natural philosophy. Often composed by men, these recipes function mostly as instructional manuals for future repetitions of experiments and can be applied to many different use cases. As a scientific tool, the recipe enables natural philosophers to take part in the collaborative effort of their project: only through the corroboration of information and knowledge can one gain reliable knowledge of the natural world. Using specialized language, these recipes are often inaccessible to people outside of the institutions of natural philosophy. Apothecaries' recipes or recipes in the laboratory take on the character of trade secrets that have to be hidden away and are only comprehensible for a select few people. The recipes require the audience to be able to understand this specific language as they become phenomena of scientific knowledge that constitute and figure the world around us through our interaction with them.[12]

A Patch-Work Screen for the Ladies uses this varied and yet standardized nature of both the recipe and the recipe collection to manifest the various roles women take on in the

[12] Karen Michelle Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007), 149.

household. A recipe collection's content incorporates everything from cookery and medicine to economy and household management. These collections are situated within the experimental project of natural philosophy in the Enlightenment and in the collaboration of sharing and collating recipes between friends and acquaintances. By structuring her novel like a recipe collection—seemingly haphazard and from multiple perspectives—and including poetic culinary recipes in her novel, Barker indicates a prevalence of women including these domestic practices in their writing. Because the recipe collection was the main material object used to pass on knowledge in the household, its literary use reveals the scientific and philosophical thought processes women engaged with and served as the material embodiment of this knowledge.[13] Production, codification, and acquisition of knowledge are at the heart of the recipe during the Enlightenment. The recipe is thus simultaneously a work of natural philosophy and a record of various household practices. The symbiotic relationship between literature and scientific and philosophical endeavors in the eighteenth century reveals how much both new forms of literature and methodologies of natural philosophy materially depended on each other.[14] Barker's use of the recipe in *A Patch-Work Screen for the Ladies* reinforces the domestic notion of natural philosophy in conjunction with its practical application.

Documented on paper, the recipe occupies the blurred region between natural philosophy and art at the turn of the century. Natural philosophy and literature engage with the same duality

[13] For a discussion of the influence of the entire household on the creation and maintenance of recipe collections in early modern England, see Leong, *Recipes and Everyday Knowledge* and Michelle DiMeo and Sara Pennell's edited volume *Reading and Writing Recipe Books, 1550–1800*, ed. Michelle DiMeo and Sara Pennell (Manchester: Manchester University Press, 2013). For the role of recipe collections in medical use, see Rebecca Laroche, *Medical Authority and Englishwomen's Herbal Texts, 1550–1650* (Farnham; Burlington, VT: Ashgate, 2009). For a discussion of the ways in which eighteenth-century women used recipe books to form connections with each other, see Amanda E. Herbert, *Female Alliances: Gender, Identity, and Friendship in Early Modern Britain* (New Haven, CT: Yale University Press, 2014), 102–16.

[14] In *The Experimental Imagination*, Tita Chico argues that to be aware of literary conventions and new modes of expression was integral to the establishment of the new science in the eighteenth century. Both were emergent in establishing stable conventions and only together were they able to do so.

of materiality and representation.[15] Thus, genres we might consider to be clearly scientific have to contend with the literariness of representing the material world just as much as poetry and literary works have to. This intersection between the presentation of knowledge and art emerges also in other writings about cookery. In her preface to *The Compleat Housewife*, Eliza Smith writes, "COOKERY, Confectionary, &c. like all other Sciences and Arts, had their Infancy, and did not arrive at a State of Maturity but by slow degrees, various Experiments, and a long Tract of Time."[16] Smith explicitly declares that recipes grow out of and belong in the toolbox of those producing knowledge during the eighteenth century. While not talking about science in the sense that we understand it today, Smith does hint at the shared methodologies between natural philosophy and cookery here. Additionally, she specifies the long history and process of experimentation in cookery. The usage of recipes and their material-discursive construction throughout the seventeenth and eighteenth centuries is a result of centuries according to Smith. As a consequence of this long history, I put the recipe's material influence on narrative techniques center-stage. Over the years, only a few studies have investigated its impact on the aesthetics of literary and creative writings in the eighteenth century.[17] However, the material representation of knowledge through the recipe within the form of Barker's narrative has not yet been the subject of a sustained study. The recipe's textual construction and representation of a process and final product provide literary texts with a unique structure to add meaning to the

[15] Chico, *The Experimental Imagination*, 134.

[16] Eliza Smith, "Preface," in *The Compleat Housewife: Or, Accomplished Gentlewoman's Companion* (London, 1728), A2v.

[17] Gilly Lehmann provides a large overview of the recipe and cookery books in eighteenth-century England in Gilly Lehmann, *The British Housewife: Cookery Books, Cooking and Society in Eighteenth-Century Britain* (Totnes: Prospect Books, 2002). Regarding early modern recipes, see Wendy Wall, *Recipes for Thought: Knowledge and Taste in the Early Modern English Kitchen* (Philadelphia, PA: University of Pennsylvania Press, 2015). Wall establishes a connection between the recipe as a genre and the intellectual and innovative work that went into the creation and collection of recipes in early modern England.

content on a formal level. Material scientific practices influence literary texts just as much as literary language influences scientific language in the Restoration and early eighteenth century.

The recipe and recipe collections are prime examples of the collaborative and instructional nature of tools of natural philosophy and science used in the household. This collective nature of the process of creation is the epitome of the new scientific thought that strengthens its position even further in the eighteenth century. The recipe did not merely occupy a space in the interpersonal exchange of information and tools; but also proved that, "manuscript recipe books were permeable, absorbing all aspects of a woman's life, imagination and intellect."[18] The recipe collection is a manifestation of the combination of the "woman's life, imagination and intellect" and the household she leads. Thus, collaborative and collective do not merely describe the work shared between several people but also between the people and the situation in which they find themselves—be that the household or the laboratory. The recipe collection if the material manifestation of this collective knowledge.

Recipe collections in the seventeenth and eighteenth centuries demonstrate the communal aspect of knowledge production within the domestic sphere that mirrors the production of knowledge promoted by natural philosophers and, in particular, by the Royal Society. Additionally, these collections situate women in particular within the discourses of natural philosophy while relocating these discourses outside of the laboratory and firmly within the domestic sphere of household management. Within recipes, women can explore natural philosophy in its practical applications as it pertains to their own lives. We can see this particularly in a recipe collection such as Mary Burwell Walpole's,[19] in which she collects

[18] Jayne Elisabeth Archer, "The 'Quintessence of Wit': Poems and Recipes in Early Modern Women's Writing," in *Reading and Writing Recipe Books*, ed. Sarah Pennell and Michelle DiMeo, (Manchester: Manchester University Press, 2013), 119.

[19] Mary Burwell Walpole, *Recipes*. The Lewis Walpole Library, LWL Mss. Vol. 6 and LWL Mss. Vol. 7.

several medical recipes related to her daughters' sicknesses. The practical character of recipes is a consequence of the collaborative nature of their collections, as women and men often shared recipes which had been tested or which were thought to be useful. Working out which recipe was actually effective or when certain ingredients might be best used, women used their networks to improve their lives as they had to take care of the household.

Most likely, Jane Barker was well versed in the use of the recipe herself, prompting her to incorporate its structure and content into her narrative, and using them to point out the complex roles women took on in the household because of the recipe's meandering and open structure.[20] Full of different types of handwriting, manuscript recipe collections were usually sorted in the event of their occurrence; when friends or acquaintances sent recipes or a new one had been experimented with in the household, the recipe would be added to the collection while trying to maintain a larger system of classification—according to alphabetical order or the main ingredient, for example. This seemingly meandering material compilation of the recipe collection combined with the recipe's genre conventions supplies the *Patch-Work Screen* with its unique structure and aesthetic. The presumably haphazard collection of poetry, recipes, and short narratives in Barker's novel is on a deeper level heavily structured to resemble, on the one hand, a patchwork screen, and on the other, a recipe collection. Barker employs both the screen and the collection in a similar fashion. Just like the screen, recipe collections in the *Patch-Work Screen* generate "not just natural knowledge but also knowledge about materials and techniques,

[20] Norma Clarke, *The Rise and Fall of the Woman of Letters* (London: Pimlico, 2004), 169. Clarke points out that during her exile in France along with the court of James II and VII and Mary of Modena in France, Barker probably supported herself with the creation and sale of remedies. Additionally, there is also "Dr Barker's Famous Gout Plaister" which Benjamin Crayle advertised in *Delightful and Ingenious Novells* (London, 1685), a collection of short narratives. This gout remedy can be arguably attributed to Jane Barker because of the proven relationship between Barker and Crayle.

household management, social and family strategies, and health and the human body."[21] The expansive quality of the recipe, which goes hand in hand with its ubiquity in domestic life, is presented through another aesthetic and almost ubiquitous object—the patchwork screen.[22] Ultimately, recipes and recipe collections provide primary evidence for women's engagement with domestic tools that enable both scientific inquiry and the practical management of the household.

As tools that mediate knowledge and information, recipes did not exist in a vacuum. Instead, the manuscript recipe of the eighteenth century is the culmination of centuries of material conventions coming together as it marks the convergence of multiple types of writings, as Eliza Smith has pointed out. Simultaneously, the recipe is part of a larger epistemic category that encompasses all types of instructional texts, including "vernacular texts that promised to reveal secret instructions used in various medical, chemical, and artisanal trades."[23] The instructional aspects of these epistemological genres contribute to Barker's unique use of the recipe in her narrative. While these instructional texts reveal secrets to trades, they also act as a collective history of the acquired knowledge of these trades, as, for example, apothecaries at the time used them. Natural philosophers used recipes as well in both their professional endeavors and their private lives. Robert Boyle, one of the most famous examples, composed a recipe collection which he had printed and shared with friends and family and which included his own recipes as well as those by others.[24] As such, they form the material foundation of externalized

[21] Leong, *Recipes and Everyday Knowledge*, 4.

[22] For an additional overview of the recipe between 1600–1800, see Francisco Alonso-Almeida, "Genre Conventions in English Recipes, 1600–1800," in *Reading and Writing Recipe Books, 1550–1800*, ed. Michelle DiMeo and Sara Pennell (Manchester: Manchester University Press, 2013), 68-90.

[23] Michelle DiMeo, "Communicating Medical Recipes: Robert Boyle's Genre and Rhetorical Strategies for Print," in *The Palgrave Handbook of Early Modern Literature and Science*, ed. Howard Marchitello and Evelyn Tribble (London: Palgrave Macmillan, 2017), 210.

[24] Robert Boyle, *Some Receipts of Medicines for the most Part Parable and Simple, Sent to a Friend in America* (London, 1688), *EEBO*. See also Leong, *Recipes and Everyday Knowledge*, 47–48.

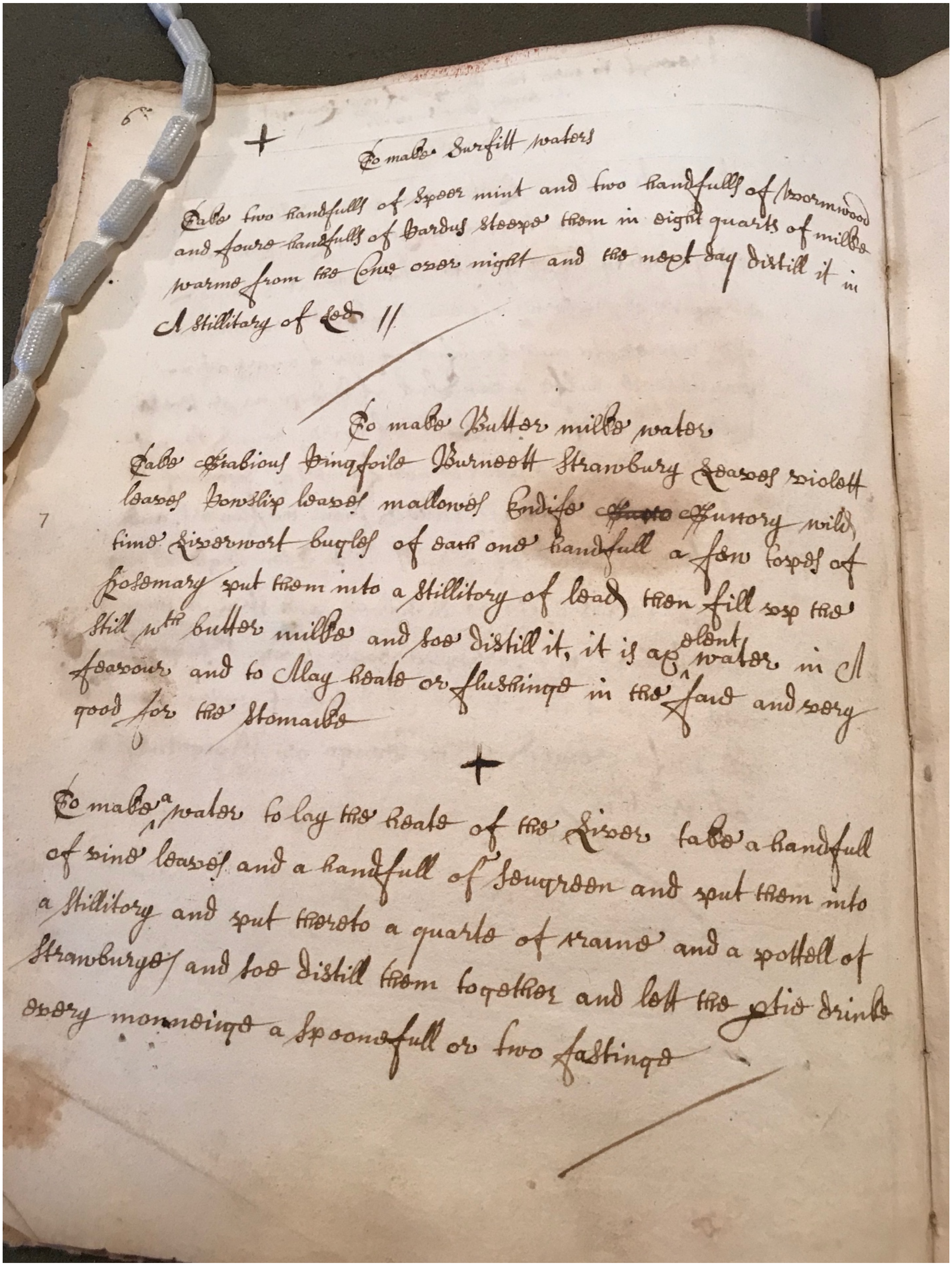
knowledge for others to make new observations and experiments—the recipe is always open to reinterpretation and reinvention. This material foundation is reflected in the unfinished patchwork screen of Barker's novel. The pervasiveness of the genre of the recipe within the domestic sphere, natural philosophy, and trades demonstrates even further the relationship between scientific inquiry and women's writing in the eighteenth century. The recipe was accessible to women on a fundamental level in their role in the management of the household. Thus, the recipe as a tool of mediation of knowledge manifests the patchwork structure of women's worlds and writings as they touched on domestic, aesthetic work, natural philosophy and management of estates.

However, while the recipe is a practical tool used both in the household and the laboratory, its literariness—the ambiguity of representation of material processes—also poses a challenge to its objectivity which is at the core of its instructional nature. It is exactly this challenge and its material scientific practice that open up the space for creative intervention that becomes apparent in the *Patch-Work Screen*. The recipe, representing a practical process, was a translational force which could be shared among people. However, as soon as the recipe is codified and thus turned into indirect instruction, the space for interpretation and error opens up. To counteract this by the seventeenth century, for example, it was not uncommon to include a key to medical recipes in particular that assured readers of the effectiveness of a recipe. Robert Boyle in *Some Receipts of Medicines* uses, for example, alphanumerical references for each recipe included in his short recipe collection to give the reader information about the trials and effectiveness of these recipes, and who made these observations. Recipes seen to be effective by Boyle himself received an "A," for example, which "is the Mark of a Remedy of the highest

Class of these [recipes]."[25] These keys—or even handwritten notes in in the margins of manuscript recipe collections as the plus signs in Figure 3, for example—try to reassure the reader that the instructions are correct and feasible. The written word, however, will always include moments of insecurity and interpretation as "the correspondence between how-to instructions and practice is often problematic. Words typically fall short of unambiguously describing the materials and processes leading to the desired result. … Recipes are translations: they moved artisanal knowledge beyond the workshop."[26] Confining information in an object that needs to be put through the process of mediation in order to be properly understood by its user means that the information contained in this object has to be parsed and executed. The recipe's literariness made the process of interpretation even more complex. Thus, the practical tool that helped women in their role as household managers also stimulated their interpretive and creative capacities. As a consequence, the literariness of the genre of the recipe actually provides a moment of creative intervention for women, bridging the gap between practicality and aesthetics.

[25] Robert Boyle, *Some Receipts of Medicines*, A4r.

[26] Sven Dupré, "Doing It Wrong: The Translation of Artisanal Knowledge and the Codification of Error," in *The Structures of Practical Knowledge* (Cham: Springer, 2017), 170.


6

To make Surfitt waters

Take two handfulls of speer mint and two handfulls of wormwood and foure handfulls of Cardus steepe them in eight quarts of milke warme from the Cowe over night and the next day distill it in A Stillitory of Lead //

To make Butter milke water

Take Scabious Cingfoile Burnett Strawbury leaves violett leaves Cowslip leaves mallowes Endife Sunory wild
7 time Liverwort bugles of each one handfull a few topps of Rosemary put them into a Stillitory of lead then fill up the Still wth butter milke and soe distill it, it is an excelent water in A feavour and to lay heate or flushinge in the face and very good for the stomacke

To make a water to lay the heate of the Liver take a handfull of vine leaves and a handfull of Sengreen and put them into a Stillitory and put thereto a quarte of raine and a pottell of Strawburyes and soe distill them together and lett the ptie drinke every morninge a spoonefull or two fastinge

Figure 3: Recipes in one of Mary Burwell Walpole's recipe collections. Courtesy of the Lewis Walpole Library, Yale University. Walpole, *Recipes*, Mss. Vol. 6.

Overall, the recipe defines a moment of knowledge production that is simultaneously structured and malleable; yet, it also obscures knowledge in its literariness and materiality. No recipe is set in stone but rather occupies a role of constant experimentation, trial, and error. In general, however, there is a basic structure to recipes which changes only minutely throughout the seventeenth and eighteenth centuries. The known structural category of the recipe prepares the reader for the presentation of the content, making it possible to parse the information presented to the reader. Often, manuscript recipe collections also incorporate tables of contents to guide their user through the collection. Disparate types of recipes written by different people might come together on the same page because they have the same central ingredient or because the process of creation is similar. The haphazard appearance of the recipe collection is actually a consequence of the wish to adhere to a higher structural hierarchy and thus an instructional quality that informs the recipe collection. The higher order that recipe collections follow is similar to the higher order that Galesia and the Lady follow in *A Patch-Work Screen for the Ladies*: the orders are both functional and aesthetically pleasing because the goal of the patchwork is its material collection of knowledge of cookery or of a character while simultaneously instructing the reader in both cookery and needlework.

Recipes in the late seventeenth and early eighteenth centuries, while having a distinct character, were fluid in their composition. Generally constituted of narrative instructions, recipes in manuscript collections often followed a single person's method of presenting information. Thus, while one can recognize recipe collections as such, each is unique and can differ vastly from another. A collection's structure and presentation are most often based on its unique purpose in each household and how they are used. The argument has been made that the surviving recipe collections extant in archives nowadays have actually not been used as

extensively in the kitchen and management of the household because the use alone would have in fact destroyed the manuscripts.[27] The fluid recipe character actually explains this discrepancy of surviving manuscripts—some collections were only superficially used and spent most of the time on a shelf or in a drawer, and others were the decorative edition of other, no longer existing manuscripts. Tracing the material history and use of recipe collections in this way underlines the variability of form that also emerges in the *Patch-Work Screen*. The mutability of the recipe also led to its universality and use as a material influence on literary works in other cases—how to make a husband, how to be a good wife, how to write drama are just some of the examples that have been represented with the recipe as a metaphor. The recipe builds the bridge between the laboratory and the household, letting women, who were generally barred from the laboratory unless it was found within the household itself, engage with the material practices of natural philosophy and use them within their own role as managers of the household.

[27] Sara Pennell, "Making Livings, Lives and Archives: Tales of Four Eighteenth-Century Recipe Books," in *Reading and Writing Recipe Books, 1550–1800*, ed. Michelle DiMeo and Sara Pennell (Manchester: Manchester University Press, 2013), 225–26.

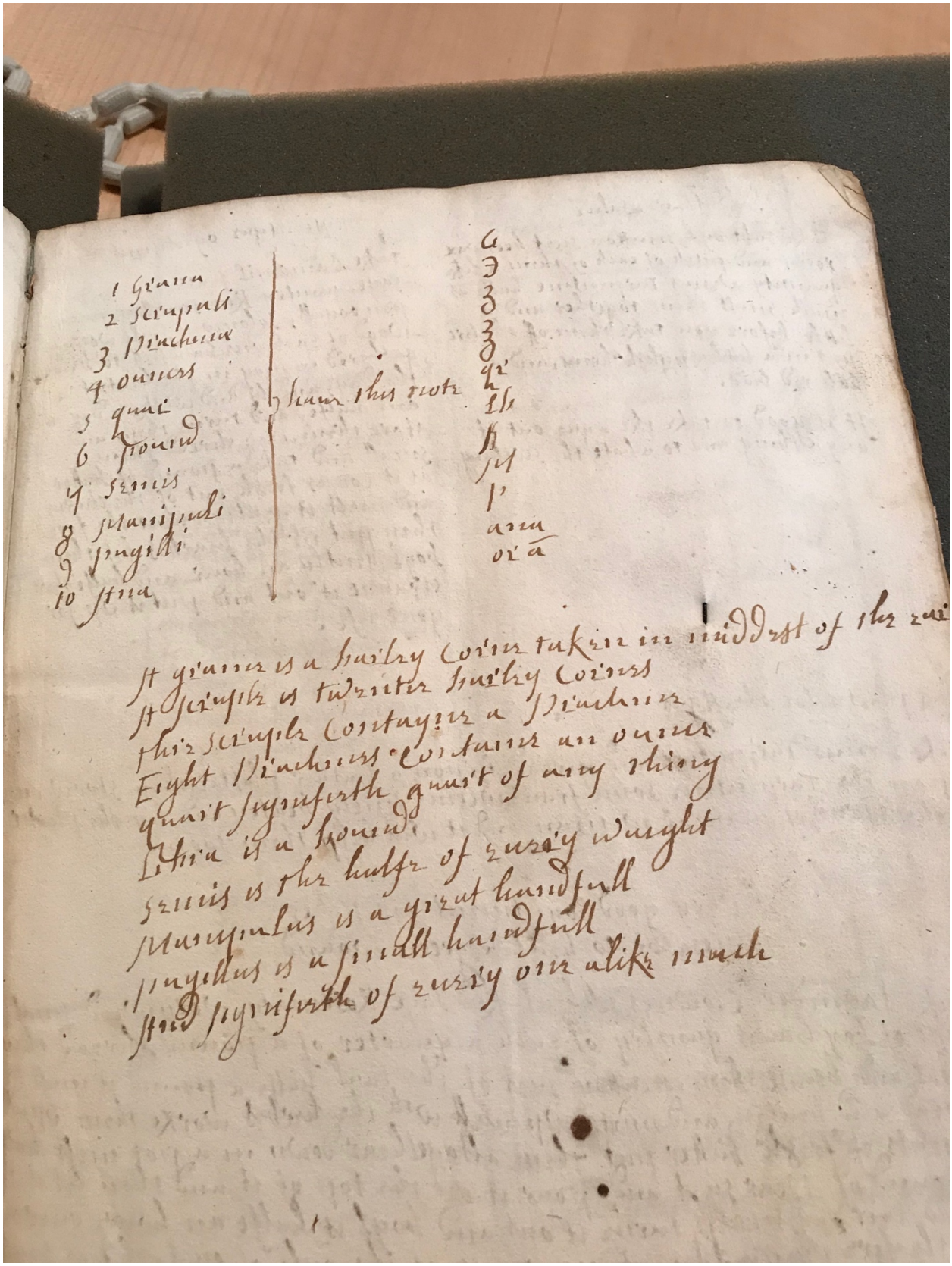


Figure 4: Introductory page of Mary Burwell Walpole's recipe collection. Courtesy of the Lewis Walpole Library, Yale University. Walpole, *Recipes*, Mss. Vol. 6.

In one of her recipe collections Mary Burwell Walpole includes a symbol key at the beginning of her manuscript, just as Robert Boyle did in his recipe collection.[28] Because of the use of shorthand in recipe collections, they often included keys to discern the different entries and help present and future readers to understand the recipes. In the case of one of her recipe collections, Mary Burwell Walpole includes a key to symbols often used by apothecaries and physicians. In Figure 4, we see the key that is most likely used to decipher the physicians' and apothecaries' recipes she includes in the recipe collection. In a table, Walpole provides the reader with the different units of measurement that would be used in recipes as well as the symbols or abbreviations used. The unit most often encountered in manuscript recipe collections is the dram, or as it is presented in Walpole's recipe collection: "drachma." The apothecary's symbol for the dram is ʒ. When used in a recipe directly the number of drams would often be included in the symbol itself in the following manner: ʒi denotes one dram, while ʒss denotes half a dram. The key, however, implies also the knowledge of the units of measurement in the first place even in the case of the reader not recognizing the symbol. While pounds, ounces, and drams might be clearly recognizable for most people, units such as "manipuli," which denotes a "handful," might not be as easily understood by every member of the household.

Functioning similarly, household recipes made up one of the central stores of knowledge and information needed for skillfully running the household. Often being passed down from one person to the next, the collections include recipes in different hands written at different times. While they might include technical language—as some of the tipped or sewn in medical recipes in Mary Burwell Walpole's recipe collection do and the included key shows—they are often used by several members of the household that might not have the same level of education. The

[28] Walpole, *Recipes*. Mss. Vol. 6, fol. 1.

household manuscript recipes represent most clearly the blurry space between the laboratory and the kitchen. Even the collections that are ostensibly only focused on culinary recipes often include medical recipes in some form or another. Ann Clifton's recipe collection, for example, is a beautified manuscript edition that most likely is based on a much messier collection. Clifton's collection includes bills of fare and table arrangements for the different courses. However, roughly in the middle of the recipe collection, Clifton includes the following recipes: "The Fever Water," "Plague Water," a "Syrup for a Consumption Cough," and "The Water of Life."[29] Even within the carefully crafted manuscript collection whose main focus is the collection of culinary recipes and the production of delightful dinners, Clifton cannot abstain from including some recipes which focus entirely on health and medical practices. Beyond indicating the status of the recipe collection between the laboratory and the kitchen, this inclusion points to the multifaceted aspect of the management of the household management.

In the household, then, recipes perform the same practical role as recipes in the laboratory: materially store information for continued use. The recipe thus becomes an "ontoepistemological" tool.[30] The difference between the two lies in the application. The recipes used in household management repurpose the structure of the recipe to function as a tool of storage of information on how to take care of sick family members when it is not feasible to have a physician come and do so—because of rural living or lack of funds—as well as how to entertain guests with culinary highlights. Instead of reproducibility, the household recipe's focus lies in its adaptability and function as an index which can be consulted when needed. It is this on-demand aspect which embodies the instructional aspects of the recipe the most both within

[29] Ann Clifton, *Receipts in Cookery*. The Lewis Walpole Library, Yale University. Recipe nos. 204, 211, 212, 225, 232.

