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The Reproductive Logic of Authorship and the Birth of the New Science
By

JESSICA HANSELMAN GRAY
DISSERTATION

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Abstract

The Reproductive Logic of Authorship and the Birth of the New Science combines literary and STS methods to examine how metaphors of the reproductive body influence the constitution of modern science and the construction of authoritative knowledge during the social and political transformation often referred to as “the scientific revolution.” It demonstrates how, in the seventeenth century, anxieties about the conditions of producing authoritative knowledge—especially who does and does not get to make that knowledge, and whose authority makes it authoritative—get written into early modern science’s narratives and institutional frameworks. It argues that one important way this happens is through a specific category of figurative language that is already long established by the seventeenth century: reproductive metaphors of authorship. These figures reveal a conceptual link not only between the products (human bodies and texts) but also the processes—material, social, and especially embodied—by which they are produced. Such metaphors draw upon naturalized assumptions about the body, and as such they import vigorous defenses of hegemony into rationales for the new science’s claims of objectivity.

Acknowledgements

“This Book, notwithstanding its great tendency to the publick weal, (and therefore highly approved of by Authority) hath stuck in the Birth for some years, by reason of the incapacity of the Author to Midwife it into the world.”
— Benjamin Southwood, “The Bookseller, to the Reader,” 1673.

One of many inspirations for this project’s direction was the ubiquity of midwifery metaphors in Acknowledgements pages, and I am excited to carry on that tradition by recognizing those who supported me through this project’s long gestation and birth.

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I live and work on the unceded traditional land of Patwin people, who today include the Cachil DeHe Band of Wintun Indians of the Colusa Indian Community, Kletsel Dehe Wintun Nation, and Yocha Dehe Wintun Nation. The Patwin people have remained committed to the stewardship of this land over many centuries, cherishing and protecting it, as elders have instructed the young through generations. I acknowledge this history, and this present reality, to honor the people on whose traditional lands I completed this work.

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Introduction

We are all familiar with figures that link thinking and writing to gestation, labor, and childbirth—bringing “out” what was previously “inside” its maker. These go back at least to antiquity and have in some cases been so naturalized that we no longer notice them as figurative. Some simply involve semantic overlap, as in conceive/conception; some are kennings, like “brainchild.” Others are more complex, as when an author, in an acknowledgements page, thanks the various “midwives” who helped support them in bringing the book into the world. Literary examples are plentiful and include even fully-formed figures of intellectual labor as a birthing scene, as when Sir Philip Sidney’s *Astrophil* refers to himself as “great with child” in the “throes” of authorial labor and in need of metaphorical midwifery from a poetic muse (1). The ubiquity of these figures, and the elastic way they have been applied in myriad configurations to make sense of many different forms of inspiration, inquiry, invention, and instantiation of new knowledges, leads me to posit an overarching reproductive *logic* of authorship. This project focuses specifically on how this logic has structured ideas about how people make and pass on knowledge, and how that impacted disciplinary boundaries and the construction of authority in early modern science. I show how reproductive metaphors of authorship pervade not only the literary but also, despite authors’ persistent attempts to repudiate it, the scientific writing of early modern England. Invoking the figure of mind-as-womb, and imagining it as either a troubled point of origin or a corrupting waystation, imports old anxieties about reproduction and childbirth into new discourses of knowledge production.

This dissertation examines how a reproductive logic of authorship influences the constitution of early modern science and the construction of authoritative knowledge during the

social and political shifts often referred to as “the scientific revolution.” It demonstrates that in the seventeenth century, anxieties about the conditions of producing authoritative knowledge—especially who does and does not get to make that knowledge, and whose authority makes it authoritative—get written into the narratives and institutional frameworks of seventeenth-century science. It argues that one important way this happens is through a specific category of figurative language already long established by the seventeenth century: reproductive metaphors of authorship. These figures reveal a conceptual link not only between the products (human bodies and texts) but also the processes—material, social, and especially embodied—by which they are produced. I argue that this reproductive logic of authorship gets inscribed into the institutional narratives of what will become modern science. These metaphors draw upon naturalized, essentialist assumptions about the body, and as such they import vigorous defenses of hegemony and exclusion into rationales for the new science’s claims of objectivity.

Many popular accounts of the birth of modern science in the seventeenth century, and many scholarly histories of science, rhetorically position Francis Bacon as its “father.” The recent *Palgrave Handbook of Early Modern Literature and Science* (2017) includes several acknowledgements of Bacon’s famously imputed paternity of the discipline; contributors note that Bacon has been “long identified as a founding father of modern science” (Poole 115), is often “hailed as the father of modern science” (Feerick 423), and is among modern science’s “forefathers” (Hyman 30). Following this genealogical lead, and perhaps with an ironic deference to paternal prerogative, this dissertation privileges Bacon’s own writing (especially the writing that he addresses to a metaphorical “son”), and writing that overtly announces its author as his intellectual offspring. I ask these texts to exercise their birthright, to speak on behalf of seventeenth-century science, as I examine one of the logics that underwrite the rhetorical, and

later institutional, differentiation of Bacon's science from other forms and methods of knowledge production. In order to help situate these narratives of science among the web of contexts linked by this logic, I have purposefully chosen to attend to a broad range of texts from a variety of genres—poetry, drama, prose fiction, and philosophical treatises—written by men and women from diverse backgrounds, and for very different audiences and contexts. With this unlikely assemblage, and side quests both geographical and temporal, in many ways the dissertation performs its insistence upon porous and permeable boundaries, calling attention to the some of the many resonances, sympathies, and continuities that transcend them.

The disciplinary divide separating “the sciences” from other fields of study has its genesis in the early modern contraction of the term “science” to designate a narrower range of knowledge than it had once included.¹ Since C. P. Snow's landmark “Two Cultures” lecture, scholarly commentary on the divide has proliferated, some focusing closely on institutional practices and some more generally on broader cultural implications. Howard Marchitello and Evelyn Tribble, in their introduction to the *Palgrave Handbook of Early Modern Literature and Science*, position the collection as largely an attempt to push back against what they say has been an overwhelming tendency of cultural studies to “police” this division and imagine “on the one side, the unfettered work of the human imagination and on the other the relentless (and accumulative) production of a rigorously rational and explicable catalog of solid truths” (xxxviii). Several of the volume's essays explore examples of how scientific writing has drawn

¹ This history complicates any use of the word “science” to describe the language, practices, and practitioners of seventeenth-century natural philosophy, and I acknowledge my sometimes anachronistic application of the term as I interrogate the constitution of its changing boundaries. The earlier capaciousness of “science” as a category gives way during this period to a narrower and more specialized *application* of the term (which is in some ways contingent upon bodies and their access to instruments both material and social). This “appeal to purity” fallacy is itself part of the story I am tracing and hoping to make better sense of in this analysis.

on “metaphor, wit, imagination, and the playfulness normally associated with the literary arts” (xliv). And naturally this influence also flowed in the other direction; as Marie-Hélène Huet reminds us, the scientific world was “much more familiar to the literary world than we often remember” (126). An entire section of the expansive *Palgrave* collection is dedicated to “seeing the early modern period before disciplines were defined and demarcated, when the direction and emphases of the new science was still up for grabs, when literature and science could be seen as densely entangled rather than mutually suspicious” (xxxix). These exemplars of a fluid, free-flowing predecessor seem nonetheless to be oriented around the looming specter of the rigid hierarchy later imposed: we are encouraged to recognize them as amalgamations by categorizing their diverse elements based on their purportedly opposing qualities. As Liza Blake puts it, the two-cultures figure especially makes it difficult to develop a “non-hierarchical, non-reductive” model for thinking about forms and modes of knowledge production that violate the imagined border (6). The seeming intractability of that hierarchy has a history, and this dissertation will trace one way in which it becomes inflected with essentialist ideologies of gender that reproductive figures help to instantiate.

This divide—whether intuitive, imagined, or imposed—remains a concrete institutional reality, its implied naturalness reinforced, rather than undermined, by terms like “interdisciplinary” or “cross-disciplinary,” which indicate a negotiation with those elastic but ineluctable boundary lines. Among the general public, the perception of the boundary between scientific and humanistic inquiry is unstable and often inflected by political self-identification. A popular understanding of the divide once seemed to have at its foundation an assumption that scientific inquiry reveals static “facts” that pre-exist their “discovery” by researchers and/or

experimenters and presents them to the public more or less unmediated by an author.² The other side of that assumption is that humanistic inquiry produces narratives that are predominantly author-derived or mediated (sometimes even described as “feelings” as if they originate from and reside entirely within the author’s sensing body), and/or often driven by pre-existing ideological commitments.³ This perceived distinction is eroding in many social and political discourses, usually not in favor of holism or integration but rather a broader anti-intellectualism, as anti-science sentiment creeps from the fringes into the mainstream and even “hard science” expertise faces similar accusations.⁴ Anti-intellectualism in public forums extends increasingly across disciplinary boundaries to question and discredit research, expertise, and even overwhelming consensus in scientific fields. In recognition of the broader shift that this trend exemplifies, in 2016 Oxford Dictionaries chose as their Word of the Year “post-truth,” an adjective describing “circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief” (“post-truth”). The time-inflected prefix “post-” presumes that there was until recently a shared public understanding that “objective facts” (a phrase that presumably refers to knowledge established through scientific inquiry) fell into the more or less stable category of “truth,” but that this is no longer the case. In this “post-truth”

² Indeed, the English word “fact” implies pre-existence; it derives from *factum*, the past participle of the Latin *facere* (“to do”). For an examination of the history of our concept of “facts” and the epistemological conditions from which it grew, especially their relationship to trust, see Mary Poovey, *A History of the Modern Fact*. For a focused look at the “fact” in an early modern context, see Barbara J. Shapiro, *A Culture of Fact: England, 1550-1720*, especially chapters 3-6, which specifically discuss its applications in discourses of “discovery” and natural knowledge, including by Bacon and the Royal Society.

³ This is a vast category, but I am especially thinking here of ongoing public discourse surrounding, for example, language, in the context of gender and other categories of identity; and history, in connection with critical race studies and feminism and other moral panic boogeymen.

⁴ See Peter J Hotez, “Mounting Antiscience Aggression in the United States,” for a U.S.-centered analysis, and Hotez, “Anti-science Kills” for a global overview, of this trend.

context, expertise and expert consensus do not necessarily make knowledge authoritative, even when it is produced using the tools and methods of scientific inquiry. Accusations of individual bias, value-driven agendas, and personal profit motives assail the authority of many types of expertise and even the most rigorous scholarship. This mistrust in turn hinders the effective communication of scientific knowledge, making it difficult to sustain a critical mass of public investment in tackling even the most thoroughly evidenced and unambiguously existential threats like climate change, global pandemics, and unsustainable extraction of natural resources.

I recognize that this is in large part the outcome of a coordinated, purposeful movement driven by conscious motivations, and that is not the focus of this inquiry. Rather, I am proposing that it is worth considering whether this crisis of authority is also enabled and exacerbated by everyday language and public discourses that make visible the implicit enclosure, exclusion, and hierarchy that were written into narratives of science at its inception. Educational and media representations too often position “science” as a set of outcomes and answers—less as a method or intellectual practice (critical-reading and narrative-making processes) and more as a body of doctrine, produced and reproduced within a hidden cloister, and mediated through a select initiated few with exclusive access to its tools.⁵ It is important to recognize that this is almost exactly how early architects of the experimental program of science described some limitations of earlier forms of knowledge production that they sought to reform. And so one question driving this inquiry is, how did we end up in a situation that so uncannily reproduces the very problems that the discipline’s “founding fathers” purportedly set out to resolve at its inception?

⁵ It is not insignificant that such access, in the contemporary context, is usually purchased either by intergenerational wealth or by a long indenture to predatory lenders.