[30] Barad, *Meeting the Universe Halfway*, 44-45.

the laboratory and the household—to increase knowledge and help others. The records of recipes do not only help others learn different facets of household management, but also allow oneself to gain new knowledge in collecting and collating recipes. Instead of merely relying on tipped or sewn in recipes, Mary Burwell Walpole includes in her collections many narrative instructions she has received from physicians for several sicknesses of her daughters.[31] By foregoing the shorthand of the physician and relying on a narrative recipe instead, Walpole is able to teach herself how to take care of her children beyond the time the physician spends with her family. Household recipes are thus much more flexible in their construction and use because they need to touch on diverse aspects of household management. They are used by a wider variety of people than recipes used exclusively by natural philosophers or even physicians and apothecaries, thus making the household manuscript collection much more influential in its use.

Stores of Knowledge

Following the specific structure of a recipe—even with its narrative form in the seventeenth and eighteenth centuries—made it easier to collect that information and knowledge to turn the recipe itself into a workable, material object. The living document of the recipe simultaneously transmits and stores the knowledge that people produce. Recipes mediate information through their formal characteristics which, while somewhat loose throughout the Restoration and early eighteenth century, are recognizable to almost any literate member of the household. The arrangement of language within the recipe itself and within recipe collections at large carries the information that has been stored in them. Thus, form itself carries the meaning in the recipe along with the actual contents.

[31] Walpole, *Recipes, 1673–1676*. Mss. Vol. 7, 33.

Consequently, recipes function as a shorthand for vast amounts of knowledge. Specialized language carries information in two ways. First, it implies the reader's ability to comprehend the particular shorthand. Secondly, it exemplifies the most concise way of representing knowledge. One way to acquire an understanding of the shorthand is to study several recipes within that collection and establish a pattern on your own. The other way to do so is to have the writer and compiler of the recipe collection instruct you on the intricacies of the shorthand used in the collection. Over time, recipes, through their form, started to gain an inherent material configuration that was easily recognized by readers in the household and in the laboratory.[32]

Accordingly, household recipe collections have to be accessible to many different types of people who have to overcome only small hurdles to unlock the knowledge stored within said collections. These hurdles have to deliberately be kept low so that even the members of the household who are minimally literate can access the stored information later and to make the instructional aspect of the collection not too burdensome. The relatively easily accessible information and knowledge contained within recipe collections also suggest that these collections form an entry point to natural philosophy for women. These collections offer women access to a network of knowledge despite being excluded from more formal modes of higher education. Because of its low bar of accessibility, the recipe thus epitomizes women's instruction—both in terms of reception and provision—in household management and scientific thinking. Women's education and instruction contained within the construction of recipe collections thus "advance female independence. Women's recipes allowed them to share

[32] Elaine Leong discusses the fact that early modern recipe collections were often based on so-called "starter" collections. This leads to recipes and their collections needing to have an inherent instructional value. Leong, *Recipes and Everyday Knowledge*, 23.

knowledge about acquiring materials and ingredients, navigating through urban spaces, and negotiating with male shopkeepers."[33] The community created through the use of recipe collections promotes access to education and instruction with the goal of making its members more independent in a society which often relegated women to the kitchen and the parlor.

As a consequence, the use of shorthand for information within recipe collections that is shared amongst women both within urban and rural spaces demonstrates the scientific qualities of medical and culinary knowledge, which, in turn, celebrates the vast amounts of knowledge available to women at the time from all kinds of different avenues. Regarding the medical recipes in these collections, the larger network becomes especially clear as "the knowledge behind household medicine was…not just passed from mother to daughter, but rather was also purchased—from vernacular medical books and medical consultations."[34] In this way, Jane Barker's *Patch-Work Screen* functions as a recipe collection that poses as a piece of needlework. The knowledge that Barker gathers within her narrative—especially the medical and culinary knowledge—is consolidated from many different sources. Even though Galesia largely names her brother who studied medicine as the main source of most of her knowledge, she also includes narratives by other people in the *Patch-Work Screen*. Distilling information into a more concise form ultimately leads to the ability of interpreting this most concise version in creative ways as Barker does in *A Patch-Work Screen for the Ladies*.

Within these networks of knowledge, recipe collections are manifestations of collaborative efforts that also mark the processes of the new science advanced throughout the early modern period that found one of its high points in the foundation of the Royal Society,

[33] Herbert, *Female Alliances*, 108.

[34] Elaine Leong, "Making Medicines in the Early Modern Household," *Bulletin of the History of Medicine* 82, no. 1 (2008): 153, https://doi.org/10.1353/bhm.2008.0042.

promoting the exchange and corroboration of information within the context of natural philosophy as one of the key processes in the production of new knowledge. This collaborative effort of scientific thinking in Barker's narrative has already been pointed out in Rachel Mann's recent article focusing on the microscope and its appearance as a foundation for methodology in the *Patch-Work Screen*.[35] While the connection between Barker's novel and natural philosophy has thus been pointed out before, the collaborative efforts of the new science are not merely limited to such overtly scientific tools as the microscope. The use of recipes in Barker's novel has been overlooked despite recipe collections of the early modern period repeatedly being presented as collaborative, material efforts.

Connections in families and social circles are central to women's work during the Restoration and the early eighteenth century, and collaboration is an inherent mode of work for women during the early modern period and into the eighteenth century. The "family and social networks" of recipe collections that demonstrate the collaborative qualities of knowledge production within the household. She identifies "economies of social credit and debts" and "systems of gift and information exchange" as signs of the collective efforts of recipe collections.[36] We see these same types of collaborative work in *A Patch-Work Screen for the Ladies*. In her address to the reader, Barker writes about her choice to compose a patchwork screen rather than a history such as *Robinson Crusoe* or *Moll Flanders*. Her main justification is that women in her age are fascinated by the "uncommonness" of such a screen, and she goes on to write, "I do not know but this may have been the chief Reason why our *Ladies*, in this latter Age, have pleas'd themselves with this sort of Entertainment; for, whenever one sees a Set of

[35] Rachel Mann, "Jane Barker, Manuscript Culture, and the Epistemology of the Microscope," *Eighteenth-Century Life* 43, no. 1 (2019): 50–75, https://doi.org/10.1215/00982601-7280290.

[36] Leong, *Recipes and Everyday Knowledge*, 21.

Ladies together, their *Sentiments*, are as differently mix'd as the *Patches* in their Work" (51-2). The patchwork screen that provides the major metaphor for the novel's composition resembles in Barker's own presentation the collaborative nature of knowledge production that is characteristic of recipe collections as Leong points out. It is particularly women who partake in this form of knowledge production because it has been inherent to the tasks they have been assigned in the household for decades or even centuries. They usually work together on their needlework and in the management of the household. This type of work is at the heart of the scientific thinking that uses the recipe as an instructional tool; one could even argue that, in this way, women have recognized the value of collaborative scientific inquiry—at least in the way that it is presented in *A Patch-Work Screen for the Ladies*.

Barker goes even further in her presentation of female collaboration in terms of the production of knowledge, explicitly connecting it to natural philosophy. In her description of the patchwork screen as the underlying metaphor of her narrative, Barker writes about the women who construct the screen: "To wit, *Whigs* and *Tories*, *High-Church* and *Low-Church*, *Jacobites* and *Williamites*, and many more Distinctions, which they *divide* and *sub-divide*, 'till at last they make this *Dis-union* meet in an harmonious *Tea-Table* Entertainment" (52). While Barker focuses on presenting political and religious differences amongst the women as they produce the "harmonious" piece of needlework despite their differences, the following sentence connects the idea of collaboration and instruction across social, economic, and political divides to natural philosophy. Barker writes, "this puts me in mind of what I have heard some *Philosophers* assert, about the *Clashing* of *Atoms*, which at last *united* to compose this glorious Fabrick of the UNIVERSE" (52). It is natural philosophy that is in fact the most fruitful in presenting the community involvement in the production of knowledge. The clashing atoms can bring

everything together just as they did with the universe. As such, regarding the recipe collection as a possible structural guide for *A Patch-Work Screen for the Ladies* is more appropriate because it actually straddles the divide between domestic labor and natural philosophy much more so than the needlework that is more overtly visible in the structure of the novel.

Collaboration also meant that people took on different roles in the creation of each collection. Two distinct roles emerge in the process of collection itself: compiler and contributor. Galesia and the Lady in the *Patch-Work Screen* adopt these two roles and provide an example of the networks of knowledge whose physical manifestations are the recipe collections.[37] When the Lady takes Galesia in after her carriage had turned over and she had been lost, the Lady "would take it kindly if [Galesia's] Affairs would permit her to stay with her some time, and assist her in her SCREEN" (74). Rather than merely referencing the construction of a piece of needlework, the use of the term "assist" here simultaneously reinforces the social difference between the two characters, but also hints at a kind of relationship that is reciprocal. The Lady takes on the role of compiler and natural philosopher, and Galesia accepts the role of contributor and assistant. The role Galesia plays in the construction of the patchwork screen is vital—she contributes large parts to it—and the knowledge that is produced within this material construction is mostly a reflection of her knowledge rather than the Lady's. Galesia becomes the main contributor to the patchwork screen and thus the source of knowledge that finds its physical manifestation in the Lady's screen.

Galesia embraces instruction and sharing knowledge with others as her valuable contributions to the piece of needlework throughout the entirety of the *Patch-Work Screen*. Galesia almost revels in her superior knowledge which is manifested in her papers the Lady

[37] On the sociability of Jane Barker's writing, see Kathryn R. King, "Jane Barker, Poetical Recreations, and the Sociable Text," *ELH* 61, no. 3 (1994): 551–70.

insists on using in the patchwork screen itself. Just as recipe collections act as the physical representations of collective knowledge, the patchwork screen in Barker's novel assumes the literal and metaphorical manifestation of Galesia's knowledge guided by the Lady. The patchwork screen centralizes the role of the contributor of knowledge as well as the network and exchange of knowledge production. This centrality of networks and exchange manifests itself within the form of *A Patch-Work Screen for the Ladies* as well. As such, the instructional character of recipe collections proves to be a fruitful source of information on how women shared and produced knowledge in the late seventeenth and early eighteenth centuries as these collections represent the networks in material ways: diverse styles of handwriting, separate pieces of paper, or even commentary on recipes.[38] Collaboration and community are at the center of Barker's *Patch-Work Screen* which blends the eponymous domestic and virtuous labor of needlework and recipe collecting with the natural philosophy forming the background to domestic healthcare at the turn of the century. Barker presents the instructional project of recipe collections and natural philosophy through the patchwork screen itself, which ultimately resembles a recipe collection.

The Recipe Collection as Patchwork

On the surface level, *A Patch-Work Screen for the Ladies* uses the patchwork screen as the guiding metaphor, while, on a deeper level, the recipe collection emerges as the actual material principle of the construction of the patchwork screen. Support for this interpretation comes from the ideas of natural philosophy running throughout the narrative, such as the poem "Anatomy" Galesia offers the Lady to include in the screen. The relationship between patchwork

[38] Herbert, *Female Alliances*, 116.

screens and recipe collections, however, also functions on a material level. As much as the patchwork screen resembles a recipe collection, manuscript recipe collections of the Restoration and the early eighteenth century also resemble pieces of needlework, and particularly patchwork screens, resulting in a reciprocal relationship between the patchwork screen and the recipe collection. The mixture of medical and culinary recipes on the content level and tipped and sewn in recipes on the physical level turns these manuscript collections into literal pieces of patchwork. Jane Barker combines the materiality of the patchwork screen and the recipe collection in her novel to create an experimental novelistic project which touches upon the overlap between literature, science, medicine, and household management.

In addition to the domestic and natural philosophical uses of the recipe which become visible in Barker's novel, the material on which knowledge is recorded and disseminated—paper—connects the *Patch-Work Screen* with the recipe. The patchwork screen in Barker's narrative is made up of pieces of paper, and the way knowledge is circulated in *A Patch-Work Screen for the Ladies* is highly dependent on the ambiguity of the material on which it is recorded. Elaine Leong points out the significant role paper played in the early modern household—for all modes of notetaking or as plaster for wound treatment, for example—as a sort of crossroads of knowledge production and application as "paper filtered, contained, and bound knowledge, objects, and the human body."[39] The application of the recipe as an "ontoepistemological" tool in *A Patch-Work Screen for the Ladies* is in fact a major contribution to the novel's structure which is bolstered by the use of paper for the patchwork screen. Jane Barker merges needlework and the creation and collection of medical and culinary recipes in the

[39] Elaine Leong, "Papering the Household: Paper, Recipes, and Everyday Technologies in Early Modern England," in *Working with Paper: Gendered Practices in the History of Knowledge*, ed. Carla Bittel, Elaine Leong, and Christine von Oertzen (Pittsburgh, PA: University of Pittsburgh Press, 2019), 33.

narrative so that the mixed structure and content of her novel embody the varied nature of knowledge production that women engaged in. Barker expertly weaves her ideas on needlework and recipes as a central medium to transmit information and knowledge to following generations into the eponymous, made-of-paper patchwork screen that ultimately constitutes the novel. Acknowledging the influence of the uses of paper in the household on the aesthetics of Barker's novel situates Barker herself even more firmly within the discourse of natural philosophy during the Restoration and the early the eighteenth century. Paper is the medium on which knowledge is shared, and Barker turns the screen into a document of knowledge for later generations.

The connection between recipe collections and needlework becomes readily apparent when looking at the construction of the patchwork screen in Barker's novel. The screen itself is made up of pieces of paper that Galesia has written recipes, poems, and short stories on. In Galesia's trunks, "they found nothing but Pieces of *Romances*, *Poems*, *Love-Letters*, and the like." Instead of using fabric for the screen, they "resolved to have these [papers] ranged and mixed in due Order, and thereof compose a SCREEN" (74). The Lady does not hesitate at all to switch to the use of paper instead of fabric for the construction of the screen, and the discrepancy in material appears to be negligible in the narrative. One reason that the Lady and the readers might overlook the use of paper in this case is that paper was "so ubiquitous that it was taken for granted, was enmeshed with social constructions of femininity and masculinity, similarly so pervasive as to be sometimes imperceptible."[40] The fact that Jane Barker constructs the patchwork screen out of paper—both literally and metaphorically—almost gets swept under the rug when reading her narrative. Yet, it is exactly because of this use of paper as the material of

[40] Carla Bittel, Elaine Leong, and Christine von Oertzen, "Introduction: Paper, Gender, and the History of Knowledge," in *Working with Paper: Gendered Practices in the History of Knowledge*, ed. Carla Bittel, Elaine Leong, and Christine von Oertzen (Pittsburgh, PA: University of Pittsburgh Press, 2019), 2.

patchworks, recipes, and narrative that we most explicitly see the connection between *A Patch-Work Screen for the Ladies* and recipe collections.

Paper's pervasiveness in people's lives ultimately leads to the repurposing of pieces of paper within household practices. Simon Werrett points out how flexible such a material as paper can be in the household: "the open-endedness of domestic practices was matched by the material open-endedness of paper: it was a material that was flexible, adaptable, and valued for being so."[41] The *Patch-Work Screen* plays with ideas underlying the uses of paper in the process of knowledge production. By making Galesia and the Lady use Galesia's letters, poems, and stories, Barker constructs the piece of needlework that finds its home in the parlor and as a mostly decorative item out of paper instead. On the one hand, the paper patchwork screen forms the frame for the narrative itself for Barker, and, on the other hand, the screen grows into the literal manifestation of Galesia's knowledge and how this knowledge is produced. The centrality of the patchwork in the Lady's apartment—entirely "embellish'd with Furniture of her own making, which was PATCH-WORK" (52) and only the screen itself left unfinished—thus highlights the significance of Galesia's, and by extension Jane Barker's, knowledge within the narrative. The conscious choice to assemble the screen out of scraps of paper brings to the fore the methods and processes of knowledge production as they relate to both paper in general and recipe collections more specifically.

Manuscript recipe collections in particular reflect this construction of knowledge through paper brought together in the form of patchwork. In Figure 5, the double page of a manuscript recipe collection shows how the anonymous compiler of these medical recipes tipped them into

[41] Simon Werrett, "The Sociomateriality of Waste and Scrap Paper in Eighteenth-Century England," in *Working with Paper: Gendered Practices in the History of Knowledge*, ed. Carla Bittel, Elaine Leong, and Christine von Oertzen (Pittsburgh, PA: University of Pittsburgh Press, 2019), 49.

the book itself. The manuscript embodies the idea of the recipe collection as patchwork on the physical level in that it consolidates recipes from different people—only the recipe "For a Dropsie" is attributed to a Dr. Good—by tipping them into the page, creating a new object in the process. On the level of knowledge collection, these pages show the networks that are found behind the material manifestation of knowledge. Recipe collections and the study of paper reveal the "continuities between practices of making and doing and practices of reading and writing, offering a new lens through which to view the intersections between the study of production of material goods and the study of knowledge codification."[42] The materiality of the recipe collection and the patchwork screen in Barker's novel lays bare the codification of Galesia's knowledge as well as how she is able to instruct other characters. In the end, the screen in *A Patch-Work Screen for the Ladies* provides the reader with the literal manifestation of collective knowledge as it is produced and assembled through paper by Galesia herself.

[42] Leong, "Papering the Household," 44.

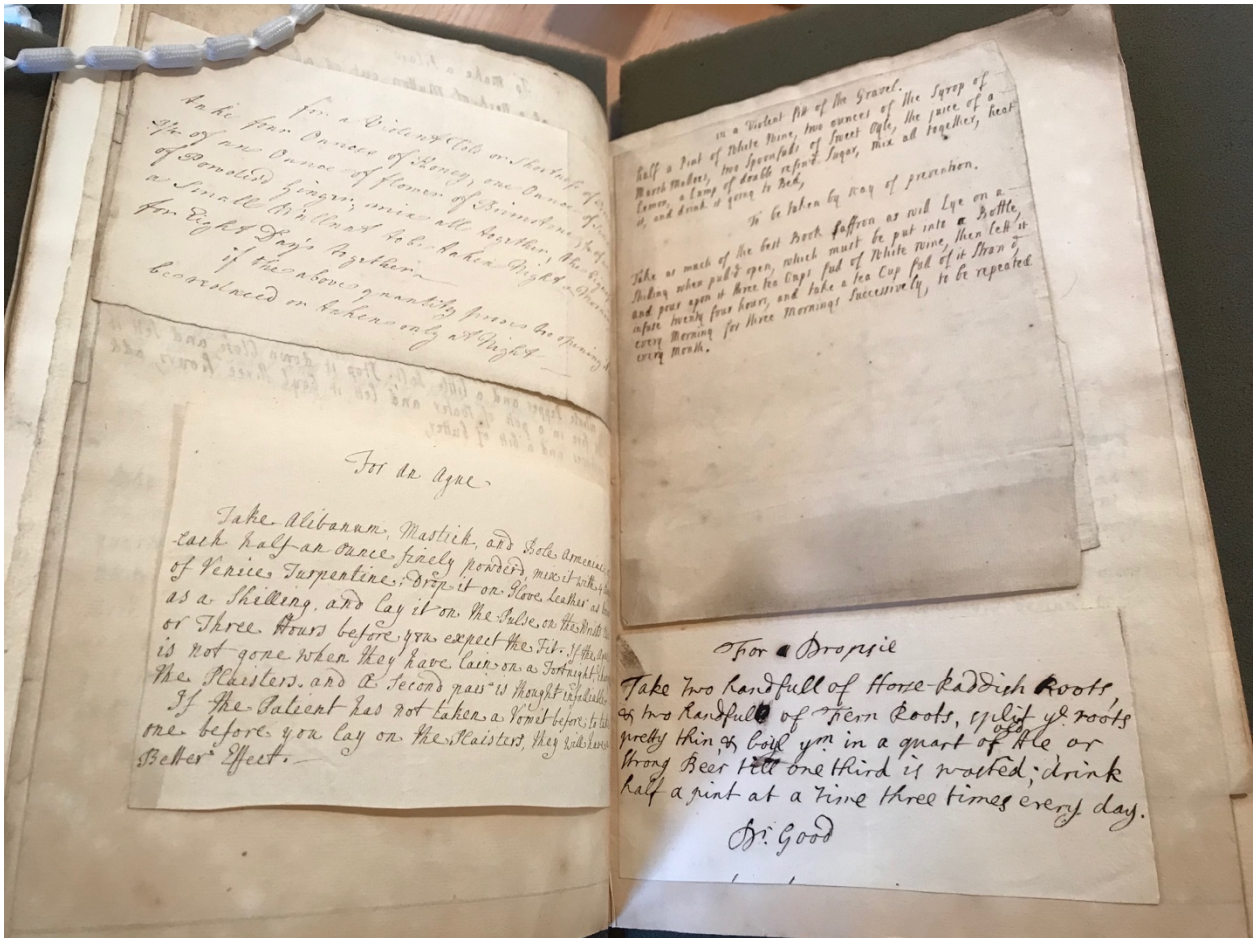


Figure 5: Tipped-in pages in LWL Mss. Vol. 8, fol. 3. Courtesy of the Lewis Walpole Library, Yale University.

Paper in its role in recipe collections in general and in Barker's *Patch-Work Screen* in particular moves the knowledge these texts produce into the ambiguous space between the domestic sphere and the laboratory; however, the use of paper in the novel also points to the unfinished nature of the produced knowledge. Simon Werrett argues that paper takes on an incomplete and infinite status: paper is constantly reworked through different knowledge and art practices during the early modern period and the Enlightenment. Consequently, the use of paper in recipe collections and Barker's novel mirrors the notion of inductive reasoning that knowledge is never finite or absolute but can rather always be improved upon.[43] Paper continually changes

[43] Werrett, "The Sociomateriality of Waste and Scrap Paper in Eighteenth-Century England," 48–51.

its meaning in the eighteenth century as it has different life cycles which build on it. Almost palimpsestic, the recipe collection and the *Patch-Work Screen* enrich themselves by using and reusing their own materiality. Manuscript recipe collections and recipes themselves are always incomplete by virtue of their existence as the starting point of the production of knowledge. Both literally and metaphorically, the recipe collection always leaves space for additions and changes. Similarly, *A Patch-Work Screen for the Ladies* leaves the space at the end of the novel for the conclusion of the screen itself. Only with the third installment of the trilogy does Barker complete the eponymous patchwork screen. Paper and incompleteness in combination show that the recipe collection as patchwork screen occupies a space that transcends and muddles boundaries between physical and epistemological spaces in the late seventeenth and early eighteenth centuries.

The infinite nature of the patchwork screen implied by its material and the recipe collection as a whole also appears within the content of recipes themselves. One defining quality of manuscript recipes is that they often do not include any form of punctuation or only the bare minimum to structure their information. In recipe 36, "To make a Lemon Creame," Mary Burwell Walpole writes the following:

> Take 12: whites of egges and eight yolkes and beat them very well together untill they leave ropeinge then take 6: of y^{e} best Lemones, and cut them in very thin slices pills and all, ~~and putt~~ and putt them into y^{e} egges and beate them agayne together ~~ver~~ very well, and soe putt them into a stronge strayner and strayne out all ye Juice into a dish:, and smooth it nth: sugar to ye likeinge, then sett it on a chafin dish: of roles, and keepe it nth continuall stirring till it come to a good thickness, & soe take it of y^{e} fire, and putt it into y^{e} dish y^{t} you serve it in[44]

[44] Walpole, *Recipes*. Mss. Vol. 6, Recipe no. 38**.**

While the recipe here includes commas to separate the different steps in the process of making the lemon cream, the instructions turn into a run-on sentence that also plays on the infinite nature of the recipe as the only thing that marks it as finished is a stroke under the recipe itself. The recipe itself marks its incomplete status by simply ending without any further punctuation. Leaving the space open for further additions or corrections, the recipe included in Walpole's collection exemplifies the work in progress that pushes both recipe collections and needlework into the realm of knowledge production in natural philosophy. Incompleteness thus identifies the scientific character of the recipe as a tool because it implies that incomplete knowledge is the only achievable goal. We can never have absolute knowledge of any one thing—the principal idea behind the inductive method promoted by Francis Bacon and the Royal Society—and the process of collecting recipes embodies this method within a domestic context through its incomplete character.

It is not merely the content of the recipe collections that thus implies the domain of natural philosophy within the domestic sphere but rather also the form of recipes and recipe collections as instructional tools. Jane Barker blends the processes of continual work and infinite knowledge production and acquisition in her metaphorical patchwork screen. The form of *A Patch-Work Screen for the Ladies* mirrors incomplete knowledge that always guides Barker's instructional project. Each poem and narrative contained within Barker's novel serves to illustrate some point about either Galesia's character or her medical knowledge and how she acquired and used that knowledge in her life. Mary Burwell Walpole's recipe collections prove to be good examples of the formal characteristics of recipe collections and how they work in conjunction with the medical and scientific contents which are reflected in the *Patch-Work Screen*. Walpole uses the physical album to collect a multitude of types of knowledge which can

be useful to her as head of the household. Ultimately, it is this usefulness of knowledge that is at the heart of Barker's narrative and the genre of the recipe collection, especially in the cases of women collecting recipes. Barker is able to use the combination of content and form to present her knowledge grounded both in natural philosophy and needlework while simultaneously passing on this knowledge and teaching her readers.

Aesthetic repurposing of material modes of knowledge production is thus at the heart of Barker's novel. Creativity marks recipe collections themselves as women create and present their networks of knowledge. As such, Barker's use of these aesthetics is a continuation of the creative work women already engaged in in their domestic natural philosophy. The patchwork-like structure of recipe collections emerged as "some female authors created conversations in their recipe books by inscribing and excerpting personal correspondence directly into their collections."[45] Editing correspondence and knowledge within recipe collections, women created an entirely new document whose purpose was multifaceted: present structured information for instructional and storage purposes; demonstrate networks of knowledge; evince the collector's knowledge and creative abilities; and create a collection whose aesthetic reflects the genre. The form of the recipe collection therefore carries its own meaning alongside the natural philosophical meaning that can be ascribed to its contents in almost all cases. Collecting recipes in the late seventeenth and early eighteenth centuries thus is the first step in the cycle of repurposed aesthetics.

In *A Patch-Work Screen for the Ladies*, Jane Barker then takes the next step in repurposing the aesthetics of scientific inquiry and embeds it within the narrative itself. Recognizing the aesthetic qualities of recipe collections that can also be found within patchwork,

[45] Herbert, *Female Alliances*, 114.

Barker uses this aesthetic to guide the construction of her novel. Additionally, she incorporates her own knowledge of the aesthetics of medicine and natural philosophy in general. Barker's "notion that knowledge is derived through a process of accretion" becomes even more apparent when contextualizing the narrative within the tradition of recipe collections.[46] Because of their unfinished status, recipe collections provide the foundation for the constant "process of accretion" even more so than the eponymous patchwork screen in Barker's novel. There is always room to add more knowledge in a recipe collection—using every last bit of the page to leave space open at the end of the book to be filled by following generations and tipping and sewing in recipes are just two ways in which knowledge can be added later on—and if every possible space has been used, the collection of knowledge proceeds in the next book. Barker repurposes the same process in the *Patch-Work Screen*, and ends the novel with the screen unfinished. The *Patch-Work Screen* lays bare the aesthetics that guide natural philosophical thinking, recipe collection, and needlework and employs these aesthetics in the production of knowledge and the process of using that knowledge in an instructional mode.

[46] Mann, "Jane Barker, Manuscript Culture, and the Epistemology of the Microscope," 67.

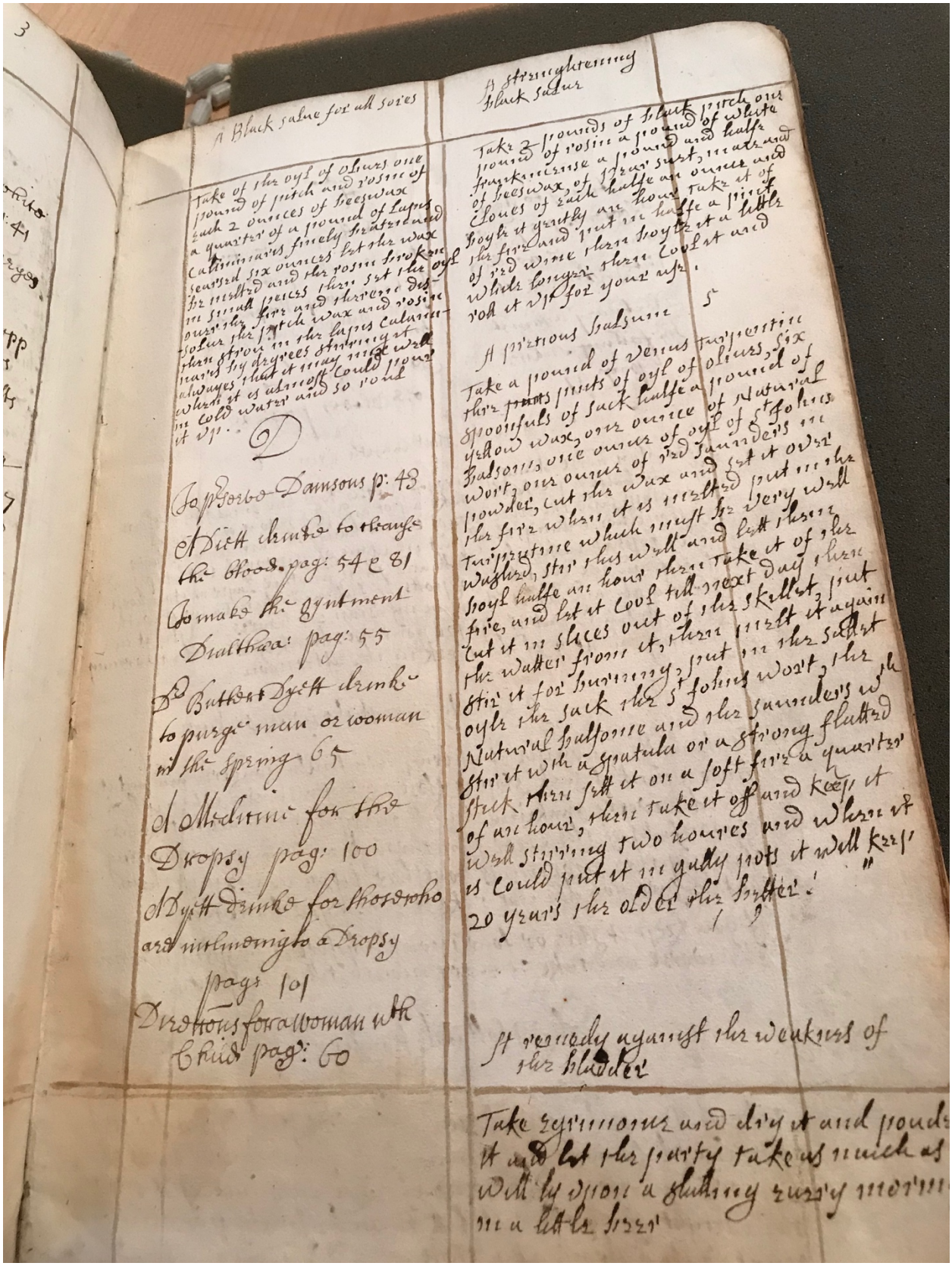


Figure 6: Table of Contents page of Mary Burwell Walpole's recipe collection. Mss. Vol. 7, fol. 3. Courtesy of the Lewis Walpole Library, Yale University.

Barker combines her creative projects in the *Patch-Work Screen* with the manuscript culture of recipes and coterie poetry, some of which she herself had composed earlier in her life and which had been published in *Poetical Recreations*.[47] The inclusion of culinary poetry in *A Patch-Work Screen for the Ladies* expands the underlying structural guide of the patchwork screen to include the manuscript recipe collection. Thus, both screen and collection highlight the domestic labor involved in the production of knowledge. Ultimately, looking at manuscript recipe collections as another source material for both form and content explains the inclusion of culinary recipes in Barker's novel in the first place. The non-linearity of the novel relies on both the textile and material nature of patchwork and paper which come together in Barker's *Patch-Work Screen*.

Culinary Poetry

Drawing the readers' attention to the recipes as instructional tools, Jane Barker pulls us even further into a "gendered community," which women in the seventeenth and eighteenth centuries created "by augmenting, revising, and commenting on the recipes of their friends, employees, and relatives."[48] Thus, the recipe acts in this way within the narrative even more so than the patchwork screen itself, which is a representation of this gendered community: "*for, whenever one sees a Set of Ladies together, their* Sentiments *are as differently mix'd as the* Patches *in their Work*" (52). The inclusion of the recipe as a guiding instrument furthers Barker's illustration of the collaborative and varied nature of women's lives while also maintaining an

[47] Jane Barker, *Poetical Recreations: Consisting of Original Poems, Songs, Odes, &c. With Several New Translations. In Two Parts.* (London, 1688), *EEBO*.

[48] Herbert, *Female Alliances*, 103.

instructional agenda. The recipe provides a structural guide which is much more scientific in its approach to instructing women than the patchwork screen on its own could be.

While the culinary recipes are freely shared with the Lady and her servants, Barker obscures her medical recipes with landscape descriptions and medical epithets for the flowers in these landscapes as well as writing about medical recipes without actually providing them for the reader. Most clearly for the reader, Barker does this in the poem "The *Grove*" (76-9), and when she introduces the poem "On the *Apothecaries*," Galesia tells the reader that she wrote her "*Bills* in *Latin*, with the same manner of *Cyphers* and *Directions* as Doctors do; which Bills and Recipes the Apothecaries fil'd amongst those of the Doctors" (116). While the recipe and its collection act as tools of mediation and storage of knowledge, Barker distinguishes between different levels of who has access to these stores through the modes of mediation. The culinary recipes in the *Patch-Work Screen* are shared first-hand in simple language, and, in their resemblance to nursery rhymes, they almost eschew their codification as they are more part of an oral tradition—a fact which is supported in Barker's novel by the appearance of their manuscript form only after Galesia has performed them. Galesia is always first asked to tell the Lady's servants how to prepare the dishes and only then does the Lady request the recipe on paper for the inclusion in the patchwork screen. The medical recipes, on the other hand, are obscured or at least more difficult to access, only available to a select few who are able to read Latin and the shorthand of apothecaries.[49] The loco-descriptive poetry and odes to apothecaries and herself that Galesia presents to the Lady and the reader make the knowledge less accessible.

[49] For a discussion of the guild practices of apothecaries throughout the eighteenth century, see Anna Simmons, "Trade, Knowledge and Networks: The Activities of the Society of Apothecaries and Its Members in London, *c.* 1670– *c.* 1800," *The British Journal for the History of Science* 52, no. 2 (2019): 279, https://doi.org/10.1017/S0007087419000256.

The culinary recipes Jane Barker included in her novel are some of the strangest and seemingly out-of-place pieces included in the patchwork screen that Galesia and the Lady construct. In the narrative, they literally disrupt the construction of the patchwork screen that Galesia and the Lady are creating out of Galesia's notes. Within the narrative, the first recipe, "The *Czar's Receipt* to make *Punch*," is introduced "as they [Galesia and the Lady] were about to proceed in their Discourse, and look for more *Patches* to carry on their Work" (140). Instead of being able to do so, they are interrupted as the butler enters the room, "saying, He was about to make a Bowl of Punch, and sent to the Stranger-Gentlewoman for her Receipt, which she was talking of the Night before; which *Galesia* readily rehears'd" (140). This moment interrupts the construction of the screen and suggests a simple form of instruction: rote memorization. Dutifully, Galesia says,

> Take Three Bottles from *Spain*, and one from *France*,
> Two from the *Rhine*, and one from *Nance*:
> No Water at all, but a little from *Roses*;
> A red-nos'd Sea-Captain, to mingle the Doses;
> *Limons*, *Nutmeg*, and *Sugar*, with a *Toast* to float on it;
> And a Knot of good Fellows, that will not shrink from it.
>
> (*A Patch-Work Screen for the Ladies*, 141)

Like a schoolteacher, Galesia communicates the recipe for the Czar's punch to the butler. The use of couplets and accentual verse turn the recipe poem into a nursery rhyme. Ending the recipe, Galesia adds a piece of advice that this punch is one that should be shared among friends while acknowledging how powerful the punch is, pointing to this recipe's ultimate function: bring people together and heighten the entertainment. The instructional aspect of the poem thus does not only cover the recipe itself but also its actual performance in the narrative. Just as soon as the recipe is "rehears'd," the interruption is completed, and "with these Instructions, the Butler made his *Exit*" (141). This insertion of a seemingly unrelated—to the patchwork screen at least—episode is over just as soon as the poem and its mission of instruction are completed. On the one

hand, this adds to the recipe's strangeness within the narrative; on the other hand, the short interruption it causes appears almost negligible to the reader.

Galesia thus functions as an intermediary between the Lady and her servants, acting as their instructor in how to serve a household through cookery. When the recipe for the "*Welsh* Flummery" is introduced, Barker writes, "as *Galesia* was about to proceed, the Lady rang for a Servant; and bad him go to her House-keeper, and tell her to get a Dish of the *Welsh* Flummery ready, which *Galesia* had taught her last Night" (143). In this case, the interruption proceeds from the Lady herself rather than a servant. While Galesia is focused on the construction of the patchwork screen, the Lady who manages the household takes care of the dinner preparations. Because of the ambiguous pronoun, it is not clear whether Galesia instructed the Lady or the housekeeper in the preparation of "*Welsh* Flummery." The poem itself again takes on the rhythm of a nursery rhyme—easy to memorize and make the process of instruction engaging: "Then mix 'em all up in a Platter / Of *China* or *Silver*; for that makes no matter" (144). The instructor of the poem is clearly nonchalant in the process of mediation, focusing more on captivating the audience's attention than the instruction itself. Galesia turns culinary recipes for household management into an entertaining pastime which can be easily studied and learned through nursery rhymes.

Shifting from the oral tradition of nursery rhymes to their codified representation, Barker's recipe poem undergoes a significant transformation that manifests knowledge within the patchwork screen in an outwardly disorganized way. After the Lady orders the Welsh flummery to be made, she directs Galesia to "give [her] the Receipt, for it shall make a *Patch* in the SCREEN, as well as that of the *Punch*" (143). Just as in a recipe collection, the recipes in the patchwork screen are arranged in a deliberate and yet seemingly indiscriminate way. The two

recipes the reader has encountered so far in the *Patch-Work Screen* are now materializing into manuscript recipes and are physically sewn into the screen. With the inclusion of these patches, the screen itself turns into a recipe collection. The fragmentary nature of the narrative is reinforced through the recipe included in the patchwork; all three, screen, recipe collection, and narrative, are carefully arranged pieces which only appear to be haphazardly brought together by the author. Together these three provide the reader with a view into the use of the recipe as an instructional and scientific tool. The codification of the recipes in Barker's narrative into the patchwork screen place the immaterial recipe in the material world of the Lady's apartment. This transition furthers the Barker's instructional project of how a collection of knowledge—in recipes or patchwork pieces—functions as its own mediator of said knowledge.

In the last culinary recipe included in the narrative, "A *Receipt* for *French Soup*," the structure of the poem itself shifts compared to the other culinary poems even though its insertion into the narrative is similar to the previous two recipes: Galesia and the Lady "dispos'd themselves in the Morning to go on with their *Patch-work*; the Lady ordering Galesia to resume her Story. Which she was about to do when the Cook came to inquire, what shou'd be for Dinner" (151). The two women are again interrupted in their construction of the patchwork screen, and the Lady once more instructs Galesia to teach a member of her household a recipe: "therefore, if you can tell my Cook how to make a very good *French* Soup, prithee do" (151). Instead of mirroring the style of the nursery rhyme of the previous recipe poems, the poem on French soup now breaks up the couplets, largely slowing down the instruction within the poem. In part, this is due to the fact that "this is a chargeable Soup" (151). The culinary journey has ended in a place where instruction is not accomplished through a nursery rhyme. Instead, Galesia presents the cook and the Lady with a meal which will surely impress the South-Sea Directors,

who have invited themselves, because of its splendor and inclusion of several types of meat. The changed structure of the poem already hints at its purpose in the text and goes beyond imparting knowledge on how to cook dishes.

While Galesia still presents the "*French* Soup" in an entertaining form, its finish now shows cracks and chips because she is economically unable to verify the recipe herself. Thus, she ends the poem on the following line: "And what else you please: for I cannot tell" (151). Galesia herself is unable to complete the recipe because she cannot fathom what to include in this exclusive meal. In her own life, she is too frugal to ever consume such a dish even though she knows about the recipe in the first place. Her frugality emerges fully in this encounter when she implores the Lady to abandon her and her husband's plans to try to impress the South-Sea Directors. The husband's plan "to lay a Debt upon his Estate, to put into this profitable Fund" (151) that the Directors propose can only fail. The shift in the structure of the recipe points to a different level of instruction—one that is defined by the economics of the concept being taught and the recipients of the dish itself. While Barker presents the Czar's punch as a drink to be shared among friends, she presents the French soup as a dish that impresses other people.

The economic instruction that floats beneath the surface of the recipe for French soup also includes moral instruction as the advice not to take part in the scheme the South-Sea Directors propose reveals the moral instruction that goes hand in hand with the economic instruction of the recipe. Barker combines the economic and moral instruction in this poem to show Galesia's superiority in these domains. Food and cookery lend themselves to an argument about this superiority, and Barker makes explicit use of this in the recipe. During the early modern period into the eighteenth century, "dietary moderation was a display of wisdom and

prudence."[50] The focus on dietary asceticism reflects Barker's own ideas, and the presentation of "A *Receipt* for *French Soup*" with its broken nursery-rhyme rhythm suggests a change in the importance of the poem's instruction. Galesia is thus not only using the culinary recipe as a process to instruct people in scientific methodology; she uses the recipe for French soup in particular to demonstrate her own virtue and to educate the people who have taken her in on how to be virtuous as well. Galesia "cannot tell" what else to include in the recipe because it is already overflowing with different types of meat. Her virtue is not only marked by her economic frugality which comes to the fore in this recipe but also in the temperance of consumption of food. She is aware that the Lady and her husband want to impress the South-Sea Directors with the dish they present and the possibility of a lucrative deal; however, through the recipe itself, she shows her own restraint and frugality, which makes her, in this case, the moral authority. By giving the recipe to the Lady to include in the screen, Galesia instructs her not only in cookery but morality and personal economy as well through the materiality of the recipes included in the patchwork screen

The culinary recipes in Jane Barker's *A Patch-Work Screen for the Ladies* demonstrate the ways in which simple instruction can take on many different forms—festivity, economy, and virtue among the most prominent ones. As a consequence of this oral transmission, however, other activities are always interrupted. The disruptive qualities of instruction are removed when the recipes are materialized and thus available at different times to the reader of the collection. The materiality of the recipes mirrors a step in which instruction is codified and thus accessible at all times instead of merely when you have someone teaching you. The mediation of

[50] Steven Shapin, *Never Pure: Historical Studies of Science as If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority* (Baltimore, MD: Johns Hopkins University Press, 2010), 266.

knowledge thus relocates from the human, who can always embellish or conceal information, to the material, written word, which has a claim to being constant—a quality the recipe and its collection constantly eschew. Furthermore, as soon as a recipe is codified on the sheet of paper and its structural guidelines—mirroring a nursery rhyme in the case of Jane Barker—the recipe itself becomes a tool of instruction which makes it possible for said instruction to be guided and placed in specific moments in time and space. The simplicity of the culinary recipes in Jane Barker's narrative prompt the reader to learn the recipes alongside the characters who are actually instructed in the recipes themselves. Barker transcends the time and space between herself and the reader and the disruptive quality of simple instruction by including the recipe within the construction of the patchwork screen itself—we are reading Galesia's (and Jane Barker's) recipe collection when reading *A Patch-Work Screen for the Ladies* while being taught cookery, economics, and morality.

Medical Professions and the Environment

The connection between virtue and the food we consume is not, however, merely connected to the culinary exploits and instructions Barker provides through Galesia. One of the largest themes running through Barker's novel is Galesia's medical training by her brother which mirrors Barker's own medical training.[51] At first glance, "On the *Apothecaries* Filing My *Recipes* amongst the *Doctors*" marks a moment in which Galesia asserts her own place among medical professionals while simultaneously effacing herself in the process to anyone outside of

[51] Kathryn R. King points out the lack of information about Barker's life in conjunction with the claims that have been made about Barker's life without proper evidence. She makes the compelling argument that because everything that Barker presents in her medical poetry and writings "is consistent with what is known about female involvement in early modern medicine," we can make certain assumptions about Barker based on her literary works. King, *Jane Barker, Exile*, 69–72, here 71.

the audience of the poem; the apothecaries do not, after all, know that it was a woman who had written the recipe. It becomes apparent that Galesia, despite the grandiose claims to medical prowess, shows her readers how knowledge that has no "cultural legitimation" in fact makes her "invisible."[52] While Galesia does acknowledge these limitations of not being a legitimate authority to prescribe medications, she comments on the materialized knowledge of medical recipes and positions herself as a member of an exclusive group.[53] The inclusion of "On the *Apothecaries*" along with the culinary recipes in *A Patch-Work Screen for the Ladies* highlights the limits women often encountered in their education, but one that Galesia has overcome. She celebrates her own membership in an elite group because she has received that level of instruction, and yet she cannot and does not want to pass on this education, a fact that becomes all the clearer because she does not actually include any of the medical recipes in the narrative itself.

The materiality of the process of mediation and the resulting practical application of the produced knowledge appeal to Barker. In the novel, Galesia wishes she could be the person who actually applies the knowledge when it comes to medical recipes because, as a woman, she is largely excluded from spaces in which she can do so. Her focus on the recipe, especially on the hidden one, "emphasizes the important place of experiential knowledge."[54] Just as with "A *Receipt* for *French Soup*," Galesia seems to again be motivated by economic gains; hiding the records of her expertise from the reader ensures the continuation of her practice of medicine and

[52] King, 77.

[53] Harold J. Cook, "The Rose Case Reconsidered: Physicians, Apothecaries, and the Law in Augustan England," *Journal of the History of Medicine and Allied Sciences* 45, no. 4 (1990): 527–55, https://doi.org/10.1093/jhmas/45.4.527. Medical practitioners licensed by the College of Physicians were the only ones allowed to prescribe medication, with apothecaries gaining the right in 1695. As a woman, Galesia could not be a member of either group. While Barker here situates herself as part of this exclusive group, she still highlights the collaborative efforts of knowledge production within this group.

[54] Leong, *Recipes and Everyday Knowledge*, 155.

serves as evidence for the notion that collaboration is never indiscriminate. Galesia negotiates her own place between three different roles: apothecary, woman, doctor. Being physically restrained from promoting this expertise in the circles that Galesia aspires to and being intent on recording best practices and strengthening her claims to expertise, she situates herself within the disputes between apothecaries and doctors and takes advantage of the elastic boundaries of each profession.[55]

However, the boundaries between the professions, while flexible, are much more rigid for a woman to cross. In the *Patch-Work Screen* Barker uses Galesia to do so. Galesia occupies a gray area between being a physician and apothecary while being a woman. Galesia reveals her knowledge through her writings that are incorporated into the patchwork screen. Because she cannot join either profession officially, Galesia uses the urban space of London to establish herself in the medical field, albeit in an obscure way that highlights her passivity in the process: "several people came to me for Advice in divers sorts of Maladies, and having tolerable good Luck, I began to be pretty much known" (116). Relying on luck and being "known," Galesia ensures her own appearance of virtue and not overstepping gendered boundaries. Jane Barker herself supposedly acted in a similar way and was known for her knowledge of medicine while in exile in France where she made her living by supplying others living in exile with both remedies and her medical expertise.[56] Galesia carves out her own place between these professions but constantly hides her expertise behind the tales of virtue that she includes in her narrative to the Lady. Just as with the boundaries between manuscript and print and scientific and literary writings, Barker lets her protagonist blur the boundaries between different medical professions whose work largely overlaps in this time period.

[55] Simmons, "Trade, Knowledge and Networks," 279.
[56] Clarke, *The Rise and Fall of the Woman of Letters*, 168-69.

Throughout the novel, Galesia highlights her medical skills through both prose narratives and poems such as "Anatomy" and "On the *Apothecaries*." She inherently connects her medical work to her understanding of virtue. One of the first people who come to her does so because she had heard that Galesia "had some Skill in Physick" (113). Galesia has already built up her reputation as a medical professional, and she is approached by the "young Girl" while they are both attending services at Westminster Abbey (112-3). However, Galesia's virtue and faith keep her from actually helping the woman who approaches her with her tale of being taken advantage of by an older man and ultimately winding up in a brothel. Instead of helping her, Galesia "perceiving her Distemper to be such as I did not well understand, nor cared to meddle withal, recommended her to a Physician of [her] Acquaintance, who was more used to the immodest Harangues necessary on such Occasions" (113). The young girl having contracted a venereal disease does not fall into the category of people that Galesia wants to treat as she doesn't "care to meddle" with that kind of disease. This episode, while not directly related to expertise in medical recipes, establishes Galesia as a professional who upholds her own beliefs and virtues. Galesia employs her medical knowledge to show the reader her virtuous character as well as her social circle, which apparently includes physicians to whom she can refer patients. She thus underpins her role as an instructor in the novel, furthering Barker's project in the *Patch-Work Screen*. The Lady and the readers can trust Galesia's knowledge because she is full of virtue and her medical prowess functions within the boundaries of said virtue.

Throughout the *Patch-Work Screen*, Barker establishes Galesia's knowledge of medicine and natural philosophy in order to turn the character into a figure of authority. Galesia has studied anatomy extensively upon her brother's death and presents her poem on anatomy to the Lady. Galesia combines poetry and natural philosophy as she calls to her muse: "Come, gentle

Muse! assist me now, / A double Wreath plait for my Brow, / Of *Poetry* and *Physick* too" (85). Galesia intertwines her knowledge of natural philosophy with her expertise in poetry, pointing to the figurative power of poetry. She blurs the lines between the two while also pointing to the overlap between the literary language used across both fields and how scientific writing actually depends on figurative language.[57] Describing the body's structure as "*Nature's Architecture*" (86), Galesia follows the physicians and natural philosophers Caspar Bartholin, Thomas Willis, and William Harvey through the body as Dante follows Virgil through hell and purgatory. She presents her knowledge of anatomy by poetically referencing competing ideologies of the body's functions. When they arrive at the brain in "Anatomy," Galesia indicates her own understanding of Galen's, Willis's, and Harvey's ideas of the starting point of life, ultimately demonstrating her superior education which she has received outside of the established institutions of natural philosophy.[58] Through her poetry, Galesia positions herself as an expert amongst physicians, natural philosophers, and poets, and thus as an expert figure whom people can consult as the young girl did, and this role manifests itself within the patchwork screen. On the one hand, this makes the culinary recipes stand out less within the narrative—the reader already knows that Galesia has a wealth of knowledge both in medicine and household management. On the other hand, the reader trusts that the recipes Galesia wrote for the apothecaries to fill are not harmful in any way because Galesia can clearly exhibit her knowledge in creative ways—the knowledge is not merely an effect of rote memorization but rather constantly being worked upon by Galesia herself.

[57] Chico, *The Experimental Imagination*, 134.

[58] For more in-depth discussions of "Anatomy" and its original version in *Poetical Recreations*, "A Farewell to Poetry with a Long Digression on Anatomy," see Mann, "Jane Barker, Manuscript Culture, and the Epistemology of the Microscope"; Gevirtz, "Philosophy and/in Verse: Jane Barker's 'Farewell to Poetry' and the Anatomy of Emotion"; and King, *Jane Barker, Exile*, 84-96.

Before the backdrop of recipe collections, *A Patch-Work Screen for the Ladies* promotes an understanding of the relationship between different medical professions and the place in which Galesia finds her footing.[59] However, Galesia never goes so far as to present her medical work as a profession; instead, she shows the reader that it is her calling. Galesia's reasoning for undertaking this work is twofold: first, the medical help she provides functions as good works and an expression of her faith. Her medical work is thus often presented alongside creative exhortations of said faith or Galesia attending church in some capacity. Secondly and coming most closely to an economic purpose, she uses this work to make a name for herself; it becomes an object of pride. Galesia's move to London, while affording her the time and space to actually make use of her medical knowledge, is not something that she is actually happy about. As "one of the *free-born* People of *England*" (108) Galesia has trouble finding a community that will support her in the city. She tells the Lady, "the Town to me was Wilderness, where, methought, I lost my self and my Time; and what the World there calls Diversion, to me was Confusion" (107). As adjusting to life in the city proves to be difficult for Galesia, she uses her medical work to distract her from the "Silence which the Ignorance of the Town laid upon me" (108). Since she is not comfortable in the kinds of discourses the women she is acquainted with want to engage her in, she inadvertently reproaches and offends these women even when they want to include her in conversation on topics she enjoys, such as "Receipts, Books, and Reading" (108). Galesia secludes herself more and more from these social circles while evidently building her reputation of being skilled in the medical arts.

[59] For an historical overview of women's engagement in and exclusion from medical professions, see Leigh Whaley, *Women and the Practice of Medical Care in Early Modern Europe, 1400-1800* (London: Palgrave Macmillan Limited, 2011).

While in the countryside, Galesia had relatively easy access to ingredients for culinary and medical recipes, which the move to London makes more difficult. In London, Galesia and her mother take up lodgings which awarded her "little Quiet, between the Noise of the Street, our own House, with Lodgers, Visiters, Messages, Howd'ye's, Billets, and a Thousand other Impertinencies" (116). Galesia describes this manner of living as confusing and taking up a great deal of her time. Additionally, the urban living with a landlady does not provide the space to have a large garden that Galesia could have had access to in the countryside; instead, she uses poetry to configure a landscape that is more to her liking. Thus, when Galesia introduces the poem "The *Grove*" to the Lady, she also discusses her admiration of Katherine Philips and her poetry. She says, "Her [Philips's] noble Genius being inimitable especially in Praise of a Country-Life, and Contempt of human Greatness; all which I swallow'd as Draughts of rich Cordial, to enliven the Understanding" (76). Poetry turns into the cordial which comforts Galesia. She consumes poems in a way that again reiterates the patchwork screen's similarity to a recipe collection, and the poems that Barker includes within the narrative thus become themselves the recipes on how to be a virtuous person. Galesia circumvents the lack of access to both culinary and medical ingredients in the city by turning to metaphorical ingredients and portraying poems instead as the source of comfort that would usually be taken up by cordials and food in the household.

Creatively rendering her knowledge through poetry, Galesia—and by extension Jane Barker herself—presents poetry as something to be consumed, even ingested, in order "to enliven the Understanding." Similar to how recipes are only a building block for the final product, medicine or food, the poetry that Galesia consumes and creates serves as a roadmap of her understanding of the world and how to be a virtuous, unmarried woman in the early

eighteenth century. Poetry, food, and medicine merge in *A Patch-Work Screen for the Ladies* and show the intricate connections between literary creativity and domestic recipe collection. Barker also bridges the lack of access to the landscapes that she is accustomed to by including loco-descriptive poetry in which she explicitly creates such a landscape. With the help of "The *Grove*," Barker gains the ability to pull the reader into the rural world that provides her with insight both into herself and her character and into her medical knowledge as it is grounded within the physical world around her.[60] She creates her own idyll in the city.