In this dissertation I suggest that some insight into this impasse can be gleaned by studying the reproductive logic of authorship that pervades its early narratives. Reproductive metaphors convey assumptions about gender and the body into the narrative fashioning of seventeenth-century “reforms” and “renewals” of knowledge. As a result, the new science is written into being, its borders marked and defended, on the basis of an essentialist ideology of gender. This ideology transcends the organic body: as Carolyn Merchant reminds us, “Women and nature have an age-old association—an affiliation that has persisted throughout culture, language, and history,” and nature itself is often implicitly or explicitly gendered female (xix). Similarly, a great deal of work in feminist cultural studies has been borne of Sherry Ortner’s connection of the “true universals” of the subordination of women and nature to men and the cultures they control (67). And so it is little wonder that early modern science, organized around a renewal of theories and practices for understanding the natural world, so readily absorbs this gendered framework into its discourses. Building upon the wealth of feminist science studies scholarship across disciplines that has revised and enriched the historiography of science,⁶ this dissertation seeks to better understand how that framework shaped the new science. In *Generating Bodies and Gendered Selves*, Eve Keller reads early modern medical texts

⁶ This is a capacious category, but much of the feminist science studies scholarship that informs this project originated in the conversations around gender and science that took shape beginning in the 1970s-80s with important work by both Ortner and Merchant; feminist critiques of science by scholars like Sandra Harding, who advocates for feminist standpoint theory, arguing that women’s perspectives offered a “stronger,” less distorted objectivity, and Evelyn Fox Keller, who examines the centrality in early modern science of domination and control over nature; and work by scholars like Helen Longino and Londa Schiebinger, on the experiences of women in the sciences. More recent work has connected feminist critiques of science with postcolonial critiques and critical race studies; for an discussion of the development of this work, see Evelyn Hammonds and Banu Subramaniam, “A Conversation on Feminist Science Studies.” The recent *Routledge Handbook of Feminist Philosophy of Science*, edited by Sharon Crasnow and Kristen Intemann, offers an up-to-date overview of the field.

“symptomatically, as early modern medical men read the body itself, marking among discernable surface patterns the signs that point to the implicit workings of a system” (7). I propose that reading for reproductive metaphors of authorship in early modern science alongside their literary counterparts makes visible an important thread of continuity that knits together a variety of discourses, and attending to their resonance with the language of other genres can be (as it were) generative. My argument is not that these figures primarily function to license the exclusion of *women* (although they certainly do at many points) but rather that the perceived naturalness of gender hierarchy makes *these* metaphors ideal for rationalizing all kinds of exclusion, because they import a time-honored, body-centered rationale for hegemony into newly acquired intellectual territory.

This dissertation largely takes for granted that science studies scholars across disciplines have successfully made the case for drumming the myth of scientific “objectivity” out of academic discourse.⁷ My intention is not to re-tread that ground but rather to highlight the connections between the birth of that myth and the reproductive logic of authorship that underlies many of its foundational assumptions. The reproductive logic that I am positing is distinct from the “reproductive unconscious” that Jennifer Wynne Hellwarth theorizes, which centers on biological reproduction and its contexts and representations. Hellwarth identifies ways in which deeply ingrained ideas about gender and culture help to structure practices related to childbearing, and shows that they are also reflected in representations of childbearing. My concern is more with how literary figures of reproduction import these and related ideas about

⁷ In addition to the above referenced feminist science studies scholarship, this project has been advanced from its roots in early constructivist critiques of science by Ludwik Fleck, which were expanded by Thomas Kuhn. Among this multidisciplinary body of study are some of the scholars whose work I engage with in this project, including Peter Galison, Peter Dear, Bruno Latour, Lorraine Daston, Steven Shapin, Simon Schaffer, and Sheila Jasanoff.

various reproductive functions into discourses of authorship, intellectual labor, and knowledge production. These figures, I argue, import cultural baggage from the contexts of patriarchal monotheism and the imperial projects with which it has been imbricated, into the supposedly universal knowledge that the new science promises to produce.

I hope to draw from this work something useful to offer the ongoing present-day discourse of science communicators, a community to which I belong and whose concerns are also central to my inquiries. The fantasy of objectivity, and the conflation of knowledge production with the proliferation of products and technologies, are still active in the public imaginary, and they can act as stumbling blocks for effectively communicating scientific knowledge even among friendly audiences and interlocutors. Recent work in cultural studies by scholars such as Bruno Latour, Karen Barad, and Donna Haraway—responding to the much-discussed “material turn”—seeks to recognize a concrete material reality without universalizing human experience. As Haraway describes it, the problem is “how to have *simultaneously* an account of radical historical contingency for all knowledge claims and knowing subjects, a critical practice for recognizing our own ‘semiotic technologies’ for making meanings, *and* a no-nonsense commitment to faithful accounts of a ‘real’ world, one that can be partially shared” (“Situated Knowledges” 579). This dissertation does not solve that problem, of course. However, it is my hope that the project might contribute something to that significant middle element by elucidating some of the meaning-making that happens in the figures I will unpack.

The opening chapter, “First Impressions,” provides some background on early modern ideas about biological reproduction, showing that early modern discourses of both maternity and knowledge production share a preoccupation with contagion and corruption. Concerns about the role of the author in knowledge production echo widespread anxiety in the early modern period

about maternal impression, the ability of a gestating mother to inscribe her offspring's body with "marks" of something she imagined, saw, or desired while pregnant. This idea circulated not only in old wives' tales but also in print materials that purported to educate their readers about the mysterious mechanisms of human reproduction. Such concerns reveal anxieties about the possibility that what happens in the hidden, secret interior space of one body can have a lasting and material influence on future generations. Gestation and childbirth, in this understanding of heritability, carry a risk that the child will forever bear marks of having passed through the maternal body.

The first chapter also shows how similar fears bleed over into narratives of scientific inquiry in part because the mind is already imagined as a figurative womb. Francis Bacon prescribes reading "the true prints and signatures made on the creation" without the corrupting influence of prior knowledge, discourse, or one's own thoughts or moods (*Novum Organum* 1.XXIII).⁸ The fantasy of science as a way to read unmediated truth directly from nature is pervasive, and as the experimental program of science develops around Bacon's proposed methods, these prescriptions become disciplinary imperatives. Rhetorical erasure of the author's mediating body (still a convention of science writing) becomes a priority, and scientists are enjoined to write as plainly as possible and avoid figures, tropes, and "eloquence" in order to present a more "pure" truth. As the humanities and natural sciences diverge in the public imaginary, this purported difference in reading and narrative practices (and, by extension, ascribed authority and truth value) becomes key to rhetorically differentiating their methods. I argue that this follows from, and relies upon, a reproductive logic of authorship: in order to

⁸ Citations for *Novum Organum* include the corresponding Book and Aphorism numbers.

[re]produce knowledge correctly, narratives of natural science should not bear an imprint of the author's mediating mind and subjectivity.

The second chapter, "Strange Intelligence," looks at two of Shakespeare's plays—a tragedy and a comedy—to explore some of the ways in which, at the turn of the seventeenth century, cultural anxieties about authority and control over knowledge production get expressed through figures of threatening maternity. I begin with *Macbeth*, establishing first that the play is obsessed with knowledge and with who controls it, and then showing how the play's tragic structure rests on Macbeth's failure to understand both the fecundity of language (that it can carry "doubled" meaning) and the vagaries of actual childbirth. I unpack how the play repeatedly ties the conditions of knowledge production to the conditions of pregnancy and childbirth, and how the witches, whose "strange intelligence" resists Macbeth's control, collectively represent a sort of threatening, uncontrollable anti-mother figure that serves also as a gatekeeper of important knowledge. I then turn to *All's Well That Ends Well*, where threatening maternity takes a different shape: Helen's threat to the conventional dynamics of knowledge and authority takes on a more literally maternal form, as she spends the entire play on a quest to acquire the knowledge and authority (and biological material) that she needs to become pregnant by her unwilling husband Bertram. Like the witches in *Macbeth*, Helen obscures the source of the knowledges she uses to direct the outcome of the story. Like the witches, she exploits a man's overestimation of his own rhetorical skill and underestimation of the fecundity of language to set him up for a surprise ending of his own making. And like the witches, Helen's machinations hinge upon both literal and figurative generativity, lending a feminized body to general anxieties about knowledge production. Helen, who deploys a variety of reproductive metaphors in military, economic, medical, and legal discourses in order to finally get her husband to

consummate their marriage, embodies the threat to social order that is posed by women, especially women of her station, having control over biological and cultural reproduction.

Chapter Three, “Foreign Relations,” engages with two works of fiction, published as companion pieces to scientific treatises, that focus on voyagers’ discoveries of hidden societies and their engagement with the scientific knowledge production happening in each. Both Bacon’s *New Atlantis* (1627) and Margaret Cavendish’s *The Description of a New World, Called the Blazing World* (1666) narrate border-crossing adventures in which travelers enmesh themselves ritually, tediously, and imperfectly into new worlds. Both present models of organized, methodical inquiry into the natural world; both assign high importance to controlling how bodies cross boundaries, connecting this intimately with conditions of knowledge production. Both invoke figures of maternity and reproduction, but in very different ways. While Bacon generates an austere and straightforward vision of masculine authority, later so pivotal for science’s self-conception, Cavendish raises troubling questions about which bodies can be included in the production of authoritative knowledge. Their two fictions reveal a tension between disciplinary gatekeeping and the very language of authority that writes this emerging discipline into being. In considering Bacon’s and Cavendish’s tales alongside their antipodal relationships to the Royal Society of London, I zoom in on some of the figures of maternity in each of their works as well as in Thomas Sprat’s *History of the Royal Society* (1667). I focus on the implications of the figuratively reproductive body (and its strategic rhetorical erasure) on what will come to be called “scientific citizenship.”

This chapter also considers the ways in which Bacon and Cavendish use the utopian genre. Like the stories’ elaborate artificial trials of nature, speculative fiction allows for experimentation in a controlled environment: an imaginative “what if?” exercise. Whereas Bacon

carefully glosses over the authorial role in that thought experiment—having his unnamed narrator stumble upon it and report back—Cavendish openly paints herself as the creator of both the Blazing World and her philosophy, forming them into being out of the “pure... rational Matter” of her mind, not hesitating to reveal the marks of her own authorship (*Blazing World*, 250). She is transparent about the formative power of the storyteller as maker and about narrative’s implicit dual function of relation and invention. I also discuss these writers alongside some of the critiques that are central to feminist science studies, showing how they each deal with what Donna Haraway calls the impossible “god trick of seeing everything from nowhere” in science’s construction of objectivity (“Situated Knowledges” 581). One of the most vivid (and amusing) illustrations of this comes in Sprat’s *History of the Royal Society*, where he invokes Bacon’s *New Atlantis* as he explains why London is, as he calls it, the “most proper Seat for the Advancement of Knowledge”: namely, that it is located “between the northern and the southern passages” (86). I compare this kind of self-centering, the implicit claim by men of science to *constitute* the center, with the way Margaret Cavendish pushes against it in her writing. It is now commonly accepted that knowledge is always partial, contingent, and situated; but long before scholars like Sandra Harding, Evelyn Fox Keller, and Donna Haraway argued for a feminist re-evaluation of scientific claims to impartiality and objectivity, Margaret Cavendish was reflecting on positionality, interrogating the social and political conditions of natural knowledge production and pondering their effects on the investment of authority.

The final chapter, “Immaculate Conceptions,” focuses on how figures of virginal “purity” import established ideals of hierarchical order from religion into discourses of knowledge. It pairs Francis Bacon’s early fragment, *Masculine Birth of Time* (1603-1609), with Lucy Hutchinson’s epic poem *Order and Disorder* (1679), to explore how the figure of purity

structures seventeenth-century ideals of natural knowledge production and authority across genres and contexts. It also extends the previous chapter's engagement with empire and colonization to consider how gendered figures of purity operate in the context of both categories of "discovery." I show how the discourses of the new science evince a preoccupation with purity as a way of rationalizing exclusion and gatekeeping, echoing religious invocations of "purity" both within the mythology and in the context of interpretation. I especially focus on Hutchinson's presentation of the Fall myth—which makes a problem of authority and access to knowledge, figures transgressive knowledge production as a corporeal act, and centers an originary mother as the entrance point for forbidden knowledge and as the source of a hereditary, corrupting "mark." I examine how she gestures toward the virgin birth that promises to erase that mark by substituting a superior one, demonstrating that it reiterates her earlier narrative of writing the poem as an exercise in clearing her mind of the "marks" left by classical philosophy. I trace how the sacrificial logic that structures Hutchinson's retelling of Genesis also structures Bacon's proposal for a re-birth of knowledge through a "pure" reproductive method, to suggest that figures of intellectual purity, like figures of corporeal purity, primarily signal concerns about establishing and maintaining exclusive control over reproductive futurity.