"The *Grove*" marks the first poem and patch of the screen included in the narrative and combines the divide between country and city with medical, poetical exhortations. Consequently, the idyllic grove—"a Landskip in Verse"—sets up the entire narrative and lets the reader know where to situate Galesia as a character in her world: she prefers and belongs in the countryside but has to relocate to the city until she finds herself in the Lady's home (76). However, she also uses the poem to connect the rural idyll to her medical expertise. The focus on the medical qualities of the flowers Barker includes in the poem are particularly striking to the reader. Instead of describing their visual qualities as one might expect in a drawn landscape, Barker presents her flowers with medical epithets that provide the reader with the knowledge of how certain flowers might be used against certain distempers. She moves through the plants in the poem from their application to physical distempers from head to toe before returning to the head. Jane Barker thus turns the body itself into a landscape with a focus on medical characteristics—both of the flowers and the body. Again, Barker lets her character use poetry to present herself as an expert who can impart her knowledge to the reader, but she has to do so in the rural idyll of "The *Grove*" because she feels stifled in the city.

[60] "The *Grove*" in *A Patch-Work Screen for the Ladies* is a revised version of "The Prospect of a LANDSKIP, Beginning with a GROVE" published in *Poetical Recreations* (1688), 20-23.

While Galesia thus felt in some ways oppressed in the city because of her lack of access to medical gardens, she is mostly restricted because of her gender, which prohibits her from officially being a medical professional. One of the most famous medicinal gardens in England is the Chelsea Physic Garden on the banks of the Thames. Two miles distant from Westminster Abbey in whose vicinity Galesia and her mother had settled in *A Patch-Work Screen for the Ladies*, the Garden was founded by the Society of Apothecaries in 1673. After Sir Hans Sloane took over the patronage of Chelsea Physic Garden, the Garden "was to become the centre of the English horticultural scene and, by training others, [Philip Miller, Sloane's successor] contributed to the foundation of other great gardens."[61] Chelsea functioned as a teaching space in which apothecaries' apprentices learned "which plants were used in physic by demonstrating them at the Chelsea Physic Garden and on herbarizings," which were conducted with the Garden as a base.[62] Chelsea was only accessible to members of the Worshipful Society of Apothecaries of London, members of the Royal Society with whom Chelsea was affiliated after Hans Sloane's patronage, and natural philosophers and physicians. Wider access to the garden has only been granted in 1983.[63] So while Galesia, and Jane Barker herself, would not have had direct access to the Garden, she was probably aware of its existence as it became the premier location for studying botany and becoming an apothecary. Most likely, this knowledge of the Chelsea Physic Garden proved to be another restriction that Jane Barker had to contend with and that she let her main character relive in the *Patch-Work Screen*.

[61] Sue Minter, *The Apothecaries' Garden: A History of the Chelsea Physic Garden* (Stroud: The History Press, 2013), 17.

[62] Penelope Hunting, "The Worshipful Society of Apothecaries of London," *Postgraduate Medical Journal* 80, no. 939 (2004): 42, https://doi.org/10.1136/pmj.2003.015933.

[63] Minter, *The Apothecaries' Garden*, 100-01.

Without access to a garden such as the Chelsea Physic Garden, Galesia instead use "The *Grove*" to create her own garden that offers her the opportunity to go on herborizings while also strengthening her creative abilities in writing poetry about such a garden.[64] Instead of providing a recipe in which she merely supplies the reader with the knowledge of different ingredients and presenting her pharmaceutical knowledge in that way, Galesia makes use of her experiences in the countryside and portrays the landscape one would encounter while on such an herborizing mission. Rather than providing the reader with a poetic recipe, Galesia demonstrates her medical expertise in a more general way in "The *Grove*." Galesia uses the poem to promote nature's superiority in the medical field as "*Nature's Culture* is so well express'd, / That *Art* herself would wish to be so dress'd" (77). Art can only clothe itself in these garments that are innate to "*Nature's Culture*," and humans can only ever hope to achieve as much skill through art as nature has on its own. Galesia praises the landscape before she even provides the reader with any details of the grove itself. Contextualizing the literary grove by using sartorial metaphors, Galesia maintains the textile imagery that lies beneath the entirety of *A Patch-Work Screen for the Ladies*. The sun, for example, "conspires with ev'ry Tree, / To deck the *Earth* in Landskip-Tapistry," and "There a soft grassy Cloth of State is spread; / With Gems and gayest Flow'rs imbroider'd o'er" (77). Just as with the entire narrative, Barker again uses the sartorial metaphor to set up her discussion of medical instructions and the possibility of using nature for medical purposes. The fact that she can create such a landscape that merely exists in her mind positions Galesia again as the instructor in the novel, and she materializes her knowledge of the natural world within the patchwork screen.

[64] "Herborizings" in the contexts of the Chelsea Physic Garden and apothecaries' work mean, on the one hand, going out to collect herbs and plants for later use in medicines or for planting them in the garden, and, on the other hand, tending to the herbs and plants one has already grown in the garden.

Barker uses this poem to establish the connections between various fields of knowledge that Galesia possesses: countryside living and botany, needlework, and household management. Barker's descriptions of the embroidery of the natural cloth that lies over the landscape she creates through words are the most overtly medical parts of the poem. She illustrates the flowers contained in this embroidery in "The *Grove*" in the following manner:

> Cephalick *Cowslips*, Cordial *Violets*.
> The cooling Diuretick *Woodbine* grows,
> Supported by th'Scorbutick *Canker-Rose*.
> Splenetick *Columbines* their Heads hang down,
> As if displeas'd their Vertue should be known.
> (*A Patch-Work Screen for the Ladies*, 77)

Using epithets to describe the flowers in the poem, Barker distills the function of the flowers down to their medicinal value rather than their beauty. She provides her reader with the main medical uses of the flowers that adorn the "Cloth of State" while additionally gesturing to the royal characteristic of nature. Barker makes use of and turns on their head the sensual and visual representations of nature that became a staple of early eighteenth-century loco-descriptive poetry, as "nature poetry became deeply invested in techniques for depicting real acts of seeing and sensing space."[65] She delivers a tangible visual sense of the grove while simultaneously moving readers away from the visual and making them instead focus on the utility of each flower in a medical sense. The poem thus moves the reader from a mere aesthetic, sensual view of the flora in the landscape to a more utilitarian depiction. It is exactly this move that compels our consideration of the recipe collections as another structural source for *A Patch-Work Screen for the Ladies* alongside the textile patchwork screen: aesthetics need to be combined with utility, and the patchwork screen as recipe collection does so.

[65] Elizabeth Oldfather, "'Snatched' into *The Seasons*: The Cognitive Roots of Loco-Descriptive Form," *The Eighteenth Century* 56, no. 4 (2015): 447, https://doi.org/10.1353/ecy.2015.0031.

Barker explores the connection between medicine and the environment and how we can use our aesthetically pleasing environment for medical purposes, but she divides this knowledge into different levels. While Barker makes use of medical epithets for the flowers in the previous section of the poem, she then goes on to merely listing the flowers instead. In the grove, there grow

> *Pinks*, *Lillies*, *Daisies*, *Bettony*, *Eye bright*,
> To purge the Head, strengthen or clear the Sight.
> Some mollify, some draw, some Ulcers clear,
> Some purify, and some perfume the Air.
> (*A Patch-Work Screen for the Ladies*, 77-8)

Now, Galesia becomes less clear about the medicinal qualities of the flowers that grow in the grove. The flowers are no longer distilled to only one quality but instead serve a more general function. The description becomes even less specific in the following two lines. It is not clear which plants "some" refers to as Barker could mean the flower with their medical epithets but also the following list of flowers. On the one hand, this makes the information that she passes on more imprecise. On the other hand, it also points to the overwhelming wealth of medical knowledge that can be found in the natural world around us. The grove itself becomes the source of medical knowledge, aesthetic pleasure, as well as the superiority of the rural world compared to the urban space that Galesia will occupy later in her life. Galesia is the one to bundle all of this knowledge of medicine and the environment within a few lines of poetry and thus instruct the reader in this same kind of knowledge.

Caught Between Apothecaries and Physicians

Overall, the description of the landscape in "The *Grove*," while it does present medical information, does not equal a medical recipe such as the ones Galesia boasts about writing and having filled by the apothecaries. However, the description provides the reader with a more

domestic type of knowledge that is appropriate for women to have and a sense of ease with which that knowledge can be acquired. As the first patch of the screen, "The *Grove*" gives Galesia a chance to take part in the loco-descriptive tradition of poetry while drawing the reader's attention to the medical properties of the plants that adorn the grove. The medical properties make up only a part of the poem, but it is important to note that they mark the first substantial description of the environment within the poem itself. Barker additionally extends the medical knowledge displayed in the *Patch-Work Screen* within the very first poem she includes in her narrative from its first iteration in *Poetical Recreations*, thus setting the stage for the medical instruction that will follow in the novel.

Beyond having medical recipes merely serve an instructional purpose in her novel, Barker employs them to show Galesia simultaneously instructing other characters and the reader in medicine and household management and distinguishing herself from them with her secret knowledge. She achieves this purpose by letting medical recipes only lurk beneath the surface of her narrative, there but not entirely accessible to the reader. These recipes come closest to the surface when she includes "On the *Apothecaries* Filing my *Recipes* amongst the *Doctors*" in the patchwork screen.[66] When talking about her reputation in London to be helpful when it came to "Advice in divers sorts of Maladies," Galesia describes herself in the following way: "for I was got such a Pitch of helping the Sick, that I wrote my *Bills* in *Latin*, with the same manner of *Cyphers* and *Directions* as Doctors do; which Bills and Recipes the Apothecaries fil'd amongst those of the Doctors" (116). As shown above, references for these "*Cyphers*" that Galesia writes

[66] Just like "The *Grove*," "On the *Apothecaries*" is a revised version of an earlier poem titled "On the *Apothecary's* Filing my Bills amongst the *Doctors*" published in *Poetical Recreations*, 31-4. The change from "Bills" to "Recipes" in the different versions is striking; however, Barker uses the terms almost synonymously in the set-up for the poem.

about are often included in manuscript recipe collections.[67] The "*Cyphers* and *Directions*" of doctors that Galesia makes use of in this poem confirm Barker's own blurred lines of who has access to what kind of education and how to pass on this knowledge. In contrast to the culinary recipes which she freely shares with the Lady's servants, the medical recipes are shrouded in obscurity in the narrative, and Galesia is proud of her own access to this knowledge. Likely because of her sense of vanity—which regularly provokes her to write poems on her fields of expertise on creative prowess—Galesia does not provide this medical knowledge in the most direct way in the *Patch-Work Screen*.

The concealed transfer of medical knowledge throughout Barker's narrative also points to the obscured knowledge of and distinctions between different medical professions. Galesia inserts herself into the middle of the disputes between apothecaries and physicians that marked the period between the publication of *Poetic Recreations* in 1688 and *A Patch-Work Screen for the Ladies* in 1723. One of the contemporary texts that clearly sides with the physicians and functions more as a diatribe against the apothecaries and lays bare the difficulties in defining the differences between the various professions is *Medicina Flagellata: Or, the Doctor Scarify'd* (1727). The anonymous author writes, for example: "and so the Apothecary executes his Design, which is to exclude the Physician, and prefer himself."[68] According to *Medicina Flagellata*, apothecaries mostly intend to earn money rather than help their patients, but in order to actually gain a profit, apothecaries have to actively push the physicians out of business. The problem which follows is the need for physicians to compete with the tactics of the apothecaries. The author goes on to write: "Now are their Engines set at work, and the Doctor not to be behind-hand, gives a new Form to his Bills, which he prescribes in Terms so obscure, that he forces all

[67] See Figure 2.2.
[68] *Medicina Flagellata: Or, the Doctor Scarify'd*, Second Edition (London, 1727), 11.

chance Patients to repair to his own Apothecary, pretending a particular Secret, which only they have a Key to unlock."[69] Both apothecaries and physicians use their knowledge to elevate themselves compared to the other group. To keep themselves afloat and relevant, they make the barriers to their knowledge more and more impenetrable. A sense of vanity and territoriality is what obscures the medical knowledge even further, and Jane Barker takes part in this obfuscation of knowledge. If Galesia divulged all of her knowledge to the reader or the Lady, there would be no more need for people to seek her out for their medical needs. Instead, she shares vague descriptions of medical properties of plants and never provides and actual medical recipe her wish "to make the *Medick-Art* [her] whole Concern" (118) in "On the *Apothecaries*." Overall, the poem focuses mostly on Galesia's reputation and how she shares this specific reputation with both physicians and apothecaries. She uses the struggles between the professions to her advantage while employing the same strategies that they do: making herself invaluable by concealing her knowledge.

Barker situates herself even further at the juncture of different medical professions when she merges poetry with the construction of recipes in "On the *Apothecaries*." Comparing herself to Ovid in her project, Galesia again lets the vanity that often lies at the center of her knowledge production shine through. Using poetical language to describe her process of healing certain illnesses, Galesia establishes a close connection between lyrical productivity and medical expertise, ultimately supporting Tita Chico's claim that scientific language depended on literary language to identify its claims to objectivity.[70] However, she also makes it clear that this relationship was reciprocal, and scientific material practices actually influence literary language as well. Galesia takes it upon herself to turn something as supposedly unwieldy as the recipe into

[69] *Medicina Flagellata: Or, the Doctor Scarify'd*, 12.
[70] Chico, *The Experimental Imagination*, 25-32.

poetry instead. Formal aspects of poetry are thus converted into the instructions of the recipe itself. Galesia writes, "To *Measure* we'll reduce *Febrific Heat*, / And make the *Pulses* in true *Numbers* beat" (118). Poetry takes on healing powers through its form, and the treated disorders turn orderly because she makes "the *Pulses*" follow the beat of the verse. They become predictable and strong again as the "*Febrific Heat*" is lowered as well to fit into the confines of the verse's structure that Galesia presents. The following two lines of the poem, then, introduce how poetry and recipe turn sicknesses to health and beauty so that "*Asthma* and *Phthisick* chant in Lays most sweet; / The *Gout* and *Rickets* too shall run on Feet" (118). The wheezing sounds of "*Asthma* and *Phthisick*" turn into melodious lines of verse instead. Galesia is flipping the narrative of sickness with the help of her poetry; everything is turned on its head with her help—both in literary and medical terms. The negative qualities of these sicknesses are turned to positive ones that are pleasing to the reader. The same is true for the "*Gout* and *Rickets*" as they leave behind their incapacitating qualities and "run on Feet" instead. Both Galesia's poetry and her recipes are the building blocks for helping people heal from debilitating sicknesses, and Galesia goes on to say, "In fine, my Muse, such Wonders we will do, / That to our *Art*, Mankind their Ease shall owe" (119). Literary and medical art come together in Galesia's recipes, and it is this "*Art*" that brings ease to people. Poetry takes on the claims to healing properties that traditionally the recipe has incorporated into its own genre, and content and form merge here in a demonstration of Galesia's, and Barker's, abilities. The lines turn into instructional verses that play on the meaning of formal aspects of the poem and their metaphorical implications for the sicknesses Galesia treats.

The talent Barker demonstrates here is not hidden by false humility either. She wants her readers to be aware of the literary and medical skills characterizing "On the *Apothecaries*," while

hiding from them the actual knowledge the poem encompasses. After ending on the note that Galesia and her Muse will be responsible for the "Ease" of "Mankind," Barker goes on to write, "Then praise and please our-selves in doing so" (119). By the end of the poem, Galesia has dropped all pretenses of humility and, instead, sings her own praises. And she is justified in doing so, "For since the Learn'd exalt and own our Fame, / It is no Arrogance to do the same, / But due Respects, and Complaisance to them" (119). By virtue of her prescriptions being fulfilled, she is included in this group of medical professionals. On top of this, she adds her literary proficiency. She allows herself to boast about her accomplishments, and Galesia makes sure that this particular poem will be part of the patchwork screen that she and the Lady are creating. Ultimately, Galesia never directly presents the reader with a medical recipe that can be explicitly used like the culinary recipes she includes in the patchwork screen. She merely hints at her knowledge throughout the narrative and "On the *Apothecaries*," but doesn't entirely divulge it to the reader. She doesn't seem to be entirely willing to do so and thus foregrounds her creative abilities and her muse's overpowering wishes to write poetry on the process of creating these recipes and having apothecaries file them. Jane Barker, by doing so, situates herself between the medical professions without ever siding firmly with one or the other, and she establishes herself as part of a group that erects a barrier to its collective knowledge even though the knowledge is not completely hidden from the uninitiated—especially not for women concerned with the collection of recipes. Barker plays with these existing boundaries by placing them between herself and the reader to flaunt her own knowledge and participation within an elite group. She is now able to instruct others in her knowledge but does not do so indiscriminately. With the Lady herself, Galesia might share such knowledge; with the reader, however, she restrains both herself and her muse—only relating what her muse has to say about Galesia being part of the medical

profession. That information never enters the codified knowledge contained within the patchwork screen.

Unlike the culinary recipes, "On the *Apothecaries*" is not couched in an interruption of the creation of the patchwork screen. Instead, the narrative introduction of the poem finds itself within the larger connection between the different patches as Galesia describes her life in London. She hides the actual, material steps which she took to help the people who came to her with their medical problems. However, within the confines of the room in which Galesia and the Lady are constructing the patchwork screen, Galesia takes the conscious step of offering the poem as a patch to the Lady directly. Coupled with the fact that the poem does not include an actual recipe but rather praises Galesia's ability to compose recipes on the same level as doctors and apothecaries, we can see her intent to at once show off her knowledge and ability to instruct people in this type of recipe and hide that information from the reader. The medical recipes thus take on a completely different character in *A Patch-Work Screen for the Ladies* than the culinary recipes, and while this is true, this only exacerbates the multidisciplinary role the recipe inhabits as medical and culinary recipes are consciously put together in both manuscript recipe collections and Jane Barker's narrative. Medical recipes often include specialized language that might even only be available to one specific physician or apothecary as we have seen in *Medicina Flagellata*, but the units of measurement in use by apothecaries and physicians were not completely hidden from the domestic spaces. The disparity between medical and culinary recipes proves to be no hindrance to the thematic relationships and construction of both the *Patch-Work Screen* and manuscript recipe collections. The use of the two in the same collections demonstrates the pervasiveness of the recipe as a structural guide, and Jane Barker illustrates the creative possibilities that the recipe carries with it. As such, even though it is important to

distinguish between different forms and purposes of recipes in both the seventeenth and eighteenth centuries, the collection of both medical and culinary recipes in a single document—or rather object in the case of the *Patch-Work Screen for the Ladies*—actually increases and foregrounds the aesthetic properties of the recipe and recipe collections as a whole which resemble those of a patchwork screen. Bringing disparate objects and subjects together, *A Patch-Work Screen for the Ladies* establishes different levels and modes of instruction that elevate both her and Galesia's proficiency in a domestic setting and a professional, medical setting.

Jane Barker places herself aesthetically at the junction of apothecary, physician, and housewife while occupying not a single one of these roles. As a Catholic, unmarried woman, Barker simply cannot actually be any of these things in the early eighteenth century, so she does so through her literary prowess and the character of Galesia. Barker is, however, aware enough of these different roles and has been educated well enough by both her mother regarding domestic roles and her brother regarding natural philosophy and medicine. She uses the *Patch-Work Screen* to further the one role she can occupy and turns instruction into the major project of the New Science through the materiality driving the narrative. Teaching her readers and characters, Barker can simultaneously indulge in her own membership in an elite group based on knowledge and express her faith and her virtues. The combination of domestic virtues and natural philosophy emerges most clearly when considering the patchwork screen to be an iteration of a recipe collection.

The recipes both present and absent in *A Patch-Work Screen for the Ladies* thus tell a tale of how women writers in particular are influenced by material practices and use the underlying scientific methods and processes of natural philosophical instruments to instruct both their readers and members of their community in these methods as well as in cookery, economy, and

morality. Recipe collections have a long tradition as tools used in the household as well as in the laboratory, and Jane Barker makes use of this tradition. The most striking parts of her narrative are the concrete recipes she includes and her claims to her medical profession which encompasses the production of medical recipes. Galesia follows the call of her Muse to "Write Recipes, as OVID Law, in Verse" (118), and her culinary and medical expertise teaches the reader and the person viewing the final patchwork screen through the combination of poetry and structural guidelines of the recipe. The codified representation of recipes within the narrative is a testament to the managerial roles in the household that included the instruction of other members of the household and which women often took on. Women were able to both shape and explore more practical aspects of scientific inquiry, especially when it came to such practical tools such as the recipe. The practical application of scientific findings or even making new discoveries through experimentation in the household shows the influence women on the practicalities of science in their everyday lives and how they went about teaching these methods to family, friends, and acquaintances. Jane Barker's inclusion of recipes in *A Patch-Work Screen* stops the reader in his or her tracks but also instructs them in how to be a virtuous person who manages a household.

CHAPTER 3

"But poets have never been botanists":

The Literary Herbarium in Charlotte Smith's Poetry

"But poets have never been botanists," Charlotte Smith asserts in her note on cuckoo-flowers in *Beachy Head*, originally published posthumously in *Beachy Head and Other Poems* (1807).[1] And yet, in her poetry, Smith situates herself as a poet within a long tradition of botanical imagery that combines aesthetics with scientific knowledge of botany.[2] Walking the line between art and science, Smith simultaneously highlights the difficulties in presenting scientific knowledge—and getting it wrong—and elevates herself to the rank of poet-botanist. The note on the cuckoo-flowers reads, "Cuckoo-flowers.—Lychnis dioica. Shakespeare describes the Cuckoo buds as being yellow. He probably meant the numerous Ranunculi, or

[1] Charlotte Smith, *Charlotte Smith: Major Poetic Works*, ed. Claire Knowles and Ingrid Horrocks (Orchard Park, NY: Broadview Press, 2017), 185n. All references to Charlotte Smith's poems are to this edition unless noted otherwise. Subsequent references will be provided parenthetically using line or page numbers. Additionally, I have decided to follow the formatting of this edition which forgoes italics for Latin binomials, and I will also mark those passages for which Smith provides notes with asterisks in the direct quotations.

[2] Charlotte Smith's affinity for botany and its attendant arts and scientific practices has been repeatedly shown. See, for example, Pamela Clemit and Brad Scott, "Botanical Networking: Four Holograph Letters from Charlotte Smith to James Edward Smith," *Romanticism* 26, no. 1 (2020): 1–12, https://doi.org/10.3366/rom.2020.0443. Clemit and Scott have most recently shown Charlotte Smith's own interest and initiative to get involved in more professional botanical work to earn money as she offered to illustrated plants included in James Edward Smith and James Sowerby's *English Botany; or, Coloured Figures of British Plants, with Their Essential Characters, Synonyms, and Places of Growth. To Which Will Be Added, Occasional Remarks.*, 36 vols. (London, 1790–1814). Additionally, Charlotte Smith credits James Edward Smith with encouraging her to include botany in her literary works. For further studies linking Charlotte Smith's poetry with botany, see Ann B. Shteir, *Cultivating Women, Cultivating Science: Flora's Daughters and Botany in England, 1760-1860* (Baltimore, MD: Johns Hopkins University Press, 1996); Judith Pascoe, "Female Botanists and the Poetry of Charlotte Smith," in *Re-Visioning Romanticism: British Women Writers, 1776–1837*, ed. Carol Shiner Wilson and Joel Haefner (Philadelphia, PA: University of Pennsylvania Press, 1994); Theresa M. Kelley, "Romantic Exemplarity: Botany and 'material' Culture," in *Romantic Science: The Literary Forms of Natural History*, ed. Noah Heringman (Albany, NY: New York State University Press, 2003), 223–54; Theresa M. Kelley, *Clandestine Marriage: Botany and Romantic Culture* (Baltimore, MD: Johns Hopkins University Press, 2012); Theresa M. Kelley, "Botanical Figura," *Studies in Romanticism* 53, no. 3 (2014): 343-368, 476; and Donelle Ruwe, "Charlotte Smith's Sublime: Feminine Poetics, Botany, and Beachy Head," *Essays in Romanticism* 7, no. 1 (1999): 117–32, https://doi.org/10.3828/EIR.7.1.7.

March marigolds (Caltha palustris) which so gild the meadows in Spring; but poets have never been botanists. The Cuckoo flower is the Lychnis floscuculi" (*Beachy Head*, p. 185n). Interestingly enough, should one look for *Lychnis dioica* today, one would find the much more colorful and vivid red campion instead of the cuckoo flower—a sign of the changes and recategorizations in the botanical field over the last two hundred years. Against this assertion of incompatibility between poetry and botany, Charlotte Smith affirms her own botanical authority in the notes in both *Beachy Head* and "Flora" by switching back and forth between binomials and common names without a clear rule when to include which in the actual verse or relegate it to the notes. Smith presents the reader with scientific poetry that repeatedly stresses its own participation within traditions of scientific inquiry through poetic means in a time when the distinctions between the two only began to emerge.[3] Through her insistence on including scientific botanical language both within her verse and her prose notes in *Beachy Head* and "Flora," Smith situates her poetry in this wavering relationship of emerging distinctions between the arts and the sciences. Her later poetry reveals the aesthetic qualities of botanical knowledge in the blurred boundaries between binomials and common names. Moreover, the lyric mode of botany in her poetry indicates Smith's material concerns about the interdependence of humans and their local and global flora. In her poetry, Smith never takes the plants out of their localized

[3] One of the most famous examples of Romantic scientific poetry is Erasmus Darwin's *The Botanic Garden* (1789–91). Consequently, texts discussing the relationship between poetry and science often extensively discuss his poem. See, for example, Noel Jackson, "Rhyme and Reason: Erasmus Darwin's Romanticism," *Modern Language Quarterly* 70, no. 2 (2009): 171–94, https://doi.org/10.1215/00267929-2008-036; and Ann Shteir, "'She Comes!—The GODDESS': Narrating Nature in Erasmus Darwin's *The Botanic Garden*," in *Fact and Fiction: Literary and Scientific Cultures in Germany and Britain*, ed. Christine Lehleiter (Toronto: University of Toronto Press, 2016), 73–96. For broader discussions of the connections between literature more generally and scientific work during the long eighteenth century, see Robin Valenza, *Literature, Language, and the Rise of the Intellectual Disciplines in Britain, 1680-1820* (Cambridge; New York, NY: Cambridge University Press, 2009); Jon P. Klancher, *Transfiguring the Arts and Sciences: Knowledge and Cultural Institutions in the Romantic Age*, (Cambridge; New York, NY : Cambridge University Press, 2013); and Christine Lehleiter, "Fact and Fiction: Literary and Scientific Cultures in Germany and Britain—Thoughts on a Contentious Relationship," in *Fact and Fiction: Literary and Scientific Cultures in Germany and Britain*, ed. Christine Lehleiter (Toronto: University of Toronto Press, 2016), 1–30.

origins as their material contexts are integral to their character and identification. The focus on the material conditions of the botanical world in *Beachy Head* and "Flora" never appears merely to serve human interests. Displaying the plant specimens in their ecological environments without subjugating them to any fixed spatial or temporal conditions, Charlotte Smith creates a literary herbarium that encompasses the identifiable qualities of the plants included in her poetry and that foregrounds the continually transformed and transforming material habitats and relationships of the nonhuman world with the human world.

Where traditional herbaria appear sterile and unfeeling, Smith's literary herbarium infuses the plant specimens with sympathy. Smith creates an image of the natural world that links professional botanical tools with literary and visual representations of nature. She achieves this in her poetry in particular through her use of notes that follow Linnaean taxonomy[4] and varying her use of binomials and common names in both her verse and these notes. This inclusion of scholarly prose notes has been variously described as her opportunity to establish her self in her poetry,[5] as "scholarly verse,"[6] as "originality through intertextuality,"[7] and as a manifestation of the intertextuality of poetic and scientific practices.[8] In particular, however, the notes in Smith's later poetry as well as several of her sonnets provide concise botanical knowledge that, in conjunction with the verse itself, carries more information than traditional

[4] The system of classification for the animal, vegetable, and mineral kingdoms based on the work of Carl Linnaeus (1707–1778).