The texts in this final chapter showcase examples of an interpretive framework that valorizes a mythical, disembodied objectivity while investing real authority and power in specific bodies. The sea change in the construction of authoritative knowledge in the seventeenth century played a major role in producing the "modern world"; its narratives of authority and truth value persist, and many systems and institutions have been built upon them. Those narratives still influence the economy of trust and credit in institutions of knowledge and among the general public, even as we collectively face an array of life-or-death challenges that occupy

the intersection of natural knowledge, authority, and structures of power. The following chapters will unpack some of the reproductive figures embedded into early modern discourses of knowledge production, in order to help illuminate how their ideological freight serves to naturalize—indeed, to position as necessary—chauvinism, enclosure, and exclusion.

Chapter 1. First Impressions

An oft-referenced incident in the history of western medicine is the case of Mary Toft, the Surrey woman who in 1724 famously convinced a number of British doctors that she was giving birth to rabbits. She and her family claimed that during her pregnancy she had so desired a particular rabbit that she could not put it out of her mind, that she developed an insatiable hunger for rabbit meat, and that the obsession had caused her to deform and miscarry a fetus and then to begin spontaneously generating more malformed creatures. Doctors, including King George I's own surgeon and anatomist, wrote of witnessing her deliver rabbits and parts thereof. This elaborate hoax was enabled by concerns, still widely held at the time, about "maternal impression," the belief that a pregnant woman's mind could physically mark the body of her fetus as a result of something she imagined, saw, or desired. Maternal impression indexes a generalized cultural anxiety about the extent of women's control over biological reproduction and about the secret, hidden workings of the female reproductive system. The idea that a woman's fears, desires, or imagination might leave a permanent mark upon her descendants had long been circulated not only by rumor and old wives' tales but also in print materials that purported to educate their readers about the mysterious mechanisms of human reproduction.

One such text is the pseudonymous *Aristotle's Compleat Master Piece: Displaying the Secrets of Nature in the Generation of Man* (1690), which had been in print in various iterations for decades. As the title suggests, the piece promises to enlighten the reader about those aspects of the reproductive process that are not readily evident to the eye. One of the ways the text works to bring those "secrets" to light is by pointing out a variety of reportedly causal relationships between what happens outside the woman's body and what happens inside. Drawing upon the

existing, widespread understanding of the mechanisms of maternal impression, the text highlights the dangers of mental and emotional perturbation in a pregnant woman:

Nor does [contentment] only comfort and strengthen the Body, but also the Operations and Imaginations of the Mind, [...] insomuch as the Imagination of the Mother works forcibly upon the Conception of the Child. Women therefore ought to take great care that their Imaginations be pure and clear,⁹ that their Children may be well formed. (46)

As Mary Fissell points out, the choice of a frontispiece design (Fig. 1) featuring a hairy, naked, pale-skinned woman and a misproportioned dark-skinned child, also naked, suggests that its producers were not as immediately concerned with shielding pregnant women from disturbing images as the body of the text implies (“Hairy Women and Naked Truths”). Still, the combination of direct warning to expectant mothers and the visual image illustrating the possible consequences of maternal impression affirms that this fear was already circulating and that the threat of imprinting and bodily corruption of the fetus was part of the public discourses relating to gestation and childbirth. The image also shows how this fear (not to mention an implicit gloss for the otherwise vague term “well formed”) is mapped onto presumed hierarchies, including light skin vs. dark. Just as gender is inscribed on the body,¹⁰ Thomas Laqueur reminds us that “scientific race—the notion that biology could account for differential states in the face of ‘natural equality’—developed at the same time and in response to the same sorts of pressures as scientific sex” (155). Recent work on issues of race in premodern contexts from scholars in a variety of disciplines, as well as ongoing conversations happening through working groups like

⁹ Chapter 4 will expand further on the implications of “pure and clear” here.

¹⁰ See Elizabeth Grosz, *Volatile Bodies*, esp. Ch. 6 and 8.

ShakeRace (Shakespeare and Race), MOC (Medievalists of Color), and the ongoing conference series and collaborative scholarly network RaceB4Race, has given us a framework for understanding the racemaking work that is also happening in these kinds of figures.¹¹



Figure 1. Frontispiece to 1704 edition of *Aristotle's Master-Piece*. This image is in the public domain. <https://commons.wikimedia.org/wiki/File:Masterpiece1704edition.jpg>

¹¹ See, for example, Ania Loomba and Jonathan Burton, *Race in Early Modern England*; Patricia Akhimie, *Shakespeare and the Cultivation of Difference*; Kim Hall, *Things of Darkness*; Ayanna Thompson, *Cambridge Companion to Shakespeare and Race*; Ian Smith, *Race and Rhetoric in the Renaissance*; and the RaceB4Race collection *Seeing Race Before Race: Visual Culture and the Racial Matrix in the Pre-modern World*, edited by Noémie Ndiaye and Lia Markey.

Another widely circulated text about biological reproduction, Jane Sharp's *The Midwives Book* (1671), discusses maternal impression and monstrous births not only in terms of imagination but also in connection to transgressive desire, foreignness, timeliness, and "purity." She offers a "deep speculation" to explain how maternal impression works, suggesting that it "may be compared and represented to our understanding by those equivocal generations made [...] by the forming faculties of the Heavens, so are the forms imagination sends forth engraven on the light spirits, for the quick spirits receive all forms from the imagination, and the seed [...] retains the images of them all" (124). My final chapter will return to this kind of perceived affinity between divine creation and human procreation, but it is important here to note that Sharp is depicting a kind of inscription, originating with a "forming faculty" and being "received" by and "engraven on" matter, combining sympathy with contagion.

Although the text is full of references to authors from classical antiquity to her own time, Sharp declines to organize the influences on childbearing consistently around Aristotle's model of causes.¹² Only once does she articulate a distinction between material cause (relating to the *matter* of the seed, which she says can fail in quantitative terms: "either when it is too much [...] or too little [...] or else the seed of both sexes is ill mixed") and efficient cause, relating to its "forming faculty," or the mother's imagination, or the "disposition of the Matrix" (117, 118). Throughout most of the text, the category names are elided and the categories themselves seem elastic and sometimes overlapping. In some places she presents the logic of maternal impression simply as a matter of sympathy between mother and child, reasoning that the "mothers imagination makes an impression upon the child [because] whatsoever moves the faculties of the

¹² Indeed, as Elaine Hobby demonstrates, Sharp's text is full of purposeful interventions and assertive revisions to some of the conventional assumptions of a genre dominated by male authors and informed by a male perspectives.

mothers soul may do the like in the child" (119). At other points she posits a complex ecosystem of matter and form that includes the seed of each parent as well as both internal and external "forming" factors: sometimes a "misshapen piece of flesh without figure or order" can result from contagion by the "uncleanness of the matter that is not endued with a forming faculty"; in general the "cause of monsters, is either from the forming faculty in the Seed, or else the strength of imagination joynd with it" (107). Sharp warns of possible corruption connected with the father's contribution as well—but specifically in terms of the danger it faces from the mother's: "when the mans seed in Copulation is weak or defective and too little, so that it is overcome by the much quantity of the womans blood [or] the blood is not fit for formation by reason of impurity [...] bad humours are ingenderd" (107). In this explanation, a man's seed is in peril of being "overcome" by the "quantity" or the "impurity" of the mother's blood.

Even outside the specific context of preventing monstrosity, this imagined scene of various factors competing for dominance is an important element of Sharp's theory of heritability. She figures the mother's imagination as a force whose strength threatens to dominate an otherwise "free" element of the seed: "if the forming faculty be free, children will be like their Parents, but if it be overpowred or wrested by imagination, the form will follow the stronger faculty" (124). "Imagination can do much," she insists, to overcome these forming faculties: "a woman that lookt on a Black-more brought forth a child like to a Black-more," and "Galen taught an Aethiopian to get a white child, setting a picture before him for his wife to look on"¹³ (118; 122). But this competitive model especially offers important context for Sharp's clarifications of the kinds of imagination that are most dangerous: "sometimes the mother is frighted or conceives wonders, or longs strangely for things not to be had, and the child is markt

¹³ This anecdote seems to refer to an event in the Fourth Book of Heliodorus' *Aethiopica* (4.142).

accordingly by it” (118). “Imagination oftentimes also produceth monstrous births, when women look too much on strange objects,” she warns (111). *Strangeness*, then, is an especially potent quality in determining the likelihood and severity of threats to futurity (a point that I will expand upon in the next chapter). Early modern discussions of maternal impression have been a rich object of study for scholars across disciplines: Mary Fissell traces popular understandings of reproduction through a careful study of vernacular and street literature that had a wide and diverse readership (*Vernacular Bodies*); Lorraine Daston and Katharine Park have discussed monstrous births in the context of studying changes in premodern views toward “wonders” (*Wonders and the Order of Nature*); Julie Crawford takes up a similar line of inquiry in the context of religion, observing that in the context of the Reformation, monstrous births were evidence of a “crisis in the reproduction of religious and social norms and institutions” (*Marvelous Protestantism* 13). Pseudo-Aristotle’s and Sharp’s texts especially make evident the authorial logic involved, and they point to anxieties not only about the power of a mother to physiologically shape another person’s body but more generally about the possibility that what happens in the hidden, secret interior space of a body can have a lasting and material influence on future generations. Protecting the integrity of the space within those boundaries, it seems, requires not only physical but also intellectual discipline.

Language describing the specific manner of a mother’s marking or “impressing” upon the developing fetus connotes an act of inscription, a moment of authorship. The overlap between the semantic fields of these superficially different kinds of “marking” points to an epistemic connection between the two, so that the naturalized fear of maternal imprinting onto the next generation becomes a way of expressing a generalized anxiety about authorship. Because authorship is a generative act that neatly aligns with both the process and function of biological

reproduction—giving form to what is ‘inside’ and then putting it ‘outside’ to potentially reproduce further—the processes are effortlessly analogous, and there is a great deal of shared language between the two, as we have seen. Such metaphors of gestation, childbirth, and maternity can reveal parallel anxieties about authorship and about the role that language plays in the conditions and practices of knowledge production and transmission.¹⁴

These figures particularly betray a growing anxiety about authorship in a time when natural philosophers were attempting to make their mediating role invisible, or at least make their authoring bodies transparent, to the receiving public. Proponents of the experimental program of science were establishing the authority of their findings in part by purporting to transmit unmodified, unadulterated by opinion or assumption, what nature itself has authored. In other words, authoritative knowledge required that practitioners not presume to compose narratives about Nature but rather coerce Nature into telling its own story, holding that they serve merely as witnesses to it. In *Novum Organum* (1620), Francis Bacon sets forth this kind of limited, passive stance as the very first tenet of producing authoritative knowledge about the natural world: “Man, being the servant and interpreter of Nature, can do and understand so much and so much only as he has observed in fact or in thought of the course of nature: beyond this he neither knows anything nor can do anything” (1.1). As we will see, knowledge that is too

¹⁴ In the introduction to *Printing and Parenting in Early Modern England*, Douglas Brooks describes how the technology of print also complicated ideas about the parental implications of “impression,” acknowledging an association between *paternity* and textual authority, which was often expressed in terms of rights and control. Similarly, Harry Newman’s *Impressive Shakespeare* examines early modern drama, especially, in connection with technologies of impression such as coin making and wax sealing, expanding our understanding of “print culture.” For further discussion of associations between imprinting and authorship, see also Joseph Loewenstein, *The Author's Due*; Janet Clare, “Shakespeare and Paradigms of Early Modern Authorship”; Lynn Maxwell, *Wax Impressions, Figures, and Forms*; Adrian Johns, *The Nature of the Book*.

aggressively mediated through language is accordingly suspect. These anxieties about authorship and knowledge production get expressed in terms of biological reproduction not only because both deal with bringing what is “inside” the private body “out” but also because both threaten to pass on undesirable traits—errors or defects—by impressing them into new bodies or minds, thus carrying patterns of deformity or monstrosity forward through time.