[5] Jacqueline M. Labbe, "'Transplanted into More Congenial Soil': Footnoting the Self in the Poetry of Charlotte Smith," in *Ma(r)King the Text: The Presentation of Meaning on the Literary Page*, ed. Joe Bray, Miriam Handley, and Anne C. Henry (Aldershot: Ashgate Press, 2000), 71–86.

[6] Ruth Knezevich, "Females and Footnotes: Excavating the Genre of Eighteenth-Century Women's Scholarly Verse," *ABO: Interactive Journal for Women in the Arts, 1640-1830* 6, no. 2 (2016), https://doi.org/10.5038/2157-7129.6.2.1.

[7] Melissa Bailes, *Questioning Nature: British Women's Scientific Writing and Literary Originality, 1750-1830* (Charlottesville, VA: University of Virginia Press, 2017), 2.

[8] Philipp Erchinger, "Science, Footnotes and the Margins of Poetry in Percy B. Shelley's *Queen Mab* and Charlotte Smith's *Beachy Head*," *European Journal of English Studies* 22, no. 3 (2018): 241–57, https://doi.org/10.1080/13825577.2018.1513709.

herbaria could. By combining literary depictions with scientific succinctness, Charlotte Smith repurposes characteristics of both styles to create her own—a literary herbarium—because her "green language is botanically exact and scientific yet charged with feeling."[9] In Smith's poetry, the herbarium shifts from a tool of mere reference and collection to one that is infused with the materiality of life and death of the natural world. In fact, Charlotte Smith employs her poetry to emphasize the material phenomena emerging out of the interactions between the human and nonhuman worlds. Instead of arranging plants and flowers in an eternal state of half-death as in herbaria or destroying them in the process of creating botanical illustrations, Smith generates a method that neither relies on the destruction of that which she represents nor on taking the plants out of their environments into an herbarium without roots, growth, or, at the other end of the spectrum, death and decay.

In her poetry, Charlotte Smith parallels Erasmus Darwin in his combination of poetry and science that results in poetry itself being constitutive of the science it represents. She does so, however, without falling back on two aspects that trouble Darwin's *The Botanic Garden* (1789–1791): on the one hand, she does not overtly insist on a hierarchical relationship between poetry and science, and, on the other hand, she does not rely on the sexual system of Linnaeus, seen as scandalous and inappropriate for women by many at the time. In the Advertisement to *The Botanic Garden* included in volume one and preceding *The Economy of Vegetation*, Erasmus Darwin establishes a hierarchy between science and imagination; in his project, he wants "to inlist Imagination under the banner of Science, and to lead her votaries from the looser analogies, which dress out the imagery of poetry, to the stricter ones, which form the ratiocination of

[9] Donna Landry, "Green Languages?: Women Poets as Naturalists in 1653 and 1807," in *Forging Connections; Women's Poetry from the Renaissance to Romanticism*, ed. Anne Mellor (San Marino, CA: Huntington Library, 2002), 61.

philosophy."[10] However, while Darwin presents these lofty goals of subjugating imagination to the service of science, the poems themselves in *The Botanic Garden* lay bare the tension between the surface of Darwin's own argument—to make poetry subordinate to science—and the connection between Darwin's philosophical poetry and Lucretius's *De Rerum Natura* scholars have established over the last decades in which poetry becomes the rhetorical basis for presenting scientific knowledge.[11] Ultimately, Darwin fails at his own insistence on establishing a hierarchy between imagination—and its poetic form—and science when poetry actually figures and constitutes scientific knowledge in *The Botanic Garden*.

Charlotte Smith, in contrast, does not present a hierarchy between her poetic approach to present, for example, the generation of life in "Flora" or the diverse local history in *Beachy Head*. Instead, she combines poetic verse with scientific prose, mixing the two at will when it serves her purpose of situating herself within scholarly conversations of botany, without arranging an artificial hierarchy between the two fields. Not only does she work against creating a hierarchical relationship between science and imagination, but Charlotte Smith also avoids reducing the plants to only their sexual system—the most distinctive feature of the plants according to Linnaeus. The consequences of doing so are twofold: she cannot be accused of engaging in inappropriate scientific endeavors, and she indicates her understanding of an entangled material world in which separate entities cannot be reduced to only one property as those properties are dynamic, continually re-constituting themselves within their material world. Charlotte Smith and Erasmus Darwin agree in their materialist understanding of the world;

[10] Erasmus Darwin, *The Botanic Garden: The Economy of Vegetation*, ed. Adam Komisaruk and Allison Dushane, vol. 1 (Milton Park, Abingdon, Oxon; New York, NY: Routledge, 2017), 40.

[11] Jackson, "Rhyme and Reason," 182. The close relationship between Darwin's *The Botanic Garden* and Lucretius's *De Rerum Natura* has been repeatedly established. See, for example, Martin Priestman, "Lucretius in Romantic and Victorian Britain," in *The Cambridge Companion to Lucretius*, ed. Stuart Gillespie and Philip Hardie (Cambridge: Cambridge University Press, 2007), 289–305; and Amanda Jo Goldstein, *Sweet Science: Romantic Materialism and the New Logics of Life* (Chicago, IL; London: The University of Chicago Press, 2017).

however, Smith eschews even the appearance of creating a hierarchy between intellectual disciplines. While Darwin attempts to create a hierarchy between science and imagination and fails to do so, Smith does never actually try to elevate one over the other.

When the herbarium acts as a lens through which to read Smith's poetry, the shortcomings of this tool as well as poetry's additive and substantive material work poetry presenting botanical knowledge emerge more clearly. The reductionist, static nature of both herbaria—dried plants mounted on sheets of paper in a state of suspended immortality—and Linnaeus's sexual system[12] goes against this materialist approach underlying Smith's poetry. The materialism that motivates her poetry is more reminiscent of Lucretian materialism, which emphasizes the constant motion of atoms, and the performative materialism proposed by Karen Barad and Vicki Kirby.[13] While it would be anachronistic to imply that Charlotte Smith was aware of such concepts as quantum entanglement and thus consciously writing in the spirit of Barad's and Kirby's arguments, looking back at Lucretius and his *De Rerum Natura* provides a reading of Charlotte Smith's materialist approach to both poetry and nature that offers the reader a new outlook on her poetry as a mutually constitutive force of the world around her. Her most prolific time as a writer additionally also falls directly in the "second British Lucretian moment" between 1780 and 1820.[14] Looking back at Lucretius and forward to Barad and Kirby, the

[12] While his language had been praised as natural by Romantic writers, Linnaeus's reductionist approach to botanical work has been condemned as artificial. See, for example, Melissa Bailes, "Linnaeus's Botanical Clocks: Chronobiological Mechanisms in the Scientific Poetry of Erasmus Darwin, Charlotte Smith, and Felicia Hemans," *Studies in Romanticism* 56, no. 2 (2017): 238.

[13] Both Karen Barad and Vicki Kirby promote a new materialist approach that simultaneously denounces human exceptionalism, like other forms of new materialism, and present a framework that focuses on the intra-action of different material entities without relying on a preceding, or outside force, as can be found in vital new materialism, for example. See Karen Michelle Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007); Vicki Kirby, *Quantum Anthropologies: Life at Large* (Durham, NC: Duke University Press, 2011). Vicki Kirby, "Matter out of Place: 'New Materialism' in Review," in *What If Culture Was Nature All Along?*, ed. Vicki Kirby (Edinburgh: Edinburgh University Press, 2017), 1–25.

[14] Priestman, "Lucretius in Romantic and Victorian Britain," 289.

analysis of Smith's poetry reinforces her insistence on locally specific material conceptions that are brought to the fore and mirrored by the use of a tool such as an herbarium. The herbarium itself already affirms these materialist approaches by inextricably linking the physical plants to the knowledge derived from them. Smith's poetry, then, uncovers the shortcomings of the herbarium in capturing the material reality of the entanglement between the human and nonhuman worlds. Taking on the figurative power of poetry as it is presented in Lucretius's work, Charlotte Smith engages her poetry and her use of botany to demonstrate poetry's constitutive qualities. Through her poetry, she thus crafts a literary herbarium that is materially grounded both within the content of her poems and the form it takes on.

Charlotte Smith's later poetry emerged in a time in which several different conceptions of life and the world in general competed with each other. In conjunction with her insistence on the material conditions of the natural world, questions of life, its vulnerability and subsequent decay, and death emerge as central themes in both her later poetry and *Elegiac Sonnets*. This insistence on the passage of life, recalls Lucretian materialism, which depends on the constant motion of matter and consequently the eventual decay of corporeal entities.[15] Lucretius himself describes the construction of material bodies in the universe as "a war waged between the primal atoms" that "is fought from infinity on equal terms."[16] Generation and dissolution of material entities constantly fight each other, with one originating in the other. For Smith, then, the beauty of the natural world lies in its ephemeral character, as the death of plants and flowers in the natural

[15] For a discussion of decay being an integral part of matter's motion in Lucretius, see Thomas Nail, *Lucretius I: An Ontology of Motion* (Edinburgh: Edinburgh University Press, 2018).

[16] Lucretius, *On the Nature of the Universe*, trans. Ronald Melville (Oxford; New York, NY: Oxford University Press, 2008), 2.573-74. All references are to this edition and will be provided parenthetically with the abbreviation *DRN*.

world marks only one step of a perpetual cycle in which life grows out of death.[17] Recalling Lucretius's materialism to understand the materialism underlying Charlotte Smith's poetry offers a view of the minutest details of the natural world without seeing them as less important than the whole they constitute or as mere cogs in a machine. Her poetry insists on the entanglement of human and nonhuman entities whose agency depends on their "intra-action."[18] Smith's work does not neatly fit into the ongoing debates about the relationships among Enlightenment vitalism,[19] Romantic organicism,[20] and mechanism that mark the Romantic period. Acknowledging instead the influence of Lucretian materialism on Smith's poetry in particular opens up the spaces in which life and death and converge in her poetry.[21] Vitalism implies a force that precedes the material entity, animating it by some outside force. While organicism comes closer to the theory underlying Smith's poetry, especially in *Beachy Head*, with its assertion of articulating wholes and bounded entities of matter, it is exactly this boundedness that infringes on the materialism present in *Beachy Head* and "Flora" in particular. Finally, Smith's

[17] The importance of death in the generation of life in the eighteenth century has also been pointed out by David Fairer. See David Fairer, "'Where Fuming Trees Refresh the Thirsty Air': The World of Eco-Georgic," *Studies in Eighteenth Century Culture* 40, no. 1 (2011): 214, https://doi.org/10.1353/sec.2011.0006.

[18] Karen Barad coins the term "intra-active" because it does not imply preceding or inherent boundaries between the entities that come into contact. Without such inherent boundaries they cannot interact, but they can intra-act instead. See Barad, *Meeting the Universe Halfway*, in particular Chapter 4 "Agential Realism," 132-85.

[19] For an overview of vitalism, see Catherine Packham, *Eighteenth-Century Vitalism: Bodies, Culture, Politics* (Houndmills, Basingstoke, Hampshire; New York, NY: Palgrave Macmillan, 2012); Peter Hanns Reill, *Vitalizing Nature in the Enlightenment* (Berkeley, CA: University of California Press, 2005); Robert Mitchell, *Experimental Life: Vitalism in Romantic Science and Literature* (Baltimore, MD: Johns Hopkins University Press, 2013); and Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke University Press, 2010) as well as Thomas Lemke's critical reading of Jane Bennett in Thomas Lemke, "An Alternative Model of Politics? Prospects and Problems of Jane Bennett's Vital Materialism," *Theory, Culture & Society* 35, no. 6 (2018): 31–54, https://doi.org/10.1177/0263276418757316. See also Clayton Koelb, *The Revivifying Word: Literature, Philosophy, and the Theory of Life in Europe's Romantic Age* (Rochester, NY: Camden House, 2008).

[20] For an overview of Romantic organicism, see Charles I. Armstrong, *Romantic Organicism: From Idealist Origins to Ambivalent Afterlife* (London: Palgrave Macmillan UK, 2003), https://doi.org/10.1057/9780230287754; and Denise Gigante, *Life: Organic Form and Romanticism* (New Haven, CT: Yale University Press, 2009).

[21] Amanda Jo Goldstein makes a similar argument about Lucretian materialism connecting biological life to historicity in Percy Bysshe Shelley's *The Triumph of Life* in Amanda Jo Goldstein, "Growing Old Together: Lucretian Materialism in Shelley's 'Poetry of Life,'" *Representations* 128, no. 1 (2014): 60–92, https://doi.org/10.1525/rep.2014.128.1.60.

poetry actively works against a mechanistic reading as it makes central the intrinsic, but not all-encompassing, relationships between the different parts of the human and nonhuman worlds that would be made irrelevant in a mechanistic worldview. A look back to Lucretius and a look forward to new materialism[22] allow Charlotte Smith to be situated within a larger trend of materialism that relies on the "intra-action" of the human and nonhuman worlds.

Through the localization of her poetry, Charlotte Smith establishes a material grounding for botanical knowledge that herbaria often lack. Her representation of the natural world thus appears as an ecological microcosm, which emphasizes the physical, concrete character of the poems' topography.[23] The ecology of her poetry collapses human and natural history in the spatial dimensions of her poems, highlighting through specific locations the networks of human and nonhuman corporeality.[24] *Beachy Head*, for example, always pulls the reader back to the minute and the material reality of the cliffs on England's southern coast. By foregrounding the location of her poetry, even in more abstract terms such as in "Flora," Charlotte Smith offers her readers an ecology "in which human interests figure as intertwined with the interests of the natural world and must be accounted for, though not pursued in exploitatively instrumental

[22] For a recent overview of new materialisms—so termed because of the vast variety of theories it encompasses—and their genealogy, see Liedeke Plate, "New Materialisms," in *Oxford Research Encyclopedia of Literature* (Oxford: Oxford University Press, 2020), https://doi.org/10.1093/acrefore/9780190201098.013.1013. The types of new materialisms can also be categorized into multiple broader groups. For a discussion, see Christopher N. Gamble, Joshua S. Hanan, and Thomas Nail, "What Is New Materialism?," *Angelaki* 24, no. 6 (2019): 111–34, https://doi.org/10.1080/0969725X.2019.1684704; and Kirby, "Matter out of Place."

[23] The proposition of an ecological microcosm can be found in Heidi C. M. Scott, *Chaos and Cosmos: Literary Roots of Modern Ecology in the British Nineteenth Century* (University Park, PA: The Pennsylvania State University Press, 2014).

[24] Stacy Alaimo, *Bodily Natures: Science, Environment, and the Material Self* (Bloomington, IN: Indiana University Press, 2010), 2. For a discussion of the conflation of human and natural history in a colonial context, see Noah Heringman, "Stadial Environmental History in the Voyage Narratives of George and John Reinhold Forster," in *Curious Encounters: Voyaging, Collecting, and Making Knowledge in the Long Eighteenth Century*, ed. Adriana Craciun and Mary Terrall (Toronto: University of Toronto Press, 2019), 206–28. Heringman elaborates how both George and John Reinhold Forster configure natural history as a foundation for the study of the history of civilization through their observations in the South Pacific.

ways."[25] Materially grounding her poems in specific locations, Charlotte Smith establishes a connection between the human and nonhuman worlds that avoids a purely utilitarian characterization of the plants and flowers, reinforcing the entanglement and equality of agency between human and nonhuman entities. Charlotte Smith's poetry encapsulates the material conditions of the natural world in conjunction with the human world without giving precedence to an anthropocentric worldview and falling victim to human exceptionalism.

The process of collecting material objects as a scientific practice in particular underpins Smith's focus on the material conditions of the natural world. Collecting plant specimens in the eighteenth century often served the purpose of exercising authority over and being able to impose a system on the natural world. As a process underlying Smith's poetry that is often literalized within the verse itself,[26] the collection of botanical specimens is refigured into a network between the human and nonhuman worlds. For Smith, botanizing neither serves the purpose of claiming authority over the natural world nor assigning authority to nature itself. Charlotte Smith materializes collections in her poetry, bringing together textual pieces from various sources in both her verse and prose. This manifestation of knowledge practices particularly emerges in *Beachy Head*, which "is composed from snippets of Smith's published poetry, novels, and children's books, as well as prose and verse by other authors."[27] By making collection practices the driving force of her poetry and connecting it to botany in particular, Smith creates a new poetical form, a literary herbarium, that presents the reader with a more materially grounded system of describing the natural world through poetic means. Her

[25] Landry, "Green Languages?: Women Poets as Naturalists in 1653 and 1807," 59.

[26] Dahlia Porter, "From Nosegay to Specimen Cabinet: Charlotte Smith and the Labour of Collecting," in *Charlotte Smith in British Romanticism*, ed. Jacqueline Labbé (London: Pickering & Chatto Publishers, 2008), 42.

[27] Dahlia Porter, *Science, Form, and the Problem of Induction in British Romanticism* (Cambridge: Cambridge University Press, 2018), 156.

arrangement of poetry and prose with a keen eye towards botanical specificity embodies the material expression of both ontology and epistemology. In Charlotte Smith's case, this process of discovery lays bare a vision of the natural world that is grounded in its materiality and the social, historical, geological, and botanical relationships that emerge as expressions of these entangled networks. *Elegiac Sonnets*, *Beachy Head*, and "Flora" establish the connection between the most minute details of the world and larger networks of knowledge. Just as atoms, the smallest units of matter, create through their union everything in the universe, verses and prose notes in Charlotte Smith's poetry constitute through both botanical (epistemological) and localized (ontological) specificity a framework for dealing with the entanglement of life and death and human and nonhuman history. Epistemologically, the herbarium functions as a metaphorical and literal representation of Lucretian materialism: each plant specimen takes on the role of an atom that through its "position decides the meaning" (*DRN* 2.1018) of the larger network of knowledge. Smith adopts this epistemological framework that mirrors Lucretius's model of the universe and reverses the distinction between ontology and epistemology. She shows in her literary herbaria their entangled webs—the "ontoepistemology"[28] of botany—that simultaneously reverse the claim of human authority by equalizing matter and knowledge. Charlotte Smith takes her cues from the natural world instead of attempting to impose order on it.

The Herbarium

Throughout the seventeenth and eighteenth centuries, the use of herbaria surged largely because of the ever-growing networks between botanists around the world and their need for

[28] Barad, *Meeting the Universe Halfway*, 44.

categorizing and storing information.[29] While the herbarium has not been the subject of a sustained, historical investigation in modern times, Alette Fleischer makes the herbarium the focal point of her article-length study of botanical knowledge and the processes of archiving plants.[30] The earliest known herbaria belonged to Luca Ghini (1490–1556), a sixteenth-century physician and botanist at the University of Pisa. With only limited specimens that needed to be stored and relatively rigid systems of order, bound herbaria served naturalists well at this time. In these systems, "several specimens might be glued in a decorative arrangement on a single sheet of paper," which "were then bound into volumes, stored in a library and cited like books."[31] However, with the increase of botanical specimens, the rigidity of bound herbaria proved to be challenging in response to the arrival of new specimens and new categories of the systematization of nature. In response to this, naturalists moved to loose-leaf collections of plant material that often resulted in the specimens themselves losing all ties to their collectors and original provenance.[32] In a similar shift, Linnaeus "advised readers of the *Philosophia Botanica* to mount just one specimen per sheet and refrain from binding them together" instead of following the more restricting tradition of mounting multiple specimens on one sheet and binding them together into volumes.[33] Thus promoting a more flexible system of categorization,

[29] In her essay, Dahlia Porter connects literary anthologies and botanical collections and how they influence each other in the late eighteenth century. She argues that there was a surge in botanical metaphors to describe poetic collections in the Romantic period because of the ubiquity of botanical work. She highlights competing principles underwriting literary anthologies. On the one hand, aesthetic reanimation of the plucked plants promotes poetic collections which focus on beauty and aesthetics. On the other hand, poets like Charlotte Smith put forth a theory of collection that highlights the historical and representative character of the poems. Dahlia Porter, "Specimen Poetics: Botany, Reanimation, and the Romantic Collection," *Representations* 139, no. 1 (2017): 64, https://doi.org/10.1525/rep.2017.139.1.60.

[30] Alette Fleischer, "Leaves on the Loose: The Changing Nature of Archiving Plants and Botanical Knowledge," *Journal of Early Modern Studies* 6, no. 1 (2017): 117–35, https://doi.org/10.5840/jems2017616; Staffan Müller-Wille, "Linnaeus' Herbarium Cabinet: A Piece of Furniture and Its Function," *Endeavour* 30, no. 2 (June 2006): 64n9, https://doi.org/10.1016/j.endeavour.2006.03.001.

[31] Müller-Wille, "Linnaeus' Herbarium Cabinet," 61.

[32] Fleischer, "Leaves on the Loose," 118.

[33] Müller-Wille, "Linnaeus' Herbarium Cabinet," 61.

Linnaeus lays the foundation for the herbarium's aesthetic character and how it influences Charlotte Smith's poetry later in her life, both in terms of compiling poems into collections more generally and within specific poems such as *Beachy Head* and "Flora."

As a tool, the herbarium did not exist in a vacuum and was part of several traditions of botanical knowledge creation and dissemination. Throughout the eighteenth century, botany became a pastime not only for expert naturalists but also for lay audiences. Depending on the different needs people had in their botanizing, they used different "publication formats—taxonomies without illustrations, identification guides with cabinet-like illustrations, and single-sheet engravings of plants appended to natural histories," which corresponded to these needs.[34] In order to deal with the abundance of material, systems of classification and easy recognition of specimens had to be established. One of the most prominent figures of this large-scale project of collecting was Sir Hans Sloane (1660–1753), whose collections built the foundations for the British Museum, the British Library, and the Natural History Museum in London. Sloane's herbarium was at first, and according to his own wishes, organized in line with John Ray's (1627–1705) taxonomy.[35] Ray's *Historia Plantarum* (1686–1704) precedes Linnaeus's work in plant taxonomy that would come to dominate British botany until the early nineteenth century by decades and would be used alongside Linnaeus's work throughout the century. Ray generally divided plants into three broader categories: herbs, shrubs, and trees. Within these categories, Ray "ascribed to each species a polynomial name, which varied from one word to a paragraph in length, after which he described the physical features of the plant, often starting with its roots

[34] Porter, "Specimen Poetics," 69.

[35] Hans Sloane, *A Voyage to the Islands Madera, Barbados, Nieves, S. Christophers and Jamaica: With the Natural History ... of the Last of Those Islands; to Which Is Prefix'd an Introduction, Wherein Is an Account of the Inhabitants, Air, Waters, Diseases, Trade, &c. ... Illustrated with The Figures of the Things Describ'd, ... By Hans Sloane, ... In Two Volumes* (London, 1707), preface.

and moving up to the flowers and fruits. Similar to the names, these descriptions were not standardised and varied in length."[36] While Ray's work could be reasonably used as a reference by early-eighteenth-century botanists, his taxonomy often proved to be unwieldy for naturalists as the sheer number of known plants rose exponentially throughout the eighteenth century, and Linnaeus soon grew weary of systems such as Ray's. When Linnaeus published his *Systema Naturae* (1735), he reduced the identification and classification of plants to their sexual system—the number of stamens and pistils defined the plant's category and placement in his system. Beyond the method for identification, Linnaeus also did away with polynomials and descriptions of plants, instead moving to the use of binomial nomenclature in his *Species Plantarum* (1753), which listed every plant known to him at the time. Both John Ray and Linnaeus tried to keep abreast of the flood of information and provide botanists with systems that were descriptive but not prescriptive, making the identification and classification of new species easier for following generations of professional and lay botanists.

For naturalists, herbaria proved to be an adaptable method of collecting and storing information that could be used to refine their descriptive systems of the natural world. Sir Hans Sloane and Linnaeus, among others, refined the practice of drying plants for conservation, giving detailed instructions on how to collect, prepare, and mount the specimens. Their herbaria "evolved into botanical documentation centres replete with technical labels and notes."[37] The specimen sheet's atomicity—one plant per object—provides epistemological value in and of itself; however, it is in the process of compilation and combination that an entirely new unit of

[36] Edwin D. Rose, "Specimens, Slips and Systems: Daniel Solander and the Classification of Nature at the World's First Public Museum, 1753–1768," *The British Journal for the History of Science* 51, no. 2 (2018): 209, https://doi.org/10.1017/S0007087418000249.

[37] James Delbourgo, *Collecting the World: Hans Sloane and the Origins of the British Museum.* (Cambridge, MA: Belknap Harvard, 2019), 100.

knowledge develops. Despite, all entities being relational, the relationships between the various sheets of dried plant specimens coexist nonhierarchically, and in the complete collection that is the herbarium, a new entity emerges: a botanical system grounded in the materiality of the plants themselves. While the single sheets carry meaning in themselves—albeit only the smallest units of information—their true value emerges in the relationships with other sheets in the collection.[38] The material constitution of the herbarium itself shapes and re-configures naturalists' systems of the natural world through the "intra-action" of human and nonhuman entities. It is, thus, this material configuration of the herbarium that simultaneously emerges out of and structures botanical knowledge. The herbarium's atomicity and constant reconfigurability invoke Lucretian materialism but also provide a look forward to the ontological entanglements and resulting phenomena of Karen Barad's agential realism. The herbarium manifests the inseparability of epistemology and ontology, or, as Barad writes, "we don't obtain knowledge by standing outside the world; we know because we are *of* the world."[39] It is because of the material adaptability of herbaria that they become productive forces through the ongoing "intra-actions" between the human and nonhuman worlds.

Linnaeus's herbarium, the precursor of modern herbaria, especially embodies these ideas of atomicity and entanglement. In contrast to other systems imposing order and hierarchy on nature, Linnaeus's system proved to be more adaptable because it "was not fixed and perpetual." Rather, in his "filing cabinet," Linnaeus could easily handle "the steady arrival of new material,"

[38] For a discussion of the relationship between parts and wholes in New Materialisms, see Monique Allewaert, "Toward a Materialist Figuration: A Slight Manifesto," *English Language Notes* 51, no. 2 (2013): 61–77, https://doi.org/10.1215/00138282-51.2.61. Allewaert's argument about synecdoche as a trope that actually maintains the distinctions between the separate parts and results in a third distinct entities is reminiscent of Karen Barad's argument the entanglement of separate entities that result in a material body that actually constitutes the natural world. See Barad, *Meeting the Universe Halfway*, 333ff.

[39] Barad, *Meeting the Universe Halfway*, 185.

and the herbarium "enabled its user, in principle at least, to repeatedly rearrange that material."[40] His system, while not entirely accurate, built its epistemological framework through the materiality of the herbarium itself and from the ground up, one specimen at a time. The flexibility of Linnaeus's system lends itself to the expansion of botanical work from natural philosophers to laypeople collecting and drying specimens in order to educate themselves and, ultimately, taking part in the Enlightenment project. Working against dogmatic order and stability in the world of botany, Linnaeus's herbarium forms a material foundation for botanical study open to adjustments and corrections. Mounting them on loose sheets of paper with their binomials as their only adornment and resting them on moveable shelves in a cabinet, Linnaeus made the plants' use much more dynamic. Forgoing hierarchy, Linnaeus builds his system of the natural world from the ground up, so to speak; the smallest units of matter—the plant specimens themselves—in their relationships with each other create a separate phenomenon that appears to be of mere epistemological quality but actually only exists within the material relationships between the plants themselves and their arrangement in the herbarium.