For a few guiding examples of the way this language spans the categories of scholarly authorship, scientific authority, and the body, we can look to some of the ways that Robert Burton deploys metaphors of generativity in *The Anatomy of Melancholy* (1621-40), a text that treads all of that ground and then some. Burton’s work grapples with the problem of melancholy both as an individual malady and as a social one, and he positions his text as both a treatment for his own melancholy (as a product of and testament to the therapeutic value of writing) and as a compendium of received and synthesized knowledge on the topic. It becomes a performative, reflective, and prescriptive meditation on scholarship as a personal and disciplinary practice (and as a questionable lifestyle choice). The text’s metanarrative about the work of a scholar and about the problem of writing offers numerous inroads for thinking about connections between mind and body and how language mediates and disrupts them. I will then turn to some of Francis Bacon’s writing from the same period to investigate the way that metaphors of generativity alternately structure and challenge both his practical, serious advice to fellow natural philosophers and his fictional narrative describing an ideal regime of scientific knowledge. Bacon’s investment in a specific methodological approach reveals a number of useful tensions between visible authorship and authoritative knowledge, and the following chapters will consider those moments of tension in relation to recent scholarship on the history, philosophy, and sociology of science.

Robert Burton's *Anatomy of Melancholy* opens with an address to the reader that lays out not only an introduction to the work itself but also his rationale for writing it at all. He presents the work both as the product of decades of scholarship and as an artifact of his attempting to work through his own melancholy. He writes of his need to unburden himself of a great deal of mental and emotional content, figuring writing as a purgative that will relieve him of the affliction. He summarizes his malady briefly in Latin, using two gestational metaphors to figure his heart and his brain as full wombs: "I had *gravidum cor, foetum caput* [...] which I was very desirous to be unladen of" (18). This self-diagnosis identifies his heart and head as figuratively pregnant, and he goes on to figure writing as the means of unburdening himself of their freight. He extends this analogy a few paragraphs later, when he offers an apology for the quality of his published work:

I should have revised, corrected, and amended this tract; but I had not [...] that happy leisure, no amanuenses or assistants. Pancrates in Lucian, wanting a servant as he went from Memphis to Coptus in Egypt, took a door bar, and after some superstitious words pronounced [...] made it stand up like a serving-man, fetch him water, turn the spit, serve in support, and what work he would besides; and when he had done that service he desired, turned his man to a stick again. I have no such skill to make new men at my pleasure, or means to hire them; [...] I have no such authority, no such benefactors as that noble Ambrosius was to Origen, allowing him six or seven amanuenses to write out his dictates, I must for that cause do my business myself, and was therefore enforced, as a bear doth her whelps, to bring forth this confused lump. I had not time to lick it

into form, as she doth her young ones, but even so to publish it, as it was first written. (23-24)

This passage is thick with maternal imagery. In the first part, Burton represents his authoring challenges in terms of reproductive failure, a crisis of fertility. He does not have the means to produce, as Panocrates did, a “man”—a body separate from his own, out of words and raw material. Besides his inability to “make new men,” he also lacks the “authority” to command other bodies, leaving him responsible for doing his own work. In the latter part of the passage, Burton explicitly figures the work of writing as a birth process, the “bringing forth” of a new body “as a bear doth her whelps.” Inadequate to the task of producing fully-formed bodies through parthenogenesis, as described in the fable, he resigns himself to the problematic, error-prone maternal mode of the animalized mother. He complains that for lack of time he could not properly “lick it into form,” thus assigning a figuratively maternal function to “revis[ing], correct[ing], and amend[ing],” shaping and forming the text into a legible body.

Burton goes on to extend his application of fertility metaphors to the process of synthetic knowledge production and scholarship:

As apothecaries we make new mixtures every day, pour out of one vessel into another, and as those old Romans robbed all the cities of the world, to set out their bad sited Rome, we skim off the cream of other men’s wits, pick the choice flowers of their tiled gardens to set out our own sterile plots [...] A fault that every writer finds, as I do now, and yet faulty themselves, *Trium literarum homines*, all thieves, they pilfer out of the old writers to stuff up their new comments, scrape Ennius’s dung-hills, and out of Democritus’ pit, as I have done. (19-20)

This passage highlights several strands of thought that are important to my analysis. First, Burton's figuring of his intellectual "plot" in terms of sterility, and the fact that his prescribed solution involves making "new mixtures" of existing matter, reinforces the importance of the reproductive logic by which he continually figures scholarly knowledge production. Synthetic knowledge production, like sexual reproduction, begins with difference: recombination, mixture, cross-pollination.¹⁵ It is worth looking at this passage next to some of the agricultural metaphors for human reproduction in Jane Sharp's *The Midwives Book* (1671): "Man in the act of generation is the [...] tiller and sower of the Ground, Woman is the [...] Ground to be tilled who brings Seed also as well as the Man to sow the ground with" (33). Sharp figures male genitalia as a "Plow wherewith the ground is tilled and made fit for the production of fruit," and extends the metaphor to add her own social commentary: "we see that some fruitful persons have a crop by it almost every year, only plowing up their own ground, and live more plentifully by it than the Countryman can with all his toil and cost; & some there are that plow up other men's ground, when they can find such lascivious women" (18-19). Both metaphors assume economies of power, and control over futurity, that are based on having a plot of one's "own."

Second, the political analogy that Burton sets up here with Rome at its center hints at questions of power imbalance and a competitive relationship among producers of knowledge. It also suggests a concern with the organization of synthetic modes of knowledge production, a point that I will take up in Chapter 3, in discussing a similar model in Bacon's *New Atlantis*, Margaret Cavendish's *The Blazing World*, and Sprat's *History of the Royal Society*. Finally, and perhaps most subtly, the spatial logic of the analogy and its characterization of Rome as "bad

¹⁵ These metaphors participate in the teleological imperative that Stephen Guy-Bray identifies among many reproductive figures of authorship, in that they are primarily concerned with use value and with futurity (*Against Reproduction*).

sited” points to concerns about an individual scholar’s position or situation respective to other participants in a discourse. The relative fruitfulness of one’s “site” and the extent to which one is able to access other sites and others’ fruits necessarily determines their approach to knowledge production. I will return in Chapter 3 to the implications of this kind of geographical framework, its colonial overtones, and how it raises questions about positionality and situatedness that are similar to those that have become crucial foci of feminist science studies.

It at first seems puzzling, given this intense topical focus on the intellectual position and practices of the scholarly author, that Burton would choose to adopt a pseudonym for *The Anatomy of Melancholy*, still more so that he chooses a derivation of the name of a well-known classical philosopher. He calls himself “Democritus Junior” and includes several paragraphs that lay out the logic by which he figures himself as Democritus’ intellectual offspring. The generational metaphor is resonant with his other metaphors of reproduction, and, interestingly, his rationale for using a pseudonym recalls one of the primary appeals of the content of *Aristotle’s Master Piece*: its secrecy and the imputation of others’ desire to seek it out. Through the Democritus Junior persona, Burton, like pseudo-Aristotle, disavows the responsibilities of authorship: “[S]uppose the Man in the Moon, or whom thou wilt to be the author,” he cheekily suggests.¹⁶ He also invites—or challenges—the reader to judge the work based on its utility rather than by its author’s identity: “seek not after that which is hid, if the contents please thee, and be for thy use” (15). This admonition to the reader not to “seek” after “that which is hid” presumes that the reader will assign value to the knowledge of the author’s identity—a

¹⁶ Contrast this with, for example, Sharp’s midwifery manual, which bears her name and marital status on its cover, promises to “discover” the “whole art” of midwifery, and refers frequently to the wealth of received knowledge, critical analysis, and practical experience on which she rests her claim to write authoritatively on the subject. The writers of these three medical “anatomies” take very different approaches to authorship and authority.

presumption that is almost certainly correct—and encourages them to reevaluate their elevation of author over text. (It would also be a superbly pithy paraphrase of a significant chunk of the book of Genesis, but we will come back to that in the final chapter.) Burton discusses his use of a pseudonym explicitly in terms of concealment, saying that he has purposely “masked [him]self” under the name of Democritus and that he “would not willingly be known” to the reader (15). This disrupts the power balance between author and reader: it denies the reader the power to see the author’s identity and to judge the work based on that knowledge, which in turn imparts to Burton the value of being *unseen* as an author.

This value, the privileged position of the seeing but unseen, is precisely the advantage that we will see is sought after by seventeenth-century natural philosophers: the scientific observer attempts to be unseen as a form-giving “author” of the matters of Nature, acting more as a mirror, a translator or repeater. An implicit or explicit claim of experimental science is that Nature is authoring its own narrative and that experimenters, witnesses, and writers merely transmit it unmediated, or very nearly so.¹⁷ As we will explore further in Chapter 3, Bacon turns this privileged position of seeing without being seen, this erasure of the author from sight, into one of the defining characteristics of the “secret conclave” island of Bensalem, the site of his utopian fable *New Atlantis*, which imagines a society built around scientific principles and practices. The narrator and his party wonder at this asymmetrical visibility, which does not seem to them humanly possible: “[I]t seemed to us a conditioner and Proprietie of Divine Powers and Beings, to be hidden and unseene to others, and yet to have others open, and as in a light to

¹⁷ Steven Shapin and Simon Schaffer discuss, for example, what they call the “literary technology” of “*virtual witnessing*,” which “involves the production in a *reader’s* mind of such an image of an experimental scene as obviates the necessity for either direct witness or replication” (60; see esp Ch. 2).

them” (275). But this aspect of Bensalem’s project is important to Bacon’s vision of an intellectually responsible praxis for the production of knowledge. As Bacon sets forth more explicitly in *Novum Organum*, the “light” of received and circulated knowledge is an important *augmentation* to experimental practice:

But the Empirical school of philosophy gives birth to dogmas even more deformed and monstrous than the Sophistical or Rational school. For it has its foundations not in the light of common notions (which though it be a faint and superficial light, is yet in a manner universal, and has reference to many things), but in the narrowness and darkness of a few experiments.

(1.LXIV)

Bacon is as doubtful of epilogistic reasoning as he is of dogma. The program of experimental science on the island of Bensalem corrects the shortcomings that Bacon identifies in separate schools of classical philosophy (and avoids reproducing them as yet another “deformed and monstrous” birth) not only through reproducing natural phenomena at the College but also by using its privileged position to see what others have discovered and incorporating that knowledge into their own work, combining complementary elements of practice.

When it comes to reproducing Bensalem’s narrative for the visiting travelers and for the reader, the structure of the gestational metaphor returns. The travelers’ enforced cloistering in *New Atlantis* and the ideal pregnancy as described in *Aristotle’s Master Piece* share a curiously parallel ontogeny that is predicated, in each context, on adhering to a strictly regimented time scale. Pseudo-Aristotle lays out the timeline of fetal development during gestation:

[S]o, in the appointed Time, the whole creation hath that Essence which it ought to have to the Perfection of it. [...] The forming of the Child in the

Womb of its Mother, is thus described: Three days in the Milk, twice three in Blood, twelve days form the Flesh, and eighteen the Members, and forty days afterwards the Child is inspired with Life, being endued with an Immortal living Soul. (49-50)

This elaborate meting out of time is echoed in the tale of the sailors who wash up on the shores of Bensalem. In both cases there seems to be a carefully controlled recipe for correct reproduction, whether biological or social. When the travelers first arrive, they are told that they will have sixteen days to vacate the island unless they are explicitly given additional time. Their stay is conditional upon their not having “shed blood” within the past forty days. Their hosts take them first to the Strangers’ House and direct them to stay “within doors” for three days. The party stays “Cloistered [...] within these Walls, for three dayes,” as appointed, during which they have friendly but controlled contact with their hosts (270). An emissary informs them that they have earned an extension and may now stay a full (and flexible) six weeks, during which time they meet new knowledge-bearers approximately every six or seven days. One tells them about the College of the Six Days’ Works, and an official’s visit is announced seven days before his arrival with the message that the “Cause of his coming is secret” (289). This highly regimented schedule and its cryptic relationship to secrecy echoes *Aristotle’s Master Piece*. Ideally, it seems, both physical and intellectual gestation involve the subject developing in a spatially delimited, “cloistered” space and over carefully measured and strictly controlled periods of time. Thus, an implicitly gestational logic structures the story of Bensalem, Bacon’s utopian vision of intellectual orthopraxis, impressing a reproductive logic into the fiction and also, by extension, writing it into what will become one of the key templates of narratives relating to knowledge production and dissemination.