One of the obvious drawbacks of the herbarium, however, when looking at it from a materialist point of view and in conjunction with Charlotte Smith's presentation of an entangled, material world is that the plant specimens have been effectively rendered entirely different entities with no connection to their origins. The herbarium depicts the specimens removed from their natural surroundings and hovering somewhere between life and death. Dried, yet preserved in their natural form, the plants take on a half-life, one that detaches the plants from their environments and forces them into singular immortality. For naturalists interested in a comparative framework of knowledge that was not defined by geographical or physical

[40] Müller-Wille, "Linnaeus' Herbarium Cabinet," 62.

boundaries—both Sloane and Linnaeus endeavored to present a view of the natural world in its material entirety—the herbarium offered a solution still grounded in the smallest ontological units. For naturalists like Gilbert White, the author of *The Natural History of Selborne* (1789), or writers like Charlotte Smith, however, the plants' detachment posed insurmountable challenges. In a brief detour from his fascination and work with migrating birds to botany, Gilbert White writes,

> The standing objection to botany has always been, that it is a pursuit that amuses the fancy and exercises the memory, without improving the mind or advancing any real knowledge: and, where the science is carried no farther than a mere systematic classification, the charge is but too true. But the botanist that is desirous of wiping off this aspersion should be by no means content with a list of names; he should study plants philosophically, should investigate the laws of vegetation, should examine the powers and virtues of efficacious herbs, should promote their cultivation; and graft the gardener, the planter, and the husbandman, on the phytologist. Not that system is by any means to be thrown aside; without system the field of Nature would be a pathless wilderness; but systems should be subservient to, not the main object of, pursuit.[41]

A bidirectional material relationship between a plant and its ecological environment demonstrates the entangled character of human and nonhuman worlds that Charlotte Smith endorses in her poetry. Consequently, while Smith uses the herbarium's atomicity and entanglement and relocates the entanglement back into nature through her poetry, she also works against the herbarium's detachment. Smith's later poetry presents the reader with botany that relies on scientific specificity in conjunction with the plants' environments and poetic figuration. This figuration of localities in her work highlights the "intra-active" relationship between the human and nonhuman worlds. In a traditional herbarium, the essential properties of the plants are lost in their detachment and subsequent reconfiguration. In her literary herbarium, Smith echoes more closely Gilbert White's assessment of studying only smaller, bounded regions. According

[41] Gilbert White, *The Natural History of Selborne*, ed. Anna Secord, (New York, NY: Oxford University Press, 2016), 183.

to White, "men that undertake only one district are much more likely to advance natural knowledge than those that grasp at more than they can possibly be acquainted with: every kingdom, every province, should have its own monographer."[42] Materially and poetically reconfiguring the natural world according to the herbarium's principles of atomicity and entanglement, Charlotte Smith resolves what is in her eyes one of the flaws of the herbarium. In her literary herbarium, agency is not only found in the human world; instead, the nonhuman world proves to be just as agential as the human one. Here, botany does not merely serve as a steppingstone to the domination and exploitation of the natural world. In Smith's poetry, botany reveals a non-hierarchical and non-exploitative view of the world.

The Life of a Plant

As a tool, the herbarium proved to be immensely useful for naturalists in their quest to understand the order of nature. The study of botany was deeply entrenched in the life and death of plants and flowers, and the herbarium offered a counter to the constant motion of matter. On the one hand, plants faced suspension in their current state or utter destruction in order to be useful for scientific purposes. On the other hand, Linnaeus's system is grounded in the reproductive system of plants, in the generation of life. Life and death emerge as central themes of Charlotte Smith's poetry that constantly tug at and materialize out of each other. Her conception of this continual movement mirrors that of Lucretius in which "the motions of destructions" can never "prevail for ever, entombing life for ever;" in the same way that "the motions of creation and growth" cannot "keep intact what they have fashioned" eternally (*DRN* 2.569-72). One way Smith achieves this back and forth between life and death through her use of

[42] White, *Selborne*, 110.

the sonnet form,[43] but she also emphasizes the fragility of life and inevitability of death and grief in her poems. Smith's proven interest in botanical illustration—she offered her services as an illustrator to James Edward Smith, the author of *English Botany*, and exchanged several letters with him[44]—results in a poetics that collapses poetic and illustrative figuration in both her botanical sonnets and "Flora." However, neither poetic nor illustrative figuration in Smith's poems "entombs" or "keeps intact" the vitality of the plants. Rather, the plants and their figurations offer a glimpse of the materiality of life and death and act as a comfort for grief. Smith presents her reader with a method of botanical study that neither relies on the willful destruction of the plant only for figuration to take its place, nor overtly endorses Linnaeus's sexual system and its focus on the generation of life. While botanical illustration often relied on the death of the plant and traditional herbaria suspend plants in a state between life and death that more or less immortalizes them, Smith's poetry simultaneously plays with modes of figuration to show the necessity of both life and death, providing the reader with a way of studying botany that recognizes the fragility of the natural world. Smith situates herself within the various discourses concerning life and death in botany and ultimately manages to highlight the fragility of plants and the vulnerability of ecosystems to human alteration or destruction in the pursuit of discovering the knowledge of the systems of nature.

Non-hierarchical intra-actions between the human and nonhuman worlds emerge as byproducts of Charlotte Smith's insistence on figuring the vulnerability and fragility of plants as

[43] On Smith's use and presentation of the sonnet and the eighteenth-century sonnet more generally, see Bethan Roberts, *Charlotte Smith and the Sonnet: Form, Place and Tradition in the Late Eighteenth Century* (Oxford; New York, NY: Oxford University Press, 2019); Daniel Robinson, "*Elegiac Sonnets*: Charlotte Smith's Formal Paradoxy," *Papers on Language and Literature* 39, no. 2 (2003): 185–220; Mary Anne Myers, "Unsexing Petrarch: Charlotte Smith's Lessons in the Sonnet as a Social Medium," *Studies in Romanticism* 53, no. 2 (2014): 239–63, https://doi.org/10.1353/srm.2014.0028; and Michael Hansen, "Elegy, Ode, and the Eighteenth-Century Sonnet Revival: The Case of Charles Emily," *Literary Imagination* 12, no. 3 (2010): 307–18, https://doi.org/10.1093/litimag/imq026.

[44] Clemit and Scott, "Botanical Networking."

metaphors and parallels of that of human life. Insisting on a materially grounded view of the entanglements of the human and nonhuman worlds, Smith presents an alternative method of collecting and storing botanical knowledge that avoids promoting control over the natural world. Instead, Charlotte Smith displays nature as a nexus of historical, social, botanical, and geological relationships without an ulterior, exploitative motive for the identification of the plants. She portrays, one the one hand, the interactions between humans and the natural world and, on the other hand, the unforgiving character of the natural world for the laboring poor that inhabit the region of Beachy Head.[45] Smith presents both humans and nature as products of the material manifestations of the social and natural history. Smith's exhibition of the botanical world in her poetry relies heavily on the lifecycles of plants. From the generation of plant life to its death and from the beauty in this transience to the reminiscent beauty of the plants in illustrations and herbaria, Charlotte Smith connects the sexual system of Linnaeus to a more realistic and less subservient representation of the natural world that will still only ever be a shadow of the literal plants. Moving from the anthropocentric presentation of the natural world, Charlotte Smith

[45] For an overview of both the exploitative relationship between humans and the natural world that was grounded in the growing mechanization of the natural world, see Carolyn Merchant, *The Death of Nature* (New York, NY: HarperOne, 2019). Merchant also reiterates this point in the collection of her essays in Carolyn Merchant, *Science and Nature: Past, Present, and Future* (New York, NY: Routledge, 2017), https://doi.org/10.4324/9781315111988. For a more general, ecocritical overview of the relationship between humans and nature, see Alan Bewell, *Natures in Translation: Romanticism and Colonial Natural History* (Baltimore, MD: Johns Hopkins University Press, 2017); Phil Macnaghten and John Urry, *Contested Natures* (London: SAGE Publications, 1998); Lawrence Buell, *The Environmental Imagination: Thoreau, Nature Writing, and the Formation of American Culture* (Cambridge, MA: Belknap Press, 1995); Kate Rigby, *Topographies of the Sacred: The Poetics of Place in European Romanticism* (Charlottesville, VA: University of Virginia Press, 2004); Jonathan Bate, *Romantic Ecology: Wordsworth and the Environmental Tradition* (London; New York, NY: Routledge, 1991); Scott, *Chaos and Cosmos*; James C. McKusick, *Green Writing: Romanticism and Ecology* (New York, NY: St. Martin's Press, 2000); Scott Knickerbocker, *Ecopoetics: The Language of Nature, the Nature of Language* (Amherst, MA: University of Massachusetts Press, 2012); John C. Ryan, "Cultural Botany: Toward a Model of Transdisciplinary, Embodied, and Poetic Research into Plants," *Nature and Culture* 6, no. 2 (2011): 123–48, https://doi.org/10.3167/nc.2011.060202; Londa L. Schiebinger, *Nature's Body: Gender in the Making of Modern Science* (Boston, MA: Beacon Press, 1993); and Dewey W. Hall and Jillmarie Murphy, eds., *Gendered Ecologies: New Materialist Interpretations of Women Writers in the Long Nineteenth Century* (Clemson, SC: Clemson University Press, 2020), https://doi.org/10.2307/j.ctvz937jd. For an overview about Romantic ecocriticism, see Jeremy Davies, "Romantic Ecocriticism: History and Prospects," *Literature Compass* 15, no. 9 (2018): n.p., https://doi.org/10.1111/lic3.12489.

instead provides her readers with a re-figuration of the relationship between the human and nonhuman worlds: both are mutually constitutive.

As a starting point for this mutual relationship, Smith highlights the generation of life that had already emerged as a particularly contested aspect of the study of botany in the eighteenth century. Smith had to contend, on the one hand, with the view of an increasingly oversexualized system that was perceived to be unsuitable for young women and, on the other hand, with the various figurations of botanical knowledge. Women interested in botany and showing an interest in Linnaeus's system of classification had to tread a fine line in the eighteenth century in order to not appear improper. Based on the sexual properties of plants and frequently anthropomorphizing the relationships between the stamens and pistils found in a flower, Linnaeus's system carried within itself the seeds of impropriety.[46] Most explicitly steeped in these sexual discourses, "Flora" toys with ideas of the generation of life, fertility, and sexuality, and how poetic and illustrative creativity can represent these ideas. Throughout the poem, Smith's narrator crafts a picture of Flora, "the enchanting goddess of the flowery tribe" ("Flora," l. 14), who brings the flowers and plants to life in the springtime. Smith emphasizes the entangled character of the natural world in her poem, with every part depending on the one before and after it. However, while the botanical footnotes Smith provides might appear to point

[46] The connection between women's botanical exploits and their sexuality has been discussed at length in various studies. Botanical language has often been used in the late eighteenth and early nineteenth centuries to describe young women as Amy M. King has shown in Amy M. King, *Bloom: The Botanical Vernacular in the English Novel* (Oxford; New York, NY: Oxford University Press, 2003). Both Sam George and Theresa M. Kelley make the sexual system of Linnaeus central to their work in Sam George, *Botany, Sexuality and Women's Writing, 1760–1830: From Modest Shoot to Forward Plant* (Manchester: Manchester University Press, 2007); and Theresa M. Kelley, *Clandestine Marriage*. See also Deidre Lynch, "'Young Ladies Are Delicate Plants': Jane Austen and Greenhouse Romanticism," *ELH* 77, no. 3 (2010): 689–729, https://doi.org/10.1353/elh.2010.0007. Additionally, Judith Pascoe establishes the connection between Charlotte Smith and the sexual characteristics against which Smith worked in Pascoe, "Female Botanists and the Poetry of Charlotte Smith"; and Judith Pascoe, "'Unsex'd Females': Barbauld, Robinson, and Smith," in *The Cambridge Companion to English Literature, 1740–1830*, ed. Thomas Keymer and Jon Mee (Cambridge; New York, NY: Cambridge University Press, 2004), 211–26.

to "an underlying order and classification to the overflowing abundance of natural phenomena,"[47] Smith actually relegates this order and classification to the realm of fancy in this poem. It is after all Fancy personified whom the narrator entreats to help her describe Flora herself ("Flora," ll. 14-15). Systems of the natural world are thus purely epistemological tools that might be useful to humans in their relationship with the natural world, but, for her, they don't prove to be materially grounded or natural.

One of the ways in which Charlotte Smith resists naturalists' reductionist approach when using such a system as Linnaeus's is to highlight fertility in contrast to sexuality. She thus goes against more traditional representations of botany in literature and poetry in particular. In contrast to Smith's poetry, Erasmus Darwin's botanical poetry, for example, proved to be too indebted to Linnaeus's sexual system. His poetry was seen as scandalous not only because it poeticized the sexual system but also because he anthropomorphized plants in often illegitimate relationships.[48] He writes,

> *Two* brother swains of COLLIN's gentle name,
> The same their features, and their forms the same,
> With rival love for fair COLLINIA sigh,
> Knit the dark brow, and roll the unsteady eye.
> With sweet concern the pitying beauty mourns,
> And sooths with smiles the jealous pair by turns.[49]

While Darwin presents the female parts of *Collinsonia* as coquettish and capricious caught between the love of two male suitors vying for her attention and being jealous of each other, his

[47] Kandi Tayebi, "Undermining the Eighteenth-Century Pastoral: Rewriting the Poet's Relationship to Nature in Charlotte Smith's Poetry," *European Romantic Review* 15, no. 1 (2004): 133, https://doi.org/10.1080/1050958042000180737.

[48] Sam George directly connects Darwin's poem to the "disturbing implications for human society" when presenting these illegitimate relationships in botanical terms. She also argues that women writers responded to this in their own texts in subversive ways. See George, *Botany, Sexuality and Women's Writing, 1760–1830*, 15.

[49] Erasmus Darwin, *The Botanic Garden: The Loves of the Plants*, ed. Adam Komisaruk and Allison Dushane, vol. 2 (Milton Park, Abingdon, Oxon; New York, NY: Routledge, 2017), ll. 51–56. All subsequent references are to this edition and provided parenthetically.

supporting footnote, however, offers a purely mechanical rationale of "one of the anthers" probably being "mature before the other" (*Loves of the Plants*, 16n). No more coquetry or caprice in her demeanor, *Collinsonia* instead is reduced to purely mechanical reproduction. The combination of oversexualized and illegitimate relationships and the mechanical view of reproduction highlights one of the largest criticisms of Linnaean classification in the Romantic era—the presentation of nature as purely mechanical as opposed to the more prevalent views of organicism and vitalism.[50] As a consequence of representations such as Darwin's, botanizing women writers at the end of the eighteenth century were simultaneously charged with being improper and unnatural and had to find methods to engage with professional botanical work without affirming the impropriety and unnaturalness ascribed to them. While Charlotte Smith desexualizes the process of mechanical reproduction in "Flora," she pays tribute to the sexual system as one of the more prevalent botanical systems. Where Darwin's *The Loves of the Plants* makes the sexual system the focus of his verse, then, Smith mostly relegates it to her scholarly, botanical notes. When Smith describes the warrior-like sylphs attending Flora, they take "the tall club from Arum's* blood-dropt leaf" ("Flora," l. 70). Even though the flower is described as a weapon in the verse itself, Smith's note on it highlights, on the one hand, the sexualized appearance of the plant and, on the other hand, how she distances herself from the common names by showing her disdain for them: "Vulgarly Cuckoo-pint, or Lords and Ladies" ("Flora," p. 205n). Smith largely desexualizes her verse, and only her prose notes bear the remnants of a sexualized portrayal of flowers in both laymen's terms and professional botanical work based on Linnaeus's sexual system.

[50] Bailes, "Linnaeus's Botanical Clocks," 234.

Smith contends with and responds to various theories of life in the Romantic period—organicism with its self-contained and self-generated wholes, vitalism and matter's inherent life force, and mechanism that Romantics often denounced for not actually capturing the true processes of nature.[51] Instead of unquestioningly following Linnaeus and Darwin in distilling the natural world to its purely mechanistic qualities of reproduction, Charlotte Smith relocates the generation of life from male-driven sexuality to the fertile, female earth in "Flora." In her footnotes, she pays attention to and situates herself within such discursive practices, but instead of providing a systematic overview of the natural world, she focuses her poem on the networks and connections between plants in "Flora" and between the human and nonhuman worlds in *Beachy Head*. Despite "Flora" having been touted "as a version of Darwin's *The Love of the Plants* for girls,"[52] Smith's poem draws a distinction between male sexuality and female fertility. Decidedly resisting a system that gives supremacy to male sexuality—Linnaeus's botanical classes are arranged according to how many "male" stamens a plant has before moving to their orders being defined by the number of "female" pistils—Charlotte Smith instead offers a view of Flora as a midwife who "descends, to dress expecting earth" ("Flora," 25). Earth, pregnant with new botanical life, becomes the mother of the natural world, and Smith circumvents the male, sexualized domination of nature by situating the generation of life firmly in the female relationship between Flora and the earth. Flora coaxes out the life buried in the earth and comes down in a vision to

> Awake the germs, and call the buds to birth;
> Bid each hibernacle its cell unfold,

[51] On Smith using her poetry to create an embodied persona that engages with and responds to professional discourse in the Romantic periods, see Jacqueline M. Labbé, *Charlotte Smith: Romanticism, Poetry and the Culture of Gender* (Manchester; New York, NY: Manchester University Press, 2003), 20.

[52] Rosalind Powell, "Linnaeus, Analogy, and Taxonomy: Botanical Naming and Categorization in Erasmus Darwin and Charlotte Smith," *Philological Quarterly* 95, no. 1 (2016): 107; Sam George makes a similar claim about Flora, her attire, and role in the poem in George, *Botany, Sexuality and Women's Writing, 1760–1830*, 126.

And open silken leaves, and eyes of gold.
("Flora," ll. 26-28)

For Smith, the generation of life falls firmly into women's domain both in the human and nonhuman world. While she does indeed rely on Darwin's work in parts of "Flora," her poem proposes a process of generation that is neither purely mechanical nor overly sexualized but rather materially grounded in the natural world. Instead of merely describing the sexual system as Linnaeus had done in his work or as Darwin had done poetically in *The Loves of the Plants*, Charlotte Smith's poem considers a process of generating life that favors the female role in it. Equating nature with women had a long history,[53] and Smith shifts the presentation of female earth and nature as unruly and wild to one deeply involved in generative processes of the natural world. Flora calling the plants to wake up, open, and unfold themselves from the pregnant earth in the beginning of the poem turns the sexual system on its head without ever fully foregrounding it.

The figurative force of Flora in the generation of life—the only scene in the poem that directly addresses the plants' coming into existence—additionally sets Smith's poem apart from philosophies that portray the natural world as purely mechanistic or fully vital. Smith avoids anthropomorphizing the plants in "Flora" beyond this first moment of generating life. Rather, the flowers and plants are caught in a sartorial metaphor throughout the entirety of the poem, from Flora intending "to dress the expecting earth" to the rush and thistle supplying "the airy texture of [Flora's] robe" ("Flora," ll. 25, 40). Instead, Flora and her attendant mythological creatures are anthropomorphized and take on the same role that Lucretius attributes to "nature, the great creatress" (*DRN* 1.629). The "germs" and "buds" are already present in the earth, and Flora does not create the plants *ex nihilo*. Rather, Flora provides order for the natural world; she "designs

[53] See in particular Merchant, *The Death of Nature*.

and controls the universe" in Charlotte Smith's poem.[54] Because she highlights the smallest ontological units interacting with each other in "Flora," Smith offers an order of the natural world which builds itself from the ground up and is thus opposed to the artificial, imposed systems that many botanists devised. However, the order still finds its grounding in the methods and characteristics of the herbarium. The conception of nature that Smith provides in "Flora" depends on the figuration of Flora herself, dressed in the flowers she has just coaxed into life. Smith wrests botany away from Romantic organicism and vitalism and relocates it in an older tradition that is more akin to Lucretian materialism but also avoids a purely mechanical representation.

The Death of a Plant

Just as her poetry focuses on the generation of life, Charlotte Smith highlights the constant decay of both the human and nonhuman worlds. Death follows life as an inevitable consequence. By making death the subject of her poetry and materializing her grief over the death of loved ones, Charlotte Smith proposes a poetics that is inextricably linked to the material conditions of life, in which death cannot be ignored or thwarted. It is exactly because of this poetics that Smith's understanding of the material world mirrors Lucretius's theories. Because his conception of the world involves the constant motion of atoms, Lucretius emphasizes the decay of all material things in the world. He writes,

> For time doth change the nature of the world;
> One state of things must pass into another;
> Nothing remains the same. All things move on.
> All things does nature turn, transform, and change.

[54] Carolyn Merchant, *Autonomous Nature: Problems of Prediction and Control from Ancient Times to the Scientific Revolutio*n (New York, NY: Routledge, 2015), 33.

> One thing decays, grows faint and weak with age;
> Another grows and is despised no more.
>
> (*DRN* 5.828-33)

As such, decayed matter also builds the foundation of new life. Mortality and fragility often take precedence in Smith's poetry, especially in the *Elegiac Sonnets* as well as in *Beachy Head*, in which natural and human history collapse into each other. It is in the death of the plants that Smith's works lay bare the shortcomings of traditional herbaria in which plants cease to be alive but do not fully die either. Botanical illustration, the twin tool of the herbarium, similarly mirrors this state of immortality. Smith resists these ideas of immortality in her poetry by emphasizing the transience and fragility of botanical, natural, and human life in her figuration of both the generation and the dissolution of life. In contrast to the herbarium and botanical illustration, Smith uses poetic figuration as an integral part of her scientific endeavor. As a science ostensibly preoccupied with the generation and preservation of life, botany actually builds its knowledge collected in herbaria and botanical illustrations on the destruction of plants or their suspension in a state of inanimate immortality. Charlotte Smith offers poetry as a means to both extract plants (or humans) from their material frameworks—without literally doing so—and to theorize the decay and death of the human and nonhuman worlds.

As twin tools that often appear together, the herbarium and botanical illustration are not only closely connected in their usage but also in their extractive and destructive treatment of the plants. In the process of recording and preparing plants for either illustrating or mounting them on sheets of paper, plant specimens are often destroyed or suspended in an inanimate state. Especially in the study of exotic, i.e. colonial, plants, their death appears to be deemed necessary by botanists to study them because the plants are prepared and dried to endure the long periods of travel from all across the globe back to the British Isles. In the introduction to his *Exotic*

Botany (1759), John Hill illuminates the destructive process of creating botanical illustrations. As the only narrative part in his collection of plant illustrations, Hill's introduction makes the death of the actual, dried plant the focus of its work:

> The following Figures are engraved from Nature. Most of the Plants came over dried, as Specimens; and they were brought to the State wherein they are represented in these Designs, by Maceration in warm Water.
>
> The Plant was laid in a China Dish, and Water was poured upon it, nearly as much as the Cavity would hold; another Dish, somewhat smaller, was turn'd down upon this, and the Edges were cemented with common Paste spread upon brown Paper. This was set upon a Pot half full of cold Water, and placed over a gentle Fire. Thus after a little Time the lower Dish heats; and Water gradually in it: A few Minutes then complete the Business. The Plant, however, rumpled up in drying, expands and takes the natural Form it had when fresh. Even the minutest Parts appear distinctly.
>
> The Specimen is destroyed by this Operation, but it shews itself, for the Time, in full Perfection: I could have wished to save some of these, but they were sacrificed to the Work; and I hope their Remembrance will live in the Designs.[55]

After a paragraph detailing the methods of achieving "the natural Form" of the plants and making "even the minutest Parts appear distinctly," it is the last paragraph of Hill's introduction that portrays most clearly the botanists' reliance on the plants' deaths in the service of botanical work. In this discussion of the plants' deaths and his illustrations, Hill highlights the global networks of exchange of dried plant specimens. he appears unfazed by the fact that the illustrations form the final step in the utter destruction of plant life. He emphasizes the human memory of the plants when he writes that "their Remembrance will live in the Designs." This remembrance, however, is an incomplete one. Entirely removed from its surroundings, "the artfully resuscitated plant in the image is stripped of geographical context by conventions of botanical illustration, themselves caught up in the projects of botanical collecting undertaken by Sloane, Linnaeus, [Joseph] Banks, and their contemporaries across the eighteenth century."[56]

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[55] John Hill, *Exotic Botany: Illustrated, in Thirty-Five Figures of Curious and Elegant Plants Explaining the Sexual System and Tending to Give Some New Lights into the Vegetable Philosophy* (London, 1759), 0.

[56] Porter, "Specimen Poetics," 80.

Without a connection to its geographical location—an important aspect of Smith's poetry—the plant as presented in Hill's illustrations is not only destroyed but, in fact, utterly annihilated and only lives on in the illustration itself. Botanical illustration is deeply bound up with the death of the original plant, and knowledge production gains a sense of morbidity that is completely detached from the locality of a plant's origins.

Figure 7: John Hill, Exotic *Botany*, Plate 23, *Musk Hibiscus*. Lewis Walpole Library.

Charlotte Smith affirms this inextricable connection between botanical illustration and death in her *Elegiac Sonnets*. In her poems, she repeatedly laments the fact that illustrations can never reconfigure a life that has already dissolved. This does not mean, however, that Smith does not view death as an integral part of life. She actually elevates death—in both the human and nonhuman worlds—to an essential element of the natural world through her insistence on themes of death and grief in her poetry. In emphasizing and foregrounding death, Charlotte Smith's literary herbarium thus differs from traditional herbaria. The death and decay of the plants both in botanical illustration, and traditional herbaria as well, often remain unacknowledged or become a necessity in the name of scientific exploration. For Charlotte Smith, death, decay, and mortality instead take center stage in her poetry, whether she makes grief or the passage of time, both human and natural, the focus of her poems. Smith's figurative grief emerges most clearly in the *Elegiac Sonnets* when she collapses botanical drawings into the fragility of life and the inevitability of death. In Sonnet XCI, "Reflections on some Drawings of Plants," Smith uses the opening lines of her sonnet to highlight the mimicry and act of composition of botanical illustration: "I can in groups these mimic flowers compose, / These bells and golden eyes, embathed in dew" ("Reflections," ll. 1-2). The speaker of the poem emphasizes her creative abilities in composing the drawing but leaves these abilities as mere possibilities. The drawing has not been realized yet. In her illustrations, the speaker hopes to "catch the soft blush" of the rose and the "veins of blue" of "the pale Iris" ("Reflections," ll. 3-4). The poem captures the lightness of the illustrations, stressing the flowers' gentle nature the speaker draws in the muted decorative qualities of the rose and the iris. The fragility and vulnerability of the plants in the poem's drawing only ever prove to be a possibility for their figuration, but never realized, which

underscores even further the importance of death that is lost when the only reference left is a drawing.