These connections reveal that questions of scientific knowledge production and of knowledge production in general are fundamentally questions about language—about storytelling, about methods and politics of writing and reading.¹⁸ Bacon seems to recognize this (and at times appears to grapple with it in ways that anticipate later critiques) but without fully resolving the contradictions in his philosophy that his fictional writing uncovers. We will return in the final chapter to the question of how Bacon’s concerns about language connect to his rejection of the Scholastic model of disputation and dialectic, but here it is important to note the tension between content and form. The narrative mode of *New Atlantis*, a fictional text that subordinates experimental practice to the narrative in which it is embedded and by which it is transmitted, calls attention to tensions inherent in the commitments that Bacon sets forth in *Novum Organum*, including an admonition to avoid the “Idols of the Tribe,” which arise in part from the “mode of impression” (1.LII). He acknowledges, and exploits, the power of fable and allegory to transmit and “impress” concepts more effectively into a reader’s mind, and yet his aphorisms on the idols betray a deep mistrust of language: “it is by discourse that men associate, [but] ill and unfit choice of words wonderfully obstructs the understanding” (1.XLIII). Language is the means by which form is imposed upon the matter of thought, and the violence that Bacon perceives in this imposition is reflected both in his use of metaphors and tropes and in his expressions of concern over the use of metaphors and tropes. He alternately celebrates and bemoans that words are unstable signifiers.

¹⁸ Also instructive here is Debapriya Sarkar’s “Shakespeare and the Social History of Truth,” which lays out how, “decades prior to the ascendance of Baconianism and the establishment of the Royal Society, [...] popular drama approached the distinctions between truth and falsehood, between proof and belief, as epistemologies of dramatic plot” (95).

In *New Atlantis*, the Governor speaks of the founding of Salomon's House with an anecdote about its naming by the king: "Some thinke it beareth the Founders Name a little corrupted, as if it should be *Solamona's House*. But the Records write it, as it is spoken" (280). Bacon calling attention to this difference highlights not only a concern with the complex web of institutional relationships—political, social, religious, and scholarly—that constitute the material conditions of knowledge production and dissemination but also an anxiety about the slipperiness of language itself. Words are unreliable, and language fails. Bacon articulates this problem in *Novum Organum* as well, when discussing the "Idols of the Market-Place," the social conditions that complicate knowledge production:

[M]ost troublesome of all [are the] idols which have crept into the understanding through the alliances of words and names. For men believe that their reason governs words; but it is also true that words react on the understanding [...] [W]henever an understanding of greater acuteness or a more diligent observation would alter those lines to suit the true divisions of nature, words stand in the way and resist the change. (1.LIX)

Agreed: the limitations of language can be frustrating. Of course, this observation seems to be true even of the words Bacon has chosen here, including the phrase "true divisions of nature," a claim that he elsewhere recognizes as specious and unsupportable.

Burton falls into a similar pattern of pushing back against metaphorical language, although he appears slightly less self-conscious about his own implication in it than is Bacon:

effudi quicquid dictavit Genius meus [I poured forth whatever my genius dictated], out of a confused company of notes, and writ with as small deliberation as I do ordinarily speak, without all affectation of big words,

fustian phrases, jingling terms, tropes [...] elegies, hyperbolic exhortations, elegancies, &c. which many so much affect. I am [...] a loose, plain writer, *ficum voco ficum, & lignonem lignonem* [I call a fig a fig and a spade a spade], and as free, as loose [...] I respect matter not words [...] / *verba propter res, non res propter verba* [words exist for things, not things for words] and seek with Seneca, *quid scribam non quemadmodum*, rather what than how to write. (24)

This definitive anti-trope position seems straightforward and credible enough, until the reader realizes that just a few lines back Burton was writing about licking his work into shape. The presence of English translations for the Latin phrases—both his own and the ones added generations later by editors—further exacerbates the tension between the point that Burton is making with this passage’s content and the one he is making with its form.

Both writers seem to gesture toward a number of concerns that scholars still grapple with in science studies across multiple disciplines, beginning to pull on threads of inquiry that are important to understanding the way that authoritative knowledge is made. Constructivist historians of science and sociologists of scientific knowledge understand, for example, the importance of the kind of complex social network in which Bacon takes care to embed the scientific investigators in *New Atlantis*,¹⁹ but as we will see in a later chapter, Bacon’s text declines to interrogate that network’s impact on the knowledge produced. Similarly, Burton’s discussion of patronage and the economy of knowledge in early modern society suggests that he

¹⁹ In many ways this fictional network reflects Bacon’s own social historical reality; the digital humanities project *Six Degrees of Francis Bacon* is instructive here as a rich visual and interactive example of how such networks structured early modern social, political, and intellectual life.

implicitly understands some elements of how scientific knowledge is, to use our contemporary terminology, socially constructed. For example, he cheekily acknowledges that scientific outcomes often do less to demonstrate the practitioner's expertise than to reflect his desire to ingratiate himself to a patron:

[H]e that can tell his money hath arithmetic enough. He is a true geometrician who can measure out a good fortune to himself; A perfect astrologer, that can cast the rise and fall of others and mark their errant motions to his own use. The best optics are, to reflect the beams of some great men's favour and grace to shine upon him. He is a good engineer that alone can make an instrument to get preferment. (192)

Burton here expresses his own concern with various kinds of personal and social influences on scientific knowledge production and dissemination; in comparing these more lucrative kinds of inquiry to the humanistic study that keeps scholars "poor" and "ragged," he recognizes that there are various metrics of use value at play, including the question of how a practitioner might put knowledge to "his own use" by positioning it as potentially useful to a patron. This begins to hint at a point that historian of science Mario Biagioli takes up in *Galileo, Courtier*, which unearths patterns of scientific patronage and court preferment that often shaped the practices, and the output, of the practitioners producing accounts of natural knowledge in the seventeenth century: Biagioli insists upon a complex matrix of power, wealth, identity, and status, in which patronage and knowledge production are inextricably embedded. My point here is simply that the germ of later critiques, already present in some of these seventeenth-century writings, participates in some of the internal contradictions that my inquiry takes up and examines. As we will see, some authors seem to perceive those contradictions more acutely than others.

Bacon also explores the question of personal and social influences, touching briefly on concerns similar to Burton's but expanding upon them to include material conditions and cultural patterns of influence that preclude the possibility of true objectivity. He categorizes these as "Idols of the Cave," which he says arise from the "peculiar constitution, mental or bodily, of each individual; and also in education, habit, and accident." He likens human understanding to a "false mirror" that "distorts and discolours the nature of things by mingling its own nature with it" (1.XLI). Bacon describes the way that personal and social factors affect observation and interpretation:

[E]very one (besides the errors common to human nature in general) has a cave or den of his own, which refracts and discolours the light of nature; or to his education and conversation with others; or to the reading of books, and the authority of those whom he esteems and admires; or the differences of impressions, accordingly as they take place in a mind preoccupied and predisposed or in a mind indifferent and settled; or the like. (1.XLII)

This is intended to elucidate the danger inherent in impressing one's own subjectivity onto either the object of inquiry or its product, reproducing anxiety about maternal impression in the specific context of scientific knowledge production, which relies upon both observation and the interpretation of nature. In other words, Bacon is articulating a concern about the impact of individual experience, bias, and situation on a person's ability to accurately encounter and interpret nature. A similar concern, of course, drives feminist philosophy of science scholarship that takes up spatial logics of positionality, or situatedness: each individual gaze is contingent upon the position (intellectual, personal, social, and structural) of the subject's body and person,

and there is no possibility of obtaining, as Donna Haraway says, a "view from above, from nowhere, from simplicity" (589). As we will see, however, Bacon's prescription for overcoming these "idols" reproduces many of the shortcomings that he perceives in earlier forms of authority, and the Royal Society's embrace of his model as a blueprint for producing "pure" natural knowledge imports these contradictions into its institutional narratives. The following chapters will look to language as one way to account for this pattern.

The way that reproductive metaphors are deployed in early modern prose offers a way of identifying concerns about knowledge production and transmission in the early days of experimental science. This analysis contributes to work across disciplinary boundaries, as literary studies, sociology of scientific knowledge, and the history and historiography of science all converge on questions of language and the role of narrative in knowledge production. The following chapters explore the complex relationship between gestation and authorship as conceptual categories and as embodied modes of social reproduction in order to understand the way that early modern writers represented the intellectual and philosophical commitments of an emerging method of knowledge production. Reproductive metaphors stitch together early modern narratives of knowledge across many discourses, and reading for them allows us to better understand the construction of the new science as a separate discipline in this period. Using these metaphors to read at the intersection of literary studies, the history of science, and the sociology of scientific knowledge allows us to identify some of the ways in which the heavily gender-coded metaphorical texture of early modern science writing, inflected with various forms and marks of embodied identity, complicates narratives of the new science as inherently liberatory or democratizing.

Chapter 2. Strange Intelligence

The body is at once an object of, a waystation for, and an instrument of knowledge. As we have seen, this multiplicity helps make sense of reproductive metaphors of authorship, and makes figurative gestation and childbirth important objects of study, as these involve one body passing another body over a threshold from the unknown into the known. Drama, itself organized around material bodies making “their exits and their entrances” over spatial boundaries that separate what is visible from what is invisible, is an especially rich genre for considering how relationships among bodies, knowledge, and thresholds get negotiated. Additionally, because the public theatres drew playgoers from a variety of backgrounds, examining how reproductive metaphors of authorship operate in these texts reveals their broad currency and relevance for diverse audiences. This chapter will turn to two of Shakespeare’s plays—*Macbeth*, a tragedy, and *All’s Well That Ends Well*, a comedy—to explore how they each fret over access to, and control over, knowledge. I trace a pattern of unlikely resonances between them to show two distinct ways in which, at the turn of the seventeenth century, anxieties about authoritative knowledge find expression in figures of threatening maternity.

In the early modern lying-in room, the birthing body serves as the site of a boundary over which another is born/borne into the observable world from a realm beyond the observation of the senses and therefore outside of human knowledge and control. This status as a boundary site contributes to the birthing room’s perceived threat to various forms of control and power—medical, social, legal, religious, domestic. My primary focus in the following case studies is the way in which this perceived threat extends, by way of a maternal logic of authorship, into discourses of knowledge production. Figures of pregnancy and childbirth locate ungovernable

processes within a feminized body and evince a more general dread of having limited control over production, dissemination, and application of knowledge. In seventeenth-century literary texts there are countless negotiations with the threat posed by the lying-in room as the site of a blurred boundary between the realms of life and non-life, and both its power and its danger often feature prominently in its characterization. George Parfitt, exploring the frequent proximity of the words “womb” and “tomb” in seventeenth-century poetry, points out that the regularity of this topos suggests a connection that cannot be accounted for purely by poetic expediency; the commonplace pairing is not incidental to sound and spelling but rather reflects genuine conceptual overlap (23). In fact, the idea that there is an intimate affinity between what comes before birth and what comes after death is fundamental to the origin story of a Christian England, as is the primacy of Christianity’s claim to exclusive authority over knowledge of that realm.

In the Venerable Bede’s account of how that claim first takes root in England in the Middle Ages, he relates a parable that invokes the continuity of the mysterious realm preceding birth and following death. According to Bede, the church succeeds in converting the Kingdom of Northumbria, which extended into what is now Scotland, to Christianity following a discussion in which the Northumbrian king Edwin puts the matter of conversion before his council. One of Edwin’s advisors comments that he is inclined to embrace the new religion based on its purported “certain knowledge” about the mysteries that lie outside “the life of man” (130). The counselor figures mortal life as “the swift flight of a sparrow through the room wherein you sit at supper in winter, with your commanders and ministers, and a good fire in the midst, whilst the storms of rain and snow are raging”—contrasting the light and safety of the natural world with the cold darkness of whatever lies beyond the bounds of mortal life:

The sparrow, I say, flying in at one door, and immediately out at another, whilst he is within, is safe from the wintry storm; but after a short space of fair weather, he immediately vanishes out of your sight, into the dark winter from which he had emerged. So this life of man appears for a short space, but of what went before, or what is to follow, we know nothing.

(129-30)

In this analogy, the sparrow's time in the hall is characterized not only by its own comfort and warmth but also by its position as an object of observation by the people in the hall: it is witnessed by human eyes, which renders it known. Beyond the hall in either direction is darkness, constituted in part by the fact that it is unseen by the people. The speaker goes on to "compare the present life of man on earth with that time of which we have no knowledge," setting up a binary relationship in which the time from birth to death stands opposite everything outside of that window—without distinguishing between before-birth and after-death timeframes. Both dark, stormy realms are included in the phrase "that time of which we have no knowledge" (129).²⁰

Bede's analogy also figures the human life from birth to death as a "short space of fair weather," during which a person is both within sight of fellow men and protected from whatever both precedes birth and follows death. In this analogy, mortal life is bounded by the twin thresholds of birth and death, beyond either of which lies eternal darkness and dangers unknown.

²⁰ I do not mean to suggest, in engaging with Bede's *History*, that only this one religion puts forth any knowledge claims about an afterlife. Certainly Christianity's claim (the one that was foundational to Bede's well-known origin story of a Christian England) is most relevant for the authors of the work with which this study engages. Within Bede's text, Edwin's counselor responds to what he perceives as a contrast between "more certain knowledge" and "know[ing] nothing" / "hav[ing] no knowledge," and this contrast is key to the story's internal logic.

This model of the human lifespan presumes a dichotomy between visible, mortal life and a hidden other world that exists beyond it and is foreign to it. It also, I argue, establishes a kind of fundamental equivalence between what came before birth and what comes after death: both womb and tomb are figured as part of the unknown, the hidden-from-our-sight, about which any “certain knowledge” must come through faith rather than sensory observation or experience. If we view this tale as an important part of the birth story of a Christian England, its presentation of a briefly-disrupted continuity between before-birth and after-death states of un-knowing provides a guiding illustration for the conventional topos of “womb” and “tomb.” It maps out a logic that pre-existed the Christianization of England, continued through the Middle Ages, and remained relevant even after the Reformation, transcending confessional differences among authors. This enduring logic is implicit in the commonplace set of metaphors by which knowledge production gets figured as an intellectual version of impregnation, gestation, and childbirth.

“this strange intelligence”: Threatening Maternity in *Macbeth*

Early modern discourses of both childbirth and various forms of secret knowledge (including necromancy, which deals explicitly with the spirit world of an afterlife) are replete with evidence of a shared preoccupation with contagion, corruption, sympathy, permeability, and hiddenness.²¹ The hidden space of existence before birth functions in the popular imagination as

²¹ I am grateful to Mary Floyd-Wilson for the opportunity to participate in her 2019 SAA seminar on Occult Agents in Shakespeare, where the germ of this section took root. The comments and discussion were helping in mapping out the overlap between these two categories of mysterious knowledge specifically in terms of the sparrow analogy and how the lying-in room functions as a double threshold space. Her book *Occult Knowledge, Science, and Gender on the Shakespearean Stage* provides an invaluable foundation for understanding how early modern ideas about sympathy and contagion cross readily into science from existing discourses that link knowledge, secrecy, and gender.

a dark unknown that in many ways mirrors the imagined realm beyond death. Both boundaries invite policing; both thresholds pose a threat of contagion or pollution, and both seem to occlude mysterious and powerful forces. These are ideas that operate in the same territory as Bede's sparrow parable but reveal that doubts and fears about the before-and-afterlife persist despite Christianity's purportedly hegemonic role as a guiding narrative. Knowledge related to pregnancy and childbirth, traditionally the domain of women, is often positioned as forbidden, inscrutable, and almost magical.

Shakespeare's *Macbeth* offers a compelling case study in the specifically maternal threat that is posed by uncertainty about the provenance of knowledge. In this play, maternal figures and witches fashioned as twisted caricatures of maternity—both of which exercise knowledge of and power over mysterious forces that operate in secret—are entangled in the play's tragic structure and function to express anxieties about the provenance of knowledge specifically in terms of the maternal. The complex relationship between childbirth and hidden knowledge in this play offers an example of how childbirth functions as a metaphor for knowledge production at a time when ideas about both are shifting rapidly in terms of methodology, authority, and relationship to power structures.²² Attending to connections among discourses of knowledge, maternity, and hiddenness, this section brings early modern ideas about the maternal body to

²² In suggesting the complexity of this relationship, and in focusing on the porosity of the boundary between the known and the unknown in the play, I build upon a critical history of attention to the play's many unstable binary oppositions, including but not limited to gender: David Scott Kastan responds to earlier criticism along these lines in a chapter focusing on many of the plays "doublings and dislocations" (242); Alexander Leggatt attends to "doubleness"; and Carolyn Asp attends to gender stereotyping. In "Macbeth: The Male Medusa," Marjorie Garber reads the play as troubling the gender boundary; in "Born of Woman," Janet Adelman traces how the play negotiates opposing fantasies of total maternal control and total lack thereof. See also Peter Stallybrass, "Macbeth and Witchcraft"; Alan Sinfield, "Macbeth: History, Ideology, and Intellectuals"; Maurice Hunt, "Reformation/counter-Reformation Macbeth."

bear on the economy of knowledge in *Macbeth*. Reading the play at this intersection reveals the multiple ways in which its central bit of “strange intelligence” (as well as other knowledge circulated within the play) exemplifies the generative, secretive, and threatening figure of the maternal body in early modern discourse.

From the first word of its opening line, *Macbeth* broadcasts its preoccupation with inquiries—with quests for knowledge or “intelligence.” The first scene opens with one of the witches asking the others for information: “When shall we three meet again?” and “Where the place?” (1.1.1, 1.1.7). After this brief appearance by the witches, which establishes their own secret knowledge of the details of future events, the second scene similarly opens with requests for information. Duncan spies one of his captains approaching and asks his son, “What bloody man is this?” (1.2.1). Before Malcolm can answer, the King continues, “He can report,” setting aside the question of the man’s identity and reading the bloody state of his body as a sign that he himself could function as a source of intelligence about the outcome of the uprising (1.2.1). Already, it seems that bodies can stand in for knowledge. Malcolm charges the man to “[s]ay to the King the knowledge” of the battle, and once he reports what he has witnessed, they turn to Ross and inquire of him for information as well, before sending him off to carry intelligence to Macbeth (1.2.7).

As Ross pursues Macbeth, bearing his own cargo of intelligence, we revisit the witches, who again kick off their conversation by questioning each other for details of their comings and goings. When Macbeth and Banquo enter the scene, they begin their own barrage of requests for information, of each other and of the witches—“How far is’t to Forres? What are these [...]? Live you? Or are you aught that man may question?”; “What are you?”—and then debrief the witches with another series of inquiries: “Are you fantastical[...]? Speak, then, to me”; “Tell me

more”; “But how of Cawdor?”; “Speak, I charge you” (1.3.40-50). This relentless pattern continues throughout the play: obsessed with knowledge and demands for intelligence, the text includes 11 instances each of the verbs “tell” and “report,” 43 instances of either “speak” or “say” in the context of gathering or reporting information, and 56 repetitions of “know” or “knowledge,” among other variations on the same theme (“Concordance”). And here in Macbeth’s first encounter with the witches, barely minutes into the play, the centrality of knowledge and intelligence is already firmly established.

The story, of course, hinges on the ambiguous provenance of one transformative piece of knowledge: the prophecy that “none of woman born shall harm Macbeth” (4.1.91). Macbeth famously interprets “none of woman born” to mean “none,” failing to recognize the phrase’s subtle duplicity of meaning. This close reading failure leaves him vulnerable to harm from Macduff, who slips through a loophole in the prophecy by virtue of having been “from his mother’s womb untimely ripped” (5.8.19-20). The phrase “born of woman” doubles down on passive voice, leaving the past passive participle entirely devoid of any subject or agent. The implication of carriage and production in the root verb *to bear*—“to bring forth, produce, give birth to”—disappears with the substitution of the preposition “of” for “by,” the conventional form of passive voice, which would attribute agency to the birthing mother (OED). Instead, the prepositional phrase positions the mother as purely contextual, leaving the verb with no subject, either stated or implied. When a woman “bears” a child, she delivers it over a threshold, the boundary between the dark unseen/unknown and this sunlit mortal life. A child born “*of woman*” is instead brought over that threshold by an unseen power, and the birthing woman is figured as the site of passage rather than its agent. The language of the play exempts Macduff’s mother from even that minimal role in bringing him into the world. This seemingly small grammatical

detail does a lot of work in setting up the power dynamics of the play, not only in the witches' manipulation of Macbeth but also in the potential power that Macduff eventually wields over him. The complete evacuation of the mother's agency in *bearing* her child across a boundary almost magically induces Macduff with the ability to overcome Macbeth's syntactically contingent immortality. In this extreme example of the womb/tomb connection, the man who can cross that first boundary under his own power, rather than a woman's, can claim the power to send Macbeth over the final one.

The phrase "untimely ripped," which appears alone in an abbreviated line, also seems to strip the mother of the agency of childbirth, but here it reattributes that agency to another subject. Although the passive voice construction of the sentence hides the identity of the verb's subject, someone, ostensibly, is doing the ripping (5.8.20). The phrase leaves the audience with an image of unidentified hands violently pulling the infant into the light, in stark contrast to the conventional notion of birth as a gradual emergence from dark into light, powered primarily by the birthing woman's visible body. It's unclear how this slight syntactical variation from the typical description of childbirth really constitutes a meaningful loophole in the prophecy,²³ as even this method involves delivery *from* a woman. What's more, Macduff doesn't come right out and assert that his birth was in fact unconventional; he simply tells Macbeth *to get* this information: "let the angel whom thou still hast served tell thee Macduff was from his mother's womb untimely ripped" (5.8.18-20). Again, a careful auditor might reject the idea that this necessarily conveys an unambiguous statement of fact; if the language of the prophecy itself is dangerously unstable, then this sentence is at least as much so. And yet the line delivers its intended payoff: this slight, ambiguous shift in agency (from a push to an unattributed pull) is

²³ Janet Adelman calls it an "unsatisfactory equivocation" (131).

enough to gain the audience's assent. The witches' intelligence becomes [fore]knowledge. This parallel between Macduff's unconventional childbirth and the witches' unconventional knowledge production exposes a general anxiety about the danger inherent in knowledge whose provenance is "strange."

In their first exchange, among his litany of interrogatives Macbeth includes an epistemological question, asking the witches to reveal *how* they know what they are reporting: "Say from whence you owe this strange intelligence" (1.3.78-79). Briefly, it occurs to him to inquire where the information comes from, although he delimits the answer within the question itself by characterizing its origin as "strange"—"foreign, alien" ("strange"). He doesn't know exactly where it's from, but he knows it is from somewhere *else*, somewhere beyond the bounds of his known world. The play here seems to propose a dichotomy of knowledge: there is experiential, natural intelligence that mortal people take in bodily by way of the senses, and there is "strange" intelligence that only bubbles up into this world from the (filthy, foggy, foreign) realms that lie beyond mortal sight. Macbeth's question suggests an anxiety about origin with regard to knowledge, a preoccupation with policing sources and methods of knowledge production. The witches resist this policing by immediately disappearing—performing their answer to Macbeth's query by simply vanishing from mortal sight.

When Macbeth seeks out the witches again after Banquo's murder and demands follow-up intelligence about Banquo's line of descendants, he sees bodily apparitions representing eight generations of Kings, the last of which "bears a glass, which shows [...] many more" (4.1.134-5). In this figuration, the events of the future—the objects of knowledge—exist in a sort of gestational state, fully formed or forming but out of human sight. The witches see forward in time by peering into the gestational space of each seed/grain and reading its reproductive

potential; similarly, Macbeth sees images of unborn generations bearing the germs of still more generations. This marks a point of deviation from earlier versions of the same tale: where Holinshed attributes the witches' prophetic powers to knowledge gained from the realm beyond death—they are “indued with knowledge of prophesie by their necromantical science”—Shakespeare here credits them also with powers derived from knowledge of the realm that precedes birth (166).

Similarly, Macbeth's letter informs his wife that the witches “have more in them than mortal knowledge,” a phrase that lends the witches' knowledge reproductive significance in two important ways. First, the phrasing locates the knowledge “in them”—in the witches themselves, implying that they bear it within their bodies rather than simply seeing it and then relating it. Second, it sets up a contrast between the witches' prophetic intelligence and “mortal” knowledge, knowledge that is limited to the experience of a mortal human being and thus is produced from within the boundaries of the human life span. Theirs is “more than mortal” intelligence; it originates beyond those boundaries, in the “strange” realm outside the natural life of man.