In the second half, the poem shifts away from plant illustration as its purported subject and instead turns the drawing into the portrait of girl. Plant and human life fold into each other in Smith's poem, and the mournful character of the latter half of "Reflections" emphasizes the inability of tools such as herbaria and botanical illustrations to capture death and its implications—a way to make visible and grieve for what has passed as "time the whole nature of the world / changes, and one state of the earth yields place to another" (*DRN* 5.834-35). Botanical illustrations and dried plants in herbaria only ever act as shadows of the original plant or flower, suspended in an artificial state that by virtue of its form cannot capture the constant motion of life in the same way that poetry can. In "Reflections," Smith raises this inadequacy of artificial renderings both with regard to the natural world and human life. In an almost biographical turn, Smith dedicates the latter half of the sonnet to the speaker mourning her daughter's death and the creative power of grief:

> But, save the portrait on my bleeding breast,
> I have no semblance of that form adored,
> That form, expressive of a soul divine,
> So early blighted; and while life is mine,
> With fond regret, and ceaseless grief deplored—
> That grief, my angel! with too faithful art
> Enshrines thy image in thy Mother's heart.
>
> ("Reflections," ll. 8-14)

Smith emphasizes the "soul divine" that had been "so early blighted," but the mere rendering of "that form adored" cannot capture the soul itself. Collapsing botanical illustration and portraiture, Charlotte Smith uses the figurative power of poetry to present the speaker's grief to the reader. While the argument that Charlotte Smith uses the process of botanical illustration in "Reflections" to visualize and make intelligible for others her grief over her daughter's death

holds true,[57] it is ultimately the grief which underpins the latter half of the sonnet that manifests the image of the dead daughter and "enshrines thy image in thy Mother's heart." The material condition of life and death as the result of the passage of time and the figurative strength of poetry over illustration are central to Smith's arguments in "Reflections." She combines botanical illustration and herbaria with poetry to lay bare the deficiency of these tools in capturing the constant motion of life and death in the natural world and the human response to this motion.

The connections Smith draws between botany and death, however, do not only function as a substitute for grief for a lost daughter but rather also point to the fragility and delicacy of the plants she describes in her poetry. Unlike the original form that cannot be captured by either botanical illustration or drying and preserving plants, this fragility can be portrayed both in art and literature. In Sonnet LXXVII, "Snowdrops," of the *Elegiac Sonnets*, Charlotte Smith repeatedly draws attention to the plants' fragility by referencing the illustrated appearance of the flowers in the lightness and softness of the veining on their petals: "where to chilling airs / Your green and pencil'd blossoms, trembling, wave" ("Snowdrops," ll. 8-9). The lightness of the snowdrops' blossoms and their whole appearance in the poem as the "wan Heralds of the Sun and Summer gale" ("Snowdrops," l. 1) draw attention to their own frailty that can hardly be captured. The plants' delicateness in *Elegiac Sonnets* not only highlights the delicacy of botanical illustrations but, in conjunction with John Hill's description of his illustrations, also the precarity of dried specimens collected in herbaria. Death and destruction constantly lurk under the surfaces of these botanical practices, and Charlotte Smith's "Snowdrops" brings them to the fore when Smith goes on to write, "Ah! ye soft, transient, children of the ground" ("Snowdrops,"

[57] Elizabeth A. Dolan, *Seeing Suffering in Women's Literature of the Romantic Era* (Aldershot, England; Burlington, VT: Ashgate, 2008), 105.

l. 10). Smith continually negotiates between the subject of the plants' fragility in her sonnets and illustrative means of capturing fading life; she links delicate, botanical practices with the sorrowful, mournful character of her *Elegiac Sonnets*. She acknowledges natural death as a necessity of life but points out the impossibility of capturing life in its entirety in stating drawings.

While botanists justify the destruction of plant specimens in traditional herbaria or botanical illustrations with their desire for present and future knowledge, Charlotte Smith's representation of flowers and plants being uprooted from their locations in *Beachy Head* highlights their deaths and subsequent removal from the narrative. Instead of observing nature on its own, the speaker of *Beachy Head* observes humans actively engaging with the natural world and removing plants from the ecological environments. For example, Smith steers the reader's gaze towards

> Some pensive lover of uncultur'd flowers,
> Who, from the tumps with bright green mosses clad,
> Plucks the wood sorrel,* with its light thin leaves,
> Heart-shaped, and triply folded; and its root
> Creeping like beaded coral.
>
> (*Beachy Head*, ll. 357-63)

The "lover of uncultur'd flowers" hints at botanical practices that play with the artificiality of plants grown in greenhouses; he loves flowers that have been untouched by humans and grown completely immersed in the natural world—despite how entangled the human and nonhuman worlds are in Smith's poetry. As a direct result of collecting and systematizing plant specimens according to Linnaeus's sexual system, greenhouses became more and more fashionable to grow both domestic and exotic plants; in the Romantic period, then, greenhouses became a "favorite

scientific instrument for both apprehending and augmenting nature's plurality."[58] *Beachy Head* depicts a character counter to this strain of thought, one who is instead interested in wild-grown flowers as nature ostensibly creates them without any human interference. And yet, he "plucks the wood sorrel," resulting in the ultimate death of the perennial flower. The destruction of the plant serves no greater purpose beyond holding on to the plant to admire its fading beauty until its death—or its death-like fate of being dried and mounted in an herbarium. While Smith's poem appears to work against the artificiality of botany as a consequence of human interference in these lines, it actually demonstrates "how often, at the start of the nineteenth century, knowledge of Nature depended on practices of artifice and exhibition that rendered Nature a representation of itself."[59] On the one hand, Smith emphasizes that the natural world as it grows without any interference is beautiful. On the other hand, she immediately links this beauty to the death of the flower itself as it is plucked by the "lover of uncultur'd flowers." Charlotte Smith plays with artifice and nature, representation and original in *Beachy Head*, and in the sense of herbaria, these dichotomies are separated by the death of the plants and their artificial presentation as the natural, original specimen. Ultimately, the inclusion of the plant in her poem ends with its death as its atoms disperse, to use Lucretius's terms, and it instead becomes something else entirely.

While the herbarium offers the semblance of immortality to the plant, Smith instead preserves the plants and their botanical study through literary means. In doing so, she is able to capture what neither botanical illustration nor traditional herbaria are able to visualize—the transience of life and importance of death in the relationship between the human and nonhuman

[58] Kelli Holt, "Charlotte Smith's Beachy Head: Science and the Dual Affliction of Minute Sympathy," *ABO: Interactive Journal for Women in the Arts, 1640-1830* 4, no. 1 (2014): n.p., https://doi.org/10.5038/2157-7129.4.1.2.

[59] Lynch, "'Young ladies are delicate plants,'" 693.

worlds. The transience of the natural world functions as a mirror to the transience of human life. The poem describing Flora acts as a collection and storage of botanical knowledge that takes into account the fleeting character of the natural world without adding to the destruction of the plants themselves. Not only are the flowers limited in their existence and thus connected to death in "Flora," but Smith also portrays the natural world as a small glimpse of Paradise:

> Thou, visionary power! mayst bid him view
> Forms not less lovely, and as transient too;
> And while they soothe the wearied pilgrim's eyes,
> Afford an antepast of Paradise.
>
> ("Flora," ll. 225-29)

Smith concludes "Flora" on the notion that nature resembles Paradise on earth, and in its fleeting character actually functions as a remedy for the weary through its beauty that is actually defined by its transience. The flowers offer beauty to the observer in the knowledge that they will fade and perish at some point. The literary herbarium as Smith presents it in her poetry functions through both its timelessness and durability while simultaneously highlighting the fleeting character of life in general. For her collections, dried plant specimens do not form the centerpiece of her knowledge. In "Flora," she acknowledges and values the temporary character of the plants, and they are never anything more than themselves. "Flora" and Smith's other poems never reduce the plants to merely utilitarian objects. They present the natural world at its height without foregrounding the plants' instrumentality—only the cotton plant mentioned in *Beachy Head* vaguely indicates its utility to humans to the reader. Smith manages to capture through her poetry what naturalists were only able to achieve through the destruction of the plants or through the suspension of the dried specimens without a fixed location in time and space: the material reality of life and death in the natural world.

In its transience, the natural world takes on the charge of being a source of solace in the face of death and suffering. This dichotomy of comfort and death in nature appears throughout

Charlotte Smith's botanical poetry. While Smith does not gloss Sonnet LXXIX, "To the Goddess of Botany," with botanical notes, she includes one of the longest notes in *Elegiac Sonnets* to the title of the poem. It is in this particular case that Smith "uses her footnotes to house an educated Self aware of the limitations placed on the social body of Woman."[60] In the note, Smith laments her own fate of wanting to escape her situation to a more peaceful place where she can dedicate herself to the study of the natural world. She quotes John Milton, William Shakespeare, and Jean-Jacques Rousseau, to whom she successively compares herself while amplifying her own suffering in the notes when she writes that "it has been [her] misfortune to have endured real calamities" compared to those of these male authors ("Goddess," p. 115n). The longing for a peaceful world in which she can leave behind humanity and "forsake / *Their* haunts for ever" ("Goddess," l. 3) heightens the mournful character of the sonnet because she explicitly denounces humanity as the source of her calamity. Instead, she wants to

> learn the bright varieties
> That from your lovely hands are fed with dew;
> And every veined leaf, that trembling sighs
> In mead or woodland.
>
> ("Goddess," ll. 8-11)

In the link between botany and the ephemerality of life and suffering, "Goddess" symbolizes one side of the coin of Charlotte Smith's scientific and botanical engagement with the natural world. In "Flora," Smith shows the other side of the lament. She portrays the natural world, and the goddess herself, weaving scientific, botanical names into the actual verse, and she ends the poem on a hopeful note, praising the afterlife. Smith has left behind the mournful character of the *Elegiac Sonnets* and instead presents her reader with a pastoral depiction of the natural world as a source of comfort. Smith portrays botanical knowledge in the context of blissful nature instead,

[60] Labbe, "'Transplanted into More Congenial Soil,'" 73; Labbe makes a similar argument in Jacqeline M. Labbe, *Charlotte Smith: Romanticism, Poetry and the Culture of Gender*, 20, 59.

and yet even "Flora" ends on a lament for "the careless wanderer" that "Truth, and Nature, form his future taste" ("Flora," ll. 207, 210). Nature serves as a constant and a reminder for the wanderer that it will, through its beauty and transience, help those who suffer the most: "But most for those, by Sorrow's hands oppress'd, / May thy beds blossom, and thy wilds be dress'd" ("Flora," ll. 215-16). The speaker hopes that nature will be a source of solace for those people who, like her in "To the Goddess of Botany," find themselves in situations like Smith's, which are marked by grief and depression. Thus, "Flora" serves as a more hopeful extension of Smith's sonnet addressed to the goddess of botany.

Charlotte Smith's materialism emerges most clearly in her botanical poetry when she engages with the transience of life and the inevitability of death. In parts of the *Elegiac Sonnets*, *Beachy Head*, and "Flora," Smith folds human and natural life into each other. Her poems continually reference the passage of time, and she grounds this historical perspective in the materiality of humans, plants, and geology. By collapsing human and natural history into each other, especially in *Beachy Head*, Smith demonstrates Lucretius's philosophy, in which "the human being is not a static thing in any sense but a process that is continually changing, moving, and, most importantly, dying."[61] Charlotte Smith's poetry engages with the ever-increasing Romantic interest in natural philosophy, but Smith also resists the philosophical trends of organicism and vitalism. Not everything is intrinsically alive in her poetry; instead, she offers the reader a conception of the natural world that is in constant motion and encompasses human and nonhuman worlds. Rather than highlighting human exceptionalism, Charlotte Smith proposes a Lucretian worldview that posits humans on the same level as any other material entity, subject to the same processes of life and death. Her use of botany in poetry offers a glimpse into the decay

[61] Thomas Nail, *Lucretius II: An Ethics of Motion*, *Kindle* (Edinburgh: Edinburgh University Press, 2020), "Dark Materialism: Folded Matter," location 1761.

that is part of the natural world that tools such as traditional herbaria and botanical illustrations cannot capture. The figurative power of poetry instead illustrates the constant motion of life and death in the material world that botanical tools depending on the stasis of the object to be studied cannot encapsulate.

The Spaces of Botany

Especially in *Beachy Head* and "Flora," Charlotte Smith creates a new compendium of botanical knowledge that is simultaneously localized and global, particular and general. However, it is not only the spatial dimension Smith engages with, but also the temporal one. Even in the localization of botany in her poetry, Smith engages with the temporality of the natural world. Insistent on the continual movement of matter, she foregrounds the materiality of both the human and nonhuman worlds in spatial and temporal terms when she folds natural and human history into each other, showing that both are constitutive of each other. As a prospect poem, *Beachy Head* thrives on its localized and detailed materiality that at the same time presents the reader with an expansive view of the world; Smith draws the connection between the local and global when she shifts the view from Beachy Head towards France and out across the ocean towards the rest of the world in more general. *Beachy Head* embodies environmental poetry, whose "distinctive feature is that attention to the non-human environment is never separate from an attendant sense of human history or culture."[62] Linking geographic space to human history before moving into detailed studies of this particular natural setting, Charlotte Smith immediately situates her reader at the apex at which natural and human history converge:

[62] Timothy Clark, *The Value of Ecocriticism* (Cambridge: Cambridge University Press, 2019), 64, https://doi.org/10.1017/9781316155073. For the original distinction between environmental and ecophenomenological poetry, see Susanna Lidström and Greg Garrard, "'Images Adequate to Our Predicament': Ecology, Environment and Ecopoetics," *Environmental Humanities* 5 (2014): 35–53.

On thy stupendous summit, rock sublime!
That o'er the channel rear'd, half way at sea
The mariner at early morning hails,*
I would recline; while Fancy should go forth,
And represent the strange and awful hour
Of vast concussion; when the Omnipotent
Stretch'd forth his arm,* and rent the solid hills,
Bidding the impetuous main flood rush between
The rifted shores, and from the continent
Eternally divided this green isle.

(*Beachy Head*, ll. 1-10)

Connecting her poem to geology, the narrator of the poem begs her fancy to go forth and imagine the moment the land mass of the British Isles broke away from the European mainland, severing the geological connection to France. The fraught social relationship between the two nations—a particularly poignant theme during the Napoleonic Wars (1803–1815)—finds its original source in the geological processes that broke the British Isles off the European continent.[63] In the footnote to "when the Omnipotent / Stretch'd forth his arm," Smith writes, "alluding to an idea that this Island was once joined to the continent of Europe, and torn from it by some convulsion of Nature. I confess I never could trace the resemblance between the two countries. Yet the cliffs about Dieppe, resemble the chalk cliffs on the Southern coast. But Normandy has no likeness whatever to the part of England opposite it" (*Beachy Head*, p. 163n). While Smith quickly declares that she does not see the resemblance between the two geological formations of the Britain and France, in the verse itself she raises no doubts whatsoever about the truth of the connection between the island and the continent. In the opening of *Beachy Head*, Smith manages

[63] For a discussion of the rivalry between Great Britain and France as it is presented in *Beachy Head*, see Lily Gurton-Wachter, "'An Enemy, I Suppose, That Nature Has Made': Charlotte Smith and the Natural Enemy," *European Romantic Review* 20, no. 2 (2009): 197–205, https://doi.org/10.1080/10509580902840475; and Lily Gurton-Wachter, *Watchwords: Romanticism and the Poetics of Attention* (Stanford, CA: Stanford University Press, 2016).

to situate the reader in various discourses on historical perspectives and the interplay between the natural world and humans during epochal shifts.[64]

Asserting the accuracy of the geological formation processes in her poetry while also presenting her own personal doubts allows Smith to partake in her own way in a network of knowledge production and dissemination that often spreads across large geographical regions. Smith's exploration of the geographic space of Beachy Head "involves her in a revisionary understanding of the *nature* in natural history as a part of an overall historical process that includes human history no less than any other, and not as an unchanging stratum above which social and political processes happen."[65] All the historical processes are uniquely connected in *Beachy Head*, and the poem functions particularly well as a representation of the compilation and collection of historical objects and attitudes—as exemplified by the elephant bones found in Beachy Head upon which, "The wondering hinds, on those enormous bones / Gaz'd; and in giants dwelling on the hills / Believed and marvell'd" (*Beachy Head*, ll. 417-19). Charlotte Smith uses her poetry in *Beachy Head* in conjunction with the prose footnotes to show her own participation in networks of knowledge and how those networks overlap. Her digression on the geological and natural history of Great Britain in *Beachy Head* provides Smith with a way to engage with the network of botanical knowledge.

[64] For a discussion of the epochal shifts from the Holocene to what we now consider the Anthropocene, see Tobias Menely, "Late Holocene Poetics: Genre and Geohistory in *Beachy Head*," *European Romantic Review* 28, no. 3 (2017): 307–14, https://doi.org/10.1080/10509585.2017.1314669. Menely demonstrates the overlap between the epochs with a particular focus on energy and its definitions. He argues that Smith's poem as an example of late Holocene poetry prefigures ideas of energy and thermodynamics that would only be defined in the Anthropocene. Locating ideas of energy cycles in locodescriptive poetry of the eighteenth century, Menely shows the overlap between epochs. Looking at the Anthropocene from the perspective of the Holocene, we see "that the geophysical conditions of society, on this sun-drenched, storm-pounded, climatologically variable planet, have been not transcended but intensified" (313).

[65] Kevis Goodman, "Conjectures on Beachy Head: Charlotte Smith's Geological Poetics and the Ground of the Present," *ELH* 81, no. 3 (2014): 986, https://doi.org/10.1353/elh.2014.0033.

Displaying the plants in time and space, Smith employs her poetry to combat the shortcomings of botanical illustration and dried plants while also steering clear of presenting the flowers as completely dead. Smith plays with the dichotomies of general and specific, global and local in her poetry. When "the prospect widens" for the speaker of *Beachy Head*, she highlights in the following lines how the natural world actually hides human creations, such as buildings whose roofs

> are half conceal'd
> By the rude arms of tress, lovely in spring,
> When on each bough, the rosy-tinctur'd bloom
> Sits thick, and promises autumnal plenty.
>
> (*Beachy Head*, ll. 310, 313-16)

Human life is concealed by the natural world that is once again presented in temporal terms. The beauty that is currently observed will result in fruit in the fall that humans can use to sustain themselves through the winter. Despite the wanderer's prospect widening, Smith narrows her readers' gaze on to the plants that cover and conceal the houses before linking these orchards found on the southern coast of England to the "Norman farms" and "the vineyards of the south" (*Beachy Head*, ll. 317, 319). Elevating the English orchards over those in France and Italy, Smith ends her stanza on the idea that the English orchards cannot be "surpassed" (*Beachy Head*, l. 320) and "not even those of Herefordshire, or Worcestershire, exhibit a more beautiful prospect, when the trees are in bloom" (*Beachy Head*, p. 174n). Moving on from the orchard to the cottage gardens, Smith's speaker acknowledges that "most [of the gardens are] for use design'd, / Yet not of beauty destitute" (*Beachy Head*, ll. 327-28). The description of the cottage gardens falls back into the depiction of flowers and plants that references their beauty but relegates their utility to an afterthought. Plants and flowers fill the cottage gardens to the brim, from "the vine / [that] mantles the little casement" to "the briar," "pansies," "pinks," "rosemary," and "rue" (*Beachy Head*, ll. 328-32). In the cottage gardens, "there honeysuckles flaunt, and roses blow / almost

uncultured" (*Beachy Head*, ll. 333-34). By the end, Smith's speaker has again emphasized the non-instrumental parts of nature. The widened prospect of the beginning of this section ends on the minute detail of "artless nosegays, knotted with a rush / by a village housewife or her ruddy maid" (*Beachy Head*, ll. 343-44). By continually directing the reader's gaze to the smallest flowers and plants from the widened prospect, Smith makes tangible the networks of bits and pieces that actually make up the prospect—whether the speaker gazes upon the small village hidden by the orchards or upon the sea from the cliffs of Beachy Head. Botany proves to be only one part—but one that highlights birth, life, and death together—of the larger mosaic character that marks Smith's poetry and *Beachy Head* in particular,[66] and Smith embeds botanical study within spatial and temporal dimensions that return the plants to their environments. The cliff on the southern coast of England "acts not as an instrument to be exploited and gawked at for sentimentalism's sake, but as a 'lively' companion to be sympathized with and regarded on its own plane of being."[67] Charlotte Smith grounds botany within the material realities of the smallest flowers growing on Beachy Head and its surrounding areas. By relocating the plants from their suspended places in traditional herbaria, Smith offers her readers a view of the world that makes no distinction between the human and the nonhuman worlds and instead presents them as inextricably intertwined in the formation of their spatial and temporal realities.

Connecting the spatial and historical specificity to botanical knowledge, Smith links local particularity to a larger network of global interaction. The study of botany depended on such a larger network in order to establish a more complete picture of the natural world. The diffusion

[66] John M. Anderson, "'Beachy Head': The Romantic Fragment Poem As Mosaic," *Huntington Library Quarterly* 63, no. 4 (2000): 547–74, https://doi.org/10.2307/3817616. For a more general discussion of fragment poems in the Romantic period, see Marjorie Levinson, *The Romantic Fragment Poem: A Critique of a Form* (Chapel Hill, NC: University of North Carolina Press, 1986).

[67] Kelli Holt, "Charlotte Smith's Beachy Head," n.p..

of knowledge in botany thus reflects the ties between the local and the global that underlie *Beachy Head*. For Smith, locality serves as a means to distinguish the material configuration of a specific space. She does so in her poem through temporal and spatial determinants grounded in the minute details of the ecological environments that bear the remnants of human and natural history. Smith relocates the vast prospect of looking out onto the sea from Beachy Head and its attendant scales of time and space onto a specific location on the southern coast of England. Placing botany on the cliffs of southern England, Charlotte Smith generates a new outlook on how and where to study the natural world. While Gilbert White writes that "the productions of vegetation have had a vast influence on the commerce of nations, and have been the great promoters of navigation,"[68] Smith instead moves her readers back to the English coast, looking out over the channel and ships traveling across the oceans. In *Beachy Head*, Smith acknowledges what White describes as the "commerce of nations" in the opening of the poem when the narrative voice looks out across the water at the "fishing vessels" and "the ship of commerce" (*Beachy Head*, ll. 39, 42). However, rather than opening her poem to the forward progression of time and commerce, Smith directs her reader's gaze towards the immediate material reality instead of one that is out of reach for large parts of society. Global connections underpin this local material reality—the various strata of sediments visible on the cliffs tell of the long history of the British Isles. The close connection to France—one part of "the hostile nations" (*Beachy Head*, l. 156) and the constant enemy—as well as to a more global trade of goods emerges in Smith's later poetry and appears to be deeply bound up with more scientific botanical study.[69]

[68] White, *A Natural History of Selborne*, 184.

[69] For the connection between Charlotte Smith's poetry and the conflicts between Great Britain and France, see Gurton-Wachter, "'An Enemy, I Suppose, That Nature Has Made'" and Gurton-Wachter, *Watchwords*. For a more in-depth discussion of the bioregional aspects of Smith's poetry, see Heather Kerr, "Melancholy Botany: Charlotte Smith's Bioregional Poetic Imaginary," in *The Bioregional Imagination: Literature, Ecology, and Place*, ed. Karla Armbruster et al. (Athens, GA: University of Georgia Press, 2012), 181–99.

Smith roots her botanical study in the moments of natural and human history that define *Beachy Head* while linking it to an elevation of the natural world as a source of comfort for humans in "Flora." Her use of botany in her poetry thus serves to reiterate Smith's claim that botanical study necessarily needs to start in the local, a fact that might get lost in the herbarium and botanical illustration that suspends the plants in a moment entirely detached from time and space.

In contrast to the tangible location of Beachy Head that Charlotte Smith's readers could actually visit and engage with, "Flora" offers an abstract location without a corresponding geographic location in southern England, and yet, the abstract location proves to be just as important as the tangible one. Smith situates the speaker of her poem in the natural world far removed from other humans as it is only there that the narrative voice is able to call on fancy to describe Flora:

> Remote from scenes, where the o'erwearied mind
> Shrinks from the crimes and follies of mankind,
> From hostile menace, and offensive boast,
> Peace, and her train of home-born pleasures lost.
> ("Flora," ll. 1-4)

It is exactly in this absence of other humans that Charlotte Smith, through the narrative voice of "Flora," finds the ability to "exhibit a more minutely detailed and taxonomic approach to natural objects than [her] male counterparts of 'high' Romanticism, and [women writers] explicitly adopt scientific models, classifications, and concerns."[70] Smith removes the narrative voice from human interaction because it is only there that the voice can find peace and the leisure "to describe / The enchanting goddess of the flowery tribe" ("Flora," ll. 13-14) through her drawings. The location of "Flora" is just as important to the poem as *Beachy Head*'s location is. The situatedness of the poems realizes Smith's own interactions with the natural world without

[70] Bailes, *Questioning Nature*, 13.

ever presenting any moment of appropriation or power over the land. Just as natural and human history are deeply intertwined in a non-hierarchical manner in her poetry, so is the power dynamic between humankind and the natural world. "Flora" demonstrates that the poem's location can be both abstract and particular at the same time, and this simultaneity does not diminish the importance of location to Smith's poetry.

Even so, Charlotte Smith conceptualizes the poem's location in such a way that the connection to the region surrounding Beachy Head appears even in "Flora" in some capacity. Flora descends through the English landscape to the cliffs of the southern coast of England—a place Smith will reclaim in *Beachy Head*—and extends the botanical exploration of the British Isles to their edges. As Flora makes her way towards the edge of the water, the narrative voice describes the local flora:

> For there, by sea-dews nurs'd and airs marine,
> The Chelidonium* blows; in glaucous green,
> Each refluent tide the thorn'd Eryngium* laves,
> And its pale leaves seem tinctured by the waves;
> And half-way up the cliff, whose rugged brow
> Hangs o'er the ever toiling surge below,
> Springs the light Tamarisk*—The summit bare,
> Is tufted by the Statice.*
>
> ("Flora," ll. 167-74)

The plants found at the edge of the land hint at the unclear and artificial distinctions between nations, so that while human and natural history often converge, nature pays no heed to human conflicts. The closer Flora moves towards the cliffs, the more unforgiving nature becomes, and when Smith adds the following note for Chelidonium, "Chelidonium glaucium. The horned or sea Poppy" ("Flora," p. 208n), the common name already alludes to this unforgiving character of the chalky cliffs. Growing on rocky beaches or chalky cliffs, the sea poppy embodies the sea-hardened mariner who is constantly exposed to the elements, and, along with Eryngium, or "Eryngium maritimum—Sea Holly" ("Flora," p. 208n), the flower grows on the coastlines of

England and Great Britain. It also at this unforgiving edge of the landmass that human distinctions fade away and nature blends boundaries. Smith dedicates the most extensive note in this section to "the light Tamarisk" whose Latin binomial indicates the plant's connection to France: "Tamarix gallica. This elegant plant is not very uncommon on cliffs in the West of England, and was in 1800 to be found on an high rock to the eastward town of Hastings in Sussex" ("Flora," p. 208n). Charlotte Smith invokes ideas of invasion through the use of Tamarix gallica and the explicit mention of Hastings, which in turn carries with it its implicit references to the Battle of Hastings and William the Conqueror; consequently, the botanical note to her poem encompasses both natural and human history in its references to plant life associated with the Continent and the history of war between the geographic locations. Thus, in "Flora," Smith not only hints at the close connection between England and France—an idea she would expand in *Beachy Head*—but she also highlights the rugged and battle-worn character of the southern coast of England as a site of repeated invasion from the Continent through her use of botanical notes. Smith employs botany to simultaneously expand and define the English landscape. The reference to France in the plant's binomial evokes not only the scholarly sense of Smith's verse but also the natural history, along the geographic and geological boundaries of the British Isles, and human history of the domination of these geographic spaces.