When Macbeth describes the witches' disappearance in the same letter to his wife, he writes: “when I burned in desire to question them further, they made themselves air, into which they vanished” (1.5.4-5). This too suggests an uncanny doubling of themselves, becoming a substance and at the same time vanishing into that substance. They at once *are* the air and are *within* the air, creating an ambiguous and permeable boundary between carrier and cargo. Macbeth's exchange with Banquo just after the witches vanish creates a similar boundary-blurring ambiguity of container and contents: Banquo posits that “the earth hath bubbles, as the water has, and these are of them”—evoking a mental image of the witches being expelled by the

earth, constituted only by a visible boundary that ceases to exist once it opens and releases them, which fits with the early modern notion of the humoral female (especially maternal) body that has, as Gail Paster Kern puts it, “faulty borders and penetrable stuff” (23). On the other hand, Banquo then goes on to ask, “Whither are they vanished?”—a question that implies that he also imagines them to have removed themselves to a destination out of sight (1.3.83). Both states of being seem possible at once. Macbeth agrees, reasoning that the witches must have disappeared “into the air, and what seemed corporal melted, as breath into the wind,” again figuring them as doubled, as air within air (1.3.84-5). The fluidity here resonates with Diane Purkiss’ reading of the early modern figure of the witch as a sort of “anti-mother,” a “fantasy image of the huge, controlling, scattered, polluted, leaky fantasy of the maternal body of the Imaginary” (119). For both Banquo and Macbeth, the witches appear to resist containment within a stable corporal boundary, and this instability extends to their knowledge as well: its provenance remains permanently mysterious and unknowable.

When on stage but out of sight of the mortal characters in the play, the witches—along with Hecate,²⁴ the self-proclaimed “mistress” and “contriver” of their magic—offer another narrative of the knowledge’s source and method of production (3.5.6-7). Hecate chastises them for giving Macbeth knowledge about his future without allowing her to “bear [her] part,” but she offers them an opportunity to make amends by combining their magic arts with hers (3.5.8). She tells them that there is a great “vap’rous drop” about to fall from the moon, which she intends to

²⁴ In referencing Hecate’s appearance and lines, I deliberately sidestep scholarly debates about when and how this character was introduced (see Taylor; Vickers). It is generally accepted that Shakespeare included only oblique references to Hecate by name, and that her appearance and lines were later additions, likely originating with Thomas Middleton sometime between the 1606 composition and the 1623 First Folio. However, for my purposes, it is sufficient to recognize them as part of the play’s seventeenth-century performance and reception history.

“catch,” midwife-like, “ere it come to ground” and to produce from it “artificial sprites” that can pass further intelligence to Macbeth (3.5.24-7). She directs the witches to meet her later with “vessels” and other instruments of magic, and when we next see them, they stand around a cauldron in a tableau that shares several key elements of a typical early modern birthing scene: signaled by “mew[s],” “whine[s]” and “cries” that “’tis time, ’tis time,” women gather in a closed-off private space in anticipation of something emerging from within a powerful, toiling vessel (4.1.1-3).

Unsurprisingly, imagined connections between witchcraft and childbirth were commonplace in this period; Purkiss describes the early modern lying-in space as intimately associated with witchcraft, as the “combination of openness and an anxiety about boundaries set the scene for witchcraft fears and stories to develop around the mother’s lying-in” (102). In *Macbeth*, the witches’ gathering, like a lying-in room, is a liminal space of simultaneous attention to protective enclosure and controlled release. The witches have total control over the environment—when Macbeth approaches, one commands, “Open, locks, whoever knocks,” recalling the traditional sympathetic opening and binding rituals of the early modern birthing space—and they closely police Macbeth’s interactions with the spirits: “He will not be commanded”; “say thou naught”; “speak not to’t”; “seek to know no more” (4.1.46-7; 4.1.80-118). Despite offering Macbeth the choice of whether to hear “from our mouths or from our masters’,” the women tightly control the conditions under which information gets passed over the threshold (4.1.68-9).

All of this doesn’t really settle Macbeth’s earlier question of *how* the witches know what they know, but by this point he professes not to need this information; when they refuse to name their deed, he brushes off their reticence: “(Howe’er you come to know it), answer me” (4.1.2).

This is a big “howe’er” for him to overlook, as there are now many layers of occlusion at play in their method. The witches start with a diverse collection of ingredients, several of which relate particularly to darkness and childbirth, and through unseen means—by way of “a deed without a name”—they bring forth intelligence from an unseen realm. Through the cauldron, the prophecies pass from dark into light, from the unknown to the (somewhat) known world. The cauldron thus serves as both a vessel within which materials change form and also a visible site of passage for knowledge, whose inner workings are nonetheless mysterious. In this way, the cauldron is strikingly womb-like in both form and function. The witches use it to bring forth the “artificial sprites” that Hecate promised to “raise” from the moon drop, and these appear as visible bodies bearing intelligence. Hecate, the self-proclaimed “mistress” of this magic and ostensibly the surrogate mother of these figures and origin of their knowledge, remains invisible. She is both present and absent, which is perhaps appropriate for one who is traditionally not only a liminal figure but also a figure for liminality itself. *The Oxford Classical Dictionary* describes Hecate as “intrinsically ambivalent and amorphous,” “straddl[ing] conventional boundaries and elud[ing] definition,” and associates her not only with witchcraft, magic, and the moon but also with doorways and crossroads (Henrichs). It is perhaps fitting, then, that she should serve as a sort of absent maternal presence and hold an unspecified degree of authority over this birthing scene: it is a space that seems constituted by its liminality, its straddling of two worlds.

As a foil to Hecate’s invisible authority, her “artificial sprites” are visible to Macbeth and seem to read and interpellate him directly from beyond the mortal realm. Still, the witches mediate and control the flow of information. As Dymphna Callaghan notes, the power in this play is “clearly located among the insatiable forces of feminine misrule” (359). The women have authority here, and Macbeth does not. He is limited in his ability to participate in the discourse;

he is an outsider in a liminal boundary space where they belong and he does not (also like the birthing room). The knowledge that circulates in this space is available to him only through their mediation, and—to push on the knowledge-production-as-childbirth metaphor—he has little to no power to “untimely rip” it over the threshold between worlds.

So then, whence *does* the witches’ intelligence come? The play suggests several overlapping origin stories for the “strange intelligence” of the various prophecies. Banquo figures the witches’ method of knowledge production as a sort of privileged reproductive knowledge, a view into the metaphorical fertility of time and worldly events: he marvels that the witches can “look into the seeds of time / And say which grain will grow and which will not” (1.3.61-2). He reasons that if they have such a power, they should be able to use it to enlighten him about the fecundity of any “seeds” or “grains” that might concern him. These insights indeed turn out to be explicitly related to his reproductive futurity: they prophesize that he will “get kings” (1.3.61-70). Essentially Banquo’s theory is that the witches can see (either literally or as a sensory metaphor) into secret, hidden spaces beyond human sensory perception where the future waits to be born.

Following along with this metaphor of sight, as is often the case, in *Macbeth* the boundary between known and unknown, between visible and invisible, is expressed in terms of light and darkness. Our language is of course rich with metaphors like “enlighten” and “illuminate” that reveal the epistemic connection between light and knowledge, and conversely between darkness and ignorance. In *Macbeth*, dark and light—representing conditions that allow or restrict human sight—are measures of knowledge, and their boundary thus marks the threshold of mortal knowledge and “strange intelligence.” In this way the text seems to propose a figurative solution to a conceptual problem: it can’t fully answer where the knowledge comes

from, but it turns to an organizing metaphor to gesture toward familiar ideas about what it looks like. In the play, discussion of the threshold of light and darkness also evokes an image of the boundaries of mortal life in unexpected ways, as when Ross comments on the eclipse:

By th' clock 'tis day,
And yet dark night strangles the traveling lamp.
Is 't night's predominance or the day's shame
That darkness does the face of earth entomb
When living light should kiss it? (2.4.8-12)

Here the eclipse is figured as a violation of temporal boundaries—the night upon the daytime hours—and as a struggle at the threshold between darkness and light: darkness “strangles” light, “entombs” the otherwise visible face of the earth. The language opposes these deathly connotations with a characterization of light as “living.” Ross’ mention of the clock implies that the darkness brought on by the eclipse is “unnatural” for its *untimeliness* — which is precisely the language that Macduff later uses in characterizing his own birth, his initial passage from darkness into light, as “untimely” (5.8.20). In both cases, the potential problem lies in *how* this threshold gets crossed—whether or not it follows the prescribed order.

Similarly, Lady Macbeth leans heavily on the language of darkness and occlusion in her infamous speech imploring spirits to “unsex” her:

Come to my woman's breasts
And take my milk for gall, you murd'ring ministers,
Wherever in your sightless substances
You wait on nature's mischief. Come, thick night,
And pall thee in the dunnest smoke of hell,

That my keen knife see not the wound it makes,
Nor heaven peep through the blanket of the dark
To cry, 'Hold, hold!' (1.5.48-61)

She summons these spirits from “sightless substances” wherein they lurk, calls upon “thick night” and “dunkest smoke” to create a “blanket of dark” that occludes the evil deeds from sight and therefore knowledge. To help this process along, she asks also that they exchange the pale milk of her breasts for dark gall. The metaphor of darkness in this prayer underscores her need to resist full sight and knowledge of her own wickedness, and the juxtaposition with maternal imagery links this willful ignorance with the de-feminizing of her body. It rhetorically transfigures Lady Macbeth into a sort of anti-mother herself, figuratively and physiologically a source of death rather than life. Again the play displays a preoccupation with the boundary between light and dark, knowledge and ignorance—specifically, with the methods by which intelligence becomes knowledge, by which light reveals what is hidden in the dark—and again the figure of the maternal both organizes this boundary and threatens it. Significantly, this preoccupation is later echoed in the language describing the “untimely” method by which Macduff is said to have passed from darkness to light.

Lady Macbeth later invokes a similar metaphor of selective knowledge in warning her husband to remove evidence of his guilt from his face, since it serves “as a book where men may read strange matters” (1.6.73-4). She advises him to occlude the truth from potential readers by masking it beneath a false expression: “look like the innocent flower, but be th’ serpent under ‘t” (1.6.76-7). It is fitting that a mother should teach him how to separate his external body from the secrets that it bears within, and it is perhaps especially fitting for this tutelage in duplicity to come from Lady Macbeth, who imagines herself as a monstrous anti-mother when she prays to

“murd’ring ministers” to exchange her “milk for gall” and when she later says of her nursing babe that she “would have plucked [her] nipple from its boneless gums and dashed the brains out” to keep an oath (1.5.55; 1.7.65-6). *Macbeth*’s composition coincides with a period during which, Mary Fissell says, “the womb goes bad”—when the “positive view of the womb was challenged by a much darker version,” beginning around 1603 (53). Identification of the birthing woman with the miraculous womb of the Virgin Mary shifted to identification with Eve, original sin, and the womb’s threat of contagious pollution and decay. Lady Macbeth’s reference to the serpent makes this connection even more explicit by tying the “serpent” to the anti-motherly deeds.

True to the conventions of the witch as a figure for the monstrous maternal, *Macbeth*’s witches (and their midwife-mother-mistress Hecate) are a constant but sometimes invisible presence in the play; they disappear and reappear at will and seem to wield power even when out of sight. They catalyze the action of the story in much the same way as women’s bodies are imagined to catalyze reproduction—dangerously and mysteriously. And then they vanish entirely by the end of the play and are not mentioned again. Although their prophecies incite Macbeth to make the series of choices that lead to his death, the tragic outcome follows not only from his belief in the content of the prophecies but also from his failure to recognize that the phrase “no man of woman born” could carry a different meaning than the one that he understood. He believes this prophecy to be not only true but also unambiguous—to be only what is apparent on the outside, with no hidden possibility within. Macbeth asserts his confidence in his interpretation repeatedly; he fails to see the alternative interpretation that the phrase was “pregnant” with, so to speak—the possibility that a man who came into the world unconventionally might exist, turning the prophecy into a warning rather than a promise. His is a

failure, in part, to fully understand not only the vagaries of childbirth but also the dangerous fecundity of language (a failing that similarly afflicts Bertram and seals his fate in *All's Well That Ends Well*, as we will see in the next section).

Macbeth is afforded every opportunity to be a suspicious reader: to recognize the witches' prophecies as visible surfaces that conceal invisible, contradictory cargo. He observes that a fair day can be foul, that bearded persons can be women, that what seems corporal can melt as breath into wind. He even professes an understanding of the *explicitly reproductive* nature of the chaos that the witches can sow—"though the treasure of nature's germens tumble all together, even till destruction sicken, answer me" (4.1.60-62). And although Macbeth can readily imagine that the witches know, from the dark beyond, things he does not know about himself, he cannot imagine that they might also know something he does not know about childbirth. He observes that the witches function as both reliable sources of intelligence and malevolent actors, but can't imagine them as both at once—one veiling the other and hiding a secret, threatening payload. As Jonathan Goldberg puts it, they embody "the menacing heterogeneity of uncontrolled duplication that threatens the autonomy of power" (257). While the witches are agents for the production of the knowledge that gives the play its structure, the tragic outcome derives mostly from Macbeth's failure to perceive the threat posed by its occluded provenance and the circumstances of its production. The play invites the audience to question what Macbeth was thinking, trusting what women brought forth into the world mysteriously, from dark and secret places into which no man can see.

Deborah Willis regards "historically specific anxieties about maternal power" and "changing beliefs about the boundaries between nature and supernature" as separate historical conditions that each contributed to the witch hunts of seventeenth-century England (244). I have

argued here that there is significant epistemological overlap between these two factors, and that the witches in *Macbeth* bridge them seamlessly by being situated at/as a boundary between nature and supernature. The witches demonstrate, both within the Macduff prophecy and through their own machinations, that there is extraordinary, social-order-threatening power inherent in women's ability to control how things [bodies, knowledge] pass over that boundary. This power, and the instability that it brings, is a frequent topic of critical discussion; I argue here that it is best understood in the context of its deep entanglement with forms and modes of knowing, and with the body of the knower.

“One that's dead is quick”: Threatening Maternity in *All's Well That Ends Well*

In *All's Well That Ends Well*, threatening maternity takes a different shape. Rather than the monstrous generativity that looms over *Macbeth* in grotesque anti-mothers and necromantical prophecies, Helen's²⁵ threat to the conventional dynamics of knowledge and authority takes a more literally maternal form, as she spends the entire play on an elaborate quest to acquire the knowledge and authority (and biological material) that she needs to become pregnant by her unwilling husband Bertram. Like the witches in *Macbeth*, Helen obscures the source of the

²⁵ Many editions give her name as “Helena.” I am working from the Folger Shakespeare Library edition because I teach from it; it is inexpensive and easy to find, lightweight but rich with useful paratextual material for students, and has a robust and navigable (and free) web counterpart that is paginated to match the paperback. Editors Barbara Mowat and Paul Werstine explain that they have opted to use “Helen” in this edition, “since, as Susan Snyder points out in her 1993 Oxford edition [...] “Helen” appears [...] twenty-five times (In contrast to the four times “Helena” appears)” in the First Folio (“An Introduction” li). I also very much appreciate the nod to Helen of Troy, to which the Fool gestures when he sings, “Was this fair face the cause [...] / Why the Grecians sackèd Troy?” (1.3.71-2): I take the names of the Florentian women (the Widow, Diana, and Mariana) as a hint that the play is winking at female archetypes, and in this context, the irony of Boccaccio's Giletta di Narbona becoming “Helen” is delicious: certainly the prospect of marrying her led a man to go to war, but not quite in the same way.

knowledge she uses to direct the outcome of the story. Like the witches, she exploits a man's overestimation of his own rhetorical skill and underestimation of the fecundity of language to set him up for a surprise ending. And like the witches, her machinations summon, and rely upon, both literal and figurative generativity, lending a feminized body to general anxieties about knowledge production. Helen embodies the threat to social order that is posed by women having control over reproductive knowledge, both in terms of the physical body and in terms of figurative language, including a variety of reproductive metaphors in military, economic, medical, and legal discourses.

Many scholars read Helen as the embodiment of virtuous submissiveness—an exemplar of prescriptive early modern femininity. Most attention to her character acknowledges what David McCandless calls her “willingness to deliver herself unequivocally to normative femininity” (467). When Helen finds herself in a position to assert her own will, she is apologetic and quick to recast herself as the object of desire, conforming to expectations and denying her own agency. Susan Snyder points to Shakespeare's departures from his source material as evidence that he revised the story “in such a way as to underline Helena's feminine shame”; that is, that he went out of his way to exaggerate Helen's adherence to normative femininity (75). Kathryn Schwartz also argues that Helen embodies prescriptive gender ideals, remaining “constant to a chaste and generative ideal of marriage” throughout the play, calling special attention to the way that Helen overcomes Bertram's willfulness by acquiescing to it, albeit on her own terms (200). Similarly, Jean Howard explores this nuanced distinction between obedience to masculine will and obliteration of Helen's will, finding that in each instance where Helen acts upon her own desire Shakespeare places “an overt emphasis on Helena's compliance with an ideal of wifely obedience” (52). These scholars have rightly pointed out that this play

balances Helen's willfulness by repeatedly asserting her enthusiastic performance of early modern ideals of womanly behavior.

Although Helen's apparently ideal femininity certainly facilitates her recuperative function in the comedy, ensuring that the play ends with the promise of a marriage that will restore the sexually fruitful social order, her performance of passive obedience to masculine will also emerges as a necessary cover for her knowledge and especially for her appropriation of masculine-coded discourses in the service of exercising her own will. At each step of her plan, Helen uses a performance of prescriptive feminine virtue to gain access to forms of knowledge that would otherwise be subject to gatekeeping—discourses that Lisa Jardine categorizes as “specialist knowledge customarily restricted to men” —in order to apply them with plausible deniability (4). By reading this as an exercise of threatening maternal power, we can see how her ironic embodiment of an essential femininity defined by lack of intellectual and reproductive agency enables her to disrupt men's authority over knowledge.

The play, which unfolds against a backdrop of war, presents military service as a source of honor for young men, a pursuit that Bertram sees as a rite of passage into manhood. One of Helen's first opportunities to appropriate traditionally specialized knowledge arises from her conversation with Bertram's companion Parolles on the topic of virginity, during which she figures sexuality in military terms as a territorial battle between men and women for control over sex and reproduction. Although she has just acknowledged, in an aside, that she thinks him “solely a coward,” she flatters Parolles by addressing him as a soldier and asks him for advice in devising a defensive strategy: “Man is enemy to virginity: how may we barricado it against him? ...Unfold to us some warlike resistance” (1.1.1.06, 1.1.107-111). Following her lead in figuring virginity as a military target, Parolles advises her that men will always manage to conquer

women strategically—that despite women’s barricades, the men, “setting down before you, will undermine you and blow you up” (1.1.112-113). In this casual characterization of sexual pursuit as a military operation, Parolles unwittingly empowers Helen—who has every interest in being “blown up” by Bertram—with an understanding of how she might employ a covert military strategy of her own to get her wish: Helen immediately shifts her focus from defensive to offensive tactics, asking Parolles, “Is there no military policy how virgins might blow up men?” (1.1.115-6). Indeed, by the end of the play it is Helen who, rather than being overcome and conquered by male intent and power as Parolles suggests is inevitable, “undermines” Bertram and figuratively blows him up. During this conversation, however, Parolles does not suspect her of anything but overenthusiastic chastity, as Helen effectively cloaks her ambition behind the appearance of defensive femininity even while she avails herself of a greater understanding of offensive military tactical maneuvers. Armed with this new strategic knowledge, Helen begins to envision her long-term battle plan, which we already understand to involve at least figurative impregnation.

Besides an effective military strategy, this conversation with Parolles also provides Helen with helpful advice for navigating another male-dominated discourse: economics. Parolles warns her not to be too selective on the marriage market, advising her against protecting her virginity—which he predicts “will lose the gloss with lying: the longer kept, the less worth”—and suggesting that she let it go “while ‘tis vendible” (1.1.142-43). As Carol Thomas Neely points out, this advice serves a double purpose, both “demystifying chastity, the virtue honored by romantic love” and also recognizing it as “a valuable commodity that can be spent for personal and social gain” (67). But besides underscoring what Helen surely already understood about a young woman’s commodified exchange value on the marriage market, Parolles also clumsily

applies the logic of an economic model in which growth of capital is possible through speculative investment: he advises that “in the commonwealth of nature,” it is best for virginity to be invested to produce “rational increase” (1.1.133). He insists, “virginity by being once lost may be ten times found” and promises that in ten years’ time a lost virginity “will make itself two, which is a goodly increase, and the principal itself not much the worse” (1.1.135-8). The insinuation, of course, is that the investment of a woman’s virginity, the material commodity that is “metal to make virgins,” can produce multiple virgins as increase (offspring), thus multiplying the return on investment (1.1.135). Interestingly, Parolles phrases this as virginity making *itself* two, a construction that suggests the figure of money “breeding” money, a metaphor that was often deployed to denounce usury as a sort of monstrous birth and therefore an affront to moral values. Again Helen responds by focusing on her own wishes, imagining herself in the role of investor rather than commodity (or depository): “How might one do, sir, to lose it to one’s own liking?” (1.1.140). Empowered now with an expanded concept of the potential agency she holds as the possessor of a tradable commodity, Helen ignores the easy interpretation of Parolles’ bawdy innuendo—that she could “answer the time of request” by selling her virginity directly to an interested suitor—and begins to imagine a more elaborate scheme by which she might leverage her virginity to get the specific man she wants (1.1.143). Here again Helen gains mastery of a quasi-reproductive discourse, normally dominated by men, onto which she can map her own ambitions, thus reversing the gendered roles of pursuer and pursued that were implied in Parolles’ metaphors.

Helen is careful here to keep up her cover, rhetorically portraying herself as appropriately passive and powerless for a woman of her social station. Mindful of the need to appear unthreatening, Helen adheres strictly to the social code that requires a woman to, as Jardine puts

it, “observe a modest silence and passivity in public” (4). We get to see Helen’s shift from public passivity to private understanding of agency toward the end of the scene. She laments to Parolles that as one of the “poorer born, whose baser stars do shut us up in wishes,” she is entirely subject to the whims of the heavens, and she implies that she is resigning herself to this fate rather than being at liberty to act upon those wishes and write her own story (1.1.170). Only after Parolles leaves and she is alone on the stage does Helen acknowledge her own agency, emphatically disavowing her earlier comment about the “baser stars” controlling her fate and directing her life. Her soliloquy tips her hand, instructing the audience that any credit (or constraint) she might ascribe to providence is insincere:

Our remedies oft in ourselves do lie
Which we ascribe to heaven. The fated sky
Gives us free scope, only doth backward pull
Our slow designs when we ourselves are dull
[...]
Impossible be strange attempts to those
That weigh their pains in sense and do suppose
What hath been cannot be. Who ever strove
To show her merit that did miss her love?
The King’s disease—my project may deceive me,
But my intents are fixed and will not leave me. (1.1.199-212)

Here she characterizes herself as enjoying “free scope” for her endeavors, and she expresses confidence that her “merit” will ensure that she gets what she wants and deserves. Earlier in the scene she had been distraught over Bertram’s leaving, lamenting that “there is no living” without

him; this soliloquy reveals a change in her prospects for the future, a reversal that could only have happened during the conversation with Parolles (1.1.79). Equipped now with a tactical strategy for the conquering of virginity and with an understanding of her potential commodity-exchange value, she announces her intention to actively pursue her own desired outcome. Crucially, she locates that agency within her own body, asserting that (despite what she might profess to others) it is not heaven that provides us with “remedies” but rather that they lie hidden “in ourselves.”

As it turns out, the remedies Helen bears within herself are not only figurative: the daughter of a physician, she has taken in some knowledge of medicine from her late father’s practice. She explains that he gave her “some prescriptions / Of rare and proved effects, such as his reading / And manifest experience had collected,” including one medicine formulated specifically for the condition from which the King is suffering (1.3.234-6). Her plan rests upon first negotiating a successful transaction with the King, who has the power to grant her the husband of her choice. Before leaving for Paris to offer her ministrations to the King, she makes it clear that her mission is primarily self-serving, telling the Countess that she credits Bertram with the idea:

My lord your son made me to think of this,
Else Paris and the medicine and the King
Had from the conversation of my thoughts
Haply been absent then. (1.3.218-221)

This admission gives Helen some cover for hatching the plan herself, shunting some responsibility (at least grammatically) onto Bertram for its inspiration, but it also reveals that Helen is invested in the King’s cure