Beachy Head serves as Charlotte Smith's work that most explicitly highlights the different links between the local and the global and botany's role in this particular geographic space. Its simultaneous presentation of the local fauna in a global context, as the speaker of the poem gazes across the water before turning his gaze back towards the minute details of Beachy Head, makes *Beachy Head* a compendium of botanical knowledge that, while concise, carries with it a profusion of connotations and information. Smith's poem functions as an illustration of

the location of Beachy Head and constantly broadens the reader's understanding of its connections to the rest of the world and natural history. At the link between human and natural history, *Beachy Head* toys with the ethics of botany that, just as in an actual herbarium, always teeters on the edge of letting the power dynamic between humans and nature tilt to either side. Smith does not partake in the destruction of the plants themselves, but rather focuses on the symbiotic relationship between humans and nature. The literary herbarium of *Beachy Head*, which takes nature's importance and agency into account, thus provides the reader with an alternative to traditional herbaria, in which the plant matter is suspended without any ties to the locality or the temporal stages of plant-life. The botanical scholarship present in Smith's poetry lays bare shortcomings of botanical practices to capture the constant motion of life in particular and natural history in more general terms.[71] Botany presents itself as a field of study continually concerned with its own past, present, and future and its trajectory. As a tool, however, the herbarium denies the plant specimens all temporality and locality. It offers the specimens as merely relational to each other rather than as reflecting the natural world in its environmental diversity. In working at the boundaries between nations, imagination, professional and amateur botany, "Smith's poetry focuses on the way in which fragments are themselves rich entities with their unique histories and contradictory stories, and the Linnean terminology throughout her extensive endnotes grounds her poetic transports."[72] *Beachy Head* in particular reflects the various methods of collecting botanical specimens through its own mosaic character, and Charlotte Smith plays with collecting practices in bringing human and natural history together.

[71] In his essay "Stadial Environmental History," Noah Heringman makes the argument that traditionally in the eighteenth century, natural history had been subordinate to the history of civilization. In his study, he shows how George and John Reinhold Forster use natural history as a foundation for the history of civilization and the intricate connections between the two. I argue here that Charlotte Smith's particular use of botany accomplishes something similar. Her use of botany in her poetry foregrounds the entanglement of human and natural history as it comes into a material existence in the particular locations of her poetry.

[72] Ruwe, "Charlotte Smith's Sublime," 127.

Beachy Head, from the very beginning of the poem, displays the natural beauty and grandeur of the cliffs on the southern coast of England with an eye to botanical specificity. From the very beginning of the poem, Smith plays with themes of power, and "Smith's daring opening move is to claim the prospect, but to do so in typically Smithian fashion; that is, she gestures towards power but cloaks her moves in decorous propriety. Again, as in so much of her work, she gradually unfolds to the reader's eyes a more assertive, authoritative persona."[73] This assertive persona, however, also indicates an ethical dilemma about the role of human authority in the natural world in a weathered region such as Beachy Head. *Beachy Head* leaves an ambiguous impression, "as the reader asks whether those feelings are solipsistic or humanitarian, self-absorbed or compassionate, anti-social or social, erotic or altruistic, detached or engaged."[74] The concise botanical knowledge that is not connected to the destruction of nature in *Beachy Head* gestures at a non-hierarchical relationship between humans and the natural world and also at exploitation of both humans and nature in the name of botanical knowledge in an age of imperial expansion.[75] The very first mention of specific botanical knowledge supported by a footnote appears in the narrative voice's expansive view of the sea: "afar off, / And just emerging from the arch immense / Where seem to part the elements" (*Beachy Head*, ll. 36-38). Among the other boats and vessels, the narrative voice sees

> The ship of commerce richly freighted, makes
> Her slower progress, on her distant voyage,
> Bound to the orient climates, where the sun
> Matures the spice within its odorous shell,
> And, rivalling the gray worm's filmy toil,
> Bursts from its pod the vegetable down;*
> Which in long turban'd wreaths, from torrid heat

[73] Labbe, *Charlotte Smith: Romanticism, Poetry and the Culture of Gender*, 143.

[74] Kari Lokke, "The Figure of the Hermit in Charlotte Smith's '*Beachy Head*,'" *Wordsworth Circle* 39, no. 1–2 (2008): 42.

[75] Charlotte Smith plays with the tension between domestic botany and imperial projects in her botanical poetry, and this also shines through in *Beachy Head*. see Porter, "From Nosegay to Specimen Cabinet," 39.

Defends the brows of Asia's countless casts.
(*Beachy Head*, ll. 42-49)

Immediately, *Beachy Head* enters the colonial world when Smith describes the products from Asia that can be found on ships returning to the shoreline visible from Beachy Head. The footnote for "bursts from its pod the vegetable down" reads, "Cotton. (Gossypium herbaceum)" (*Beachy Head*, p. 164n), and again Smith signals the global connections of Beachy Head: one common name for this plant is also Levant cotton. The web of connections emerging from this simple reference in the verse is extensive: textile production, exploitation of the colonial world, and fascination with the exotic.[76] Yet, Smith's portrayal of the cotton plant admits agency of the natural world. Instead of presenting the textiles themselves—silk and cotton cloth—she focuses on the silkworm and the plant themselves without directly representing the exploitation of labor of enslaved people involved in turning the plant's and insect's work into the textiles humans use until a few lines later in the poem.

This first moment of connecting the prospect to the colonial expansion of the British empire marks a moment of tension in Charlotte Smith's poem. While she praises both the cotton plant and the silkworm in the previous section for their inherent generation of source material for textiles without acknowledging the human labor that is necessarily part of this material transformation, Smith's attitude towards the exploitation of nature and labor becomes more complicated. As the speaker digresses from the prospect seen from Beachy Head on to the riches of the earth such as "the beamy adamant,* and the round pearl / Enchased in rugged covering," she quickly turns her attention to the exploitation of labor involved in the collection of Nature's "gaudes and baubles" (*Beachy Head*, ll. 51-53, 58). For "the toys of Nature," which "in Reason's

[76] For a global history of cotton, see Sven Beckert, *Empire of Cotton: A Global History* (New York, NY: Vintage, 2015).

eye" only matters little, man would "violate / the sacred freedom of his fellow man" (*Beachy Head*, ll. 55-59). The shift from nature generating material that humans can use for the production of textiles in the case of the cotton plant and the silkworm to Nature producing "toys" for only "her sport" that should never be the cause for the exploitation and enslavement of fellow human beings offers the reader a glimpse of the apparent tensions in Smith's poem (*Beachy Head*, l. 55). Smith's use of cotton as the first plant in *Beachy Head* immediately sets her in a context of imperialism and slavery; however, she does not directly establish this connection herself as slavery only appears in these subsequent lines. Devoid of human labor, the cotton plant itself is both generating and fabricating as it "bursts." The implication of imperialism in botany and a somewhat ambiguous attitude towards it emerges in *Beachy Head* and falls in line with studies of botany of the eighteenth and early nineteenth centuries.[77]

The relationship between Smith's presentation of the cotton plant's agency in its transformed materiality as cloth in "long turban'd wreaths" and that of nature's toys being nothing more than "gaudes and baubles" (*Beachy Head*, ll. 48, 58) lays bare some of the tensions between different foci of the human and nonhuman worlds in *Beachy Head*. In these lines of the poem, when the plants (or the work of the silkworm) are useful for humans, Smith omits the human labor involved in the further processing of raw materials. Diamonds and pearls, however,

[77] For the connections between colonialism and botany see, Michael T. Bravo, "Mission Gardens: Natural History and Global Expansion, 1720–1820," in *Colonial Botany: Science, Commerce, and Politics in the Early Modern World*, ed. Londa Schiebinger and Claudia Swan (Philadelphia, PA: University of Pennsylvania Press, 2005), 49–65; Staffan Müller-Wille, "Walnuts at Hudson Bay, Coral Reefs in Gotland: The Colonialism of Linnaean Botany," in *Colonial Botany: Science, Commerce, and Politics in the Early Modern World*, ed. Londa Schiebinger and Claudia Swan (Philadelphia, PA: University of Pennsylvania Press, 2005), 34–48. Schiebinger and Swan's collection in more general offers a well-rounded discussion of the role botany played in colonial spaces and imperial projects. Additionally, also see Londa L. Schiebinger, *Plants and Empire: Colonial Bioprospecting in the Atlantic World* (Cambridge, MA; London: Harvard University Press, 2004). Here, Schiebinger traces the colonial and botanical history of a singular plant: the peacock flower and its abortive qualities. For a discussion of plants' literary lives in the nineteenth century, see Elizabeth Hope Chang, *Novel Cultivations: Plants in British Literature of the Global Nineteenth Century* (Charlottesville, VA: University of Virginia Press, 2019).

do not carry such intrinsic value as cotton, when Smith describes them as mere toys, for which fellow human beings should not be enslaved. The fragmentary conception of productive bodies and nature shows a fraught display of the material relationships between the human and nonhuman worlds that Smith cannot escape in *Beachy Head*.[78] The tensions apparent in this section of the poem reveal an attitude towards nature that is held up throughout *Beachy Head*: highlighting nature's agency as the cotton bursts from its plant. In contrast to this, the diamonds and pearls have to be taken from nature through the destruction of its material configuration. *Beachy Head* appears to simultaneously elevate nature's generative and productive capacities and denounce the enslavement of human beings. In doing so, however, Smith ignores and elides the human toil involved in the collection and processing of cotton until it can be used within the "turban'd wreaths." While this does open up some questions about Smith's attitude towards the exploitation of human labor, her use of botany throughout her poetry actually offers the reader a critical view of exploitation of both humans and nature. It is not a coincidence that the cotton plant—immensely important to British trade—appears as the first botanical specimen in *Beachy Head*'s herbarium. Its inclusion in the poem reveals Smith's own attitude towards exploitation of labor and natural resources that is still somewhat driven by utilitarian ideals.

Thus, she emphasizes nature's creative and generative capacities while omitting the human labor involved in the processing of natural materials. On the other hand, when she

[78] For a discussion of the connections between ecocritical and postcolonial approaches to early modern literature, see Monique Allewaert, *Ariel's Ecology: Plantations, Personhood, and Colonialism in the American Tropics* (Minneapolis, MN: University of Minnesota Press, 2013). Allewaert argues for a materialist conception of the interactions between humans and the natural world. As such, the natural world had just as much influence on relationships between humans as humans' economic, social, or political interests. Allewaert brings theories of ecocriticism and postcolonial studies together in her work, and she demonstrates the productivity of looking at these theories in conjunction with each other. For further discussions of the connections between postcolonial studies and ecocriticism, see Graham Huggan and Helen Tiffin, *Postcolonial Ecocriticism: Literature, Animals, Environment* (London; New York, NY: Routledge, 2015); and Graham Huggan, "Postcolonial Ecocriticism and the Limits of Green Romanticism," *Journal of Postcolonial Writing* 45, no. 1 (2009): 3–14, https://doi.org/10.1080/17449850802636465.

highlights human involvement in obtaining resources such as diamonds and pearls, she does so by indicating the destruction that follows as "the slave, / … tears [them] off / from the rough sea-rock, deep beneath the waves" (*Beachy Head*, ll. 52-54). Smith shows her own unease with slavery but is unable to ignore some of the utilitarian value of natural resources. Cotton and the resulting textiles have a direct value for humans in Smith's eyes, and she can highlight nature's generative capacities through the cotton bursting from its cotton bolls. Pearls and diamonds, however, only gain value through the difficulty in accessing them, not their utility. Even in this section, though, Smith insists on "the sacred freedom of [her] fellow man" (*Beachy Head*, l.59), and denounces slavery as a practice. The vast expansion of cotton across the globe mirrors the vast prospect of the opening of the poem. Smith connects human and natural history through the very first plant included in *Beachy Head*, and she does so deliberately so as to denounce practices of exploitation—whether through the enslavement of human beings or the destruction of ecological spaces through the removal of plants for professional scientific study. *Beachy Head*'s literary herbarium starts with the most remote plant possible in the small locality of Beachy Head and implies one of the main uses for the herbarium—expanding the knowledge of the botanical world and its uses beyond local boundaries. Through her poetry, however, Charlotte Smith offers her readers a material configuration of the natural world that does not depend on the extraction and destruction of material objects—plants and bodies alike—to produce knowledge. Instead, the material relationships between plants and their localities in both spatial and temporal terms indicate the interdependence of the human and nonhuman worlds and take into account the fragility and vulnerability that goes hand in hand with these material connections.

Smith's move from the expansive prospect atop Beachy Head to specific moments of natural and human history makes visible the relationship between the smaller, mostly domestic plants and the larger, global contexts. However, this relationship also offers the reader a return to the self and the local to avoid larger conflicts when, "by insistently focusing on the minute within even the grandest expanse, Smith suggests the escapist possibilities of the particular. Within the carefully delineated realm of the cottage garden, locus of female work and duty, Smith employs the extreme close-up of the botanist's gaze, creating an explosion of dazzling specificity, so that the limitations of a female vantage point become forces of liberation."[79] The focus on the smallest entities—plants, fossils, and animals—thus gives Charlotte Smith the opportunity to appropriate the gaze's dominion in prospect poetry and instead equalize the observer and observed.[80] Treating *Beachy Head* as a literary herbarium offers the reader a glimpse into Charlotte Smith's ethical concerns—the agency of the natural world and how human and natural history are interwoven and mirroring each other. Considering the natural world in this manner, Smith provides a less exploitative and utilitarian view of nature and, instead, emphasizes the equality between the human and the nonhuman worlds. Where traditional herbaria function as tools of humans' quest for mastery over the natural world by creating a system of it, Smith's literary herbarium instead highlights the web of connections and temporal and spatial fragilities of the natural world that encompasses the human world. In her poetry, human and nonhuman do not appear as distinct categories anymore, and her use of botany and reversal of herbarium practices act as additional steps in conflating the human and

[79] Pascoe, "Female Botanists and the Poetry of Charlotte Smith," 205.

[80] Kevis Goodman also points out the microscopic gaze that registers as noise in *Beachy Head* similar to her reading of Margaret Cavendish's antipathy towards the microscope because of its distorting qualities in Chapter 1 of this dissertation; see Kevis Goodman, *Georgic Modernity and British Romanticism: Poetry and the Mediation of History* (Cambridge; New York, NY: Cambridge University Press, 2004), 169n89-170n89.

nonhuman worlds in their material entanglements with each other. Showing the links between broad and detailed views of the natural world in spatial terms in particular affords Charlotte Smith with an opportunity to advocate for the equality and equivalence between the human and the nonhuman worlds.

The entanglement between humans and the natural world materializes most clearly in *Beachy Head*'s depiction of the poor inhabitants of the rough region surrounding the chalky cliffs. When Smith writes about the laboring rural family, she connects their shepherding work to the disruption of the natural world through the disruption of the meter while also highlighting the interdependent relationship between nature and humans:

> A few sheep,
> His best possession, with his children share
> The rugged shed when wintry tempests blow;
> But, when with Spring's return the green blades rise
> Amid the russet heath, the household live
> Joint tenants of the waste throughout the day,
> And often, from her nest, among the swamps,
> Where the gemm'd sun-dew grows, or fring'd buck-bean,
> They scare the plover,* that with plaintive cries
> Flutters, as sorely wounded, down the wind.
>
> (*Beachy Head*, ll. 197-206)

The simple life presented here demonstrates through its close connection of humans and nature—both directly in the passage of the poem and with regard to the humans living in the rural areas of southern England—that the association with the eighteenth-century georgic reflects Smith's attitude toward the natural world more aptly than Romantic theories of the sublime. The material conditions of the natural world are deeply ingrained in human life, creating a cycle of dependence. The vision that she paints in this passage is everything but utopian, and the natural resources available on Beachy Head's cliffs and its surrounding areas prove to not fully support the people living there. The hind's vision of his own rural, sparse life—one in which "the labourers of this tract of country, a hardy and athletic race of men, are almost universally

engaged in the contraband trade, carried on for the coarsest and most destructive spirits, with the opposite coast" (*Beachy Head*, p. 170n)—is dominated by the few sheep he possesses with which his children are forced to share their space and the unwelcoming nature that surrounds his shed. The sparse life on Beachy Head reflects both the human and nonhuman worlds that come together in this location, and Smith's poem functions again as an entanglement of human and nonhuman lives, coming together and configuring each other. Both "sun-dew" and "buck-bean" are generally found in fens and bogs, and even here Smith portrays "the apparent contradictions in nature" when emphasizing these plants' beauty when they are "gemm'd" and "fring'd." The sundew itself, for example, reflects the harsh region of Beachy Head as it is a plant that does not rely on nutrient-rich soil; it has fully adapted to its surroundings. While life in the "russet heath" and the "swamps" proves to be solitary and difficult for humans, both plants and birds make their home there, and just like humans, the plants have adjusted to their sparse environment. Smith intentionally depicts these plants in their natural environment, paying no mind to their perceived beauty or lack thereof. *Beachy Head*'s literary herbarium depicts a more materially realistic vision of the world that the plant is a part of. In her literary herbarium, Smith returns the plants to their original space—including the hardships that come along with the natural world instead of depicting it as a sublime entity and nothing more.

The labor practices in their interaction with the natural world frame the larger section of *Beachy Head*, and Charlotte Smith makes use of the hardships encountered by the people living on the cliffs of Beachy Head. The georgic "influence is more diffuse but still strong" in Smith's poem, and thus *Beachy Head* still finds itself at the divide between the georgic and the sublime in its employment of the prospect poem.[81] Smith plays with themes of environmental

[81] Goodman, *Georgic Modernity and British Romanticism*, 1.

exploitation—in other words, a reference to the herbarium as a tool of extraction and exploitation—and harsh living conditions, in which the natural world pays no heed to humans' ulterior motives. For her, nature and humans are equal partners, and knowledge of the natural world should not be used to exploit it. Smith goes on to describe the hind's "industrious mate" as one who "shares in his labour" (*Beachy Head*, ll. 212-13):

> Otherwhile
> She leads her infant group where charlock* grows
> "Unprofitably gay,"* or to the fields,
> Where congregate the linnet and the finch,
> That on the thistles, so profusely spread,
> Feast in the desert.
>
> (*Beachy Head*, ll. 219-24)

Charlotte Smith herself only provides one note in this section for the direct quotation she includes in the poem; she references the line "With blossom'd furze, unprofitably gay" from Oliver Goldsmith's poem "The Deserted Village" (1770). Neither charlock nor thistles can be used to feed the sheep. On the one hand, charlock is a mustard seed that is poisonous for sheep.[82] On the other hand, thistles resemble more a weed, which because of its prickles is not a favorite with herbivores and thus not a food source for the sheep either. Smith focuses on the impossibility of using these plants for profit as their abundance still does not offer any utility to the shepherd. Her botanical specificity combined with the detailed location of Beachy Head comes to life in plants that serve no larger purpose for human exploits, and her literary herbarium in turn emphasizes a picture of the natural world without any ulterior motive of exploitation for profit. Charlotte Smith demonstrates, through the particular landscape of the chalky cliffs of Beachy Head, how nature poses challenges to being cultivated and exploited. Since the plants in this section cannot be used for profit—or even survival—one way the hind and his family go

[82] Charlotte Turner Smith, *The Poems of Charlotte Smith*, ed. Stuart Curran (New York, NY: Oxford University Press, 1993), 226n.

about dealing with the rugged and unyielding nature is to destroy the plants by burning them so as to keep an equilibrium between humans and nature. Handling the charlock and thistles,

> the poor family
> Early resort, extirpating with care
> These, and the gaudier mischief of the ground;
> Then flames the high rais'd heap; seen afar off
> Like hostile war-fires* flashing to the sky.
> (*Beachy Head*, ll. 224-28)

The family collects all of what they consider weed-like plants and "gaudier mischief of the ground" to set it ablaze. This is the moment when the hostility between humans and nature emerges most explicitly: the rural life in *Beachy Head* is not romanticized but rather highlights the constant struggles the families face in the uncompromising terrain of the southern coast of England. Smith also references Beachy Head's geographical location: "in crossing the Channel from the coast of France, Beachy-Head is the first land made" (*Beachy Head*, p. 163n). The "hostile war-fires flashing to the sky" allude to more than merely the destruction of nature—which is described as an aggressive conflict—but also again reference human history and the conflicts between Britain and France. Charlotte Smith blends natural and human history in a similar way that the herbarium blends the two.[83] In doing so, she is able to demonstrate the interdependence of the two. Only together do human and natural history give the observer a more accurate picture of the world—something the herbarium cannot achieve through its detachment of plants from their natural environments. In fact, Smith highlights the fact that human history itself offers limitations in analyzing specific localities such as Beachy Head. In *Beachy Head*'s literary herbarium, Smith brings the two together poetically, making them dependent on each

[83] Hans Sloane's specimens from Jamaica are, for example, the most clearly labeled ones in his herbarium. James Delbourgo highlights, "how important the assistance of Jamaica's planters was in enabling Sloane to make collections and how his mapping of the island's natural species relied on the artificial reference points supplied by plantations" (Delbourgo, *Collecting the World*, 101).

other through her use of botanical footnotes; the text still functions as a reference guide for the reader but also imparts more information than a dried plant specimen alone ever could.

The botany in Charlotte Smith's poetry emerges as one that is, in contrast to that of her male contemporaries and professional botanists, less concerned with a prescriptive model of the natural world and instead more interested in a descriptive and adaptable system. Charlotte Smith achieves this by focusing on minute details, but unlike Linnaeus's sexual system, for example, she does not reduce plants to one distinctive quality in the process of doing so. By avoiding a reductionist view of the natural world, Smith at the same time represents nature for itself without an eye to its utility for humans. She does not rely on the minutest details without any value in themselves when describing the natural world, but instead she treats these details as parts of larger botanical, geological, and ultimately social networks. The literary herbarium Charlotte Smith creates in her poetry moves beyond the essential qualities of plants used to identify them and instead incorporates their natural environments as well as their relationship with the human world.

In the eighteenth century, herbaria manifest the varied world of botany. Because of the shift from bound and artistic representations to ones that mount single dried plants on separate sheets of paper, herbaria embody a highly adaptable method of collecting and storing information. Charlotte Smith employs this adaptability and combines literary and scientific language to create an herbarium that does not rely on the plant's removal from its natural environment or its utter destruction. Exactly because of the large number of variations in the botanical world does Charlotte Smith's literary herbarium direct the reader's gaze to a small part of nature that simultaneously offers an expansive view of the world—Beachy Head. When combining the prospect poem with binomial nomenclature as well as local descriptors of plants,

Smith creates a compendium of knowledge that proves to be much more comprehensive than traditional herbaria could ever be because her poetry locates the plants and flowers in their actual environment. While poetry might appear to be too rigid to act as an herbarium, Charlotte Smith proves that in its attention to detail and form it can actually more accurately present botanical knowledge in a small amount of space and is thus very adaptable.

In addition to its adaptability, Smith's poetry depicts the cyclical and material character of the plants' lives, up to and including their deaths. In doing so, Smith is able to combine themes of the generation of life that emerges as one of the key consequences of Linnaeus's sexual system and of the end of life that she connects to themes of suffering and mourning. In her poetry, she establishes material manifestations of these themes through the cyclical character, as for example in "Flora," and through the harsh realities of life on the southern coast of England, as in *Beachy Head*. The material aspects of these manifestations in her poetry emerge most clearly in Smith's use of botany, as these instances most clearly form a link between material methods of producing knowledge. Life and death are natural parts of the human experience as much as that of the natural world. New life can grow out of death such as when Flora can chase away the clouds from the beauty's face. Even though Smith emphasizes that tools like herbaria, botanical illustrations, or even poetry can only ever produce shadows of the original plant, they offer a sense of hope and comfort to the human reader. Through her poetry, Charlotte Smith creates a new compendium of botanical knowledge, and this knowledge is simultaneously localized and global, particular and general, alive and dead. And in the end, Charlotte Smith demonstrates that poets can be botanists after all.

CODA

The Materiality of Knowledge

Ending my discussion about the influence of scientific material practices on women's writing with a discussion of the herbarium in Charlotte Smith's poetry has two reasons. On the one hand, Charlotte Smith as a Romantic author forms the chronological endpoint of the writers in this dissertation. On the other hand, the herbarium offers the most muted material influence on the literary works discussed here. The literary herbarium Charlotte Smith creates in *Beachy Head* and in "Flora," in particular, materially grounds the literary and scientific knowledge of botany within a tool that prides itself on its detachment and reconfigurability. In turn, Smith's poetry figures this knowledge and situates it back within the natural world. Her poetry becomes a constitutive force that offers a materialist understanding of the world that does not elevate humanity to a position of dominion over nature. Instead, Smith demonstrates a material entanglement between the human and nonhuman worlds that creates non-hierarchical relationship between epistemology and ontology.

This entanglement between material scientific practices and literary explorations of both form and content is also at the heart of my discussions of Margaret Cavendish and Jane Barker in this dissertation. Both Cavendish's and Barker's fictional narratives, *The Blazing World* and *A Patch-Work Screen for the Ladies*, experiment with the form in which they present their ideas. Cavendish attaches *The Blazing World* to *Observations upon Experimental Philosophy* as a case study for her own natural philosophy. Similarly, Barker presents her collection of poetry and short narratives as a patchwork screen and recipe collection, incorporating a material framework of knowledge production into her experimental novel. In conjunction with Charlotte Smith, these

two authors offer us case studies in the study of the influence material scientific practices had on the literary world in the eighteenth century.

This present study is by no means a comprehensive overview of eighteenth-century women's writing and its relationship to the material world and natural philosophy. Instead, it acts as a starting point for broadening the discussion of how literature and natural philosophy and science influenced each other between 1660 and 1810. The material influence of scientific tools and practices on women's writing offers a new dimension to the study of women's engagement in the production of knowledge in the eighteenth century. Additionally, it also provides us with an exemplification of how women applied and transformed scientific knowledge into literary frameworks. The study of the microscope, the recipe, and the herbarium in conjunction with these literary works demonstrates the entangled character between epistemology and ontology that is especially apparent to women writers. Grounded in material practices, Cavendish's, Barker's, and Smith's works serve as a testament to the material realities of women's lives and as a foundation for expanding the study of the influence of material scientific practices on literary works.

Recognizing the material influence on the way women construct and work on their literary explorations offers a reading of these texts of Cavendish, Barker, and Smith that situates them within a larger tradition of scholarship on the relationship between literature and science throughout the Enlightenment and the Romantic period. Instead of pointing out the influence literariness had on scientific language, it instead provides us with a more balanced picture that shows the intersection of literature and science in more material ways. Opening the discussion of women writers' works in the eighteenth century to be investigated through a new materialist lens lets us investigate the close relationship women and particular observed between epistemology

and ontology. For these three writers in particular, the relationship between the material world and the knowledge produced about it are inseparable.

The temporal span of this dissertation opens up the space for questions about the historiography of women's writing in the eighteenth century, the changes in discursive practices from the Restoration to the Romantic period, and the changing attitudes towards science as it emerges as a distinct field from natural philosophy. Possible avenues to reconcile the temporal span are to highlight a more general intellectual history that relies on literary texts but with fewer case studies and the inclusion of more eighteenth-century texts by women writers who write at the intersection of literature and science. As I have shown in the introduction of this dissertation, possible authors to include could be Aphra Behn and Eliza Haywood to complement the works by Margaret Cavendish and Jane Barker. Additionally, in the Romantic period Mary Shelley's *Frankenstein* could also offer opportunities for expansion and rounding out the overall argument. The divide between the Restoration and the Romantic period within the cases studies of this dissertation provide a starting point for a larger investigation into the materiality of knowledge in the eighteenth century.

Overall, this dissertation functions as a collection of case studies that open up a window into the relationship between science and literature that, while being a larger debate with eighteenth-century studies, has not focused on the material influence of science and natural philosophy on literary expression. Broadening this focus to include a larger variety of genres and authors that might not be as clearly interested in science as Cavendish, Barker, and Smith were gives us a glimpse into the world of material knowledge women often engaged with in the eighteenth century because of their exclusion from institutions of knowledge production. Grounding their knowledge the material world around them, Cavendish, Barker, and Smith offer

a view of the world around us that is not primarily marked by a wish to dominate both the human and the nonhuman worlds through knowledge, but instead demonstrate the intricate relationship between materiality and thought that is constantly renegotiated and does not give either one precedence over the other.

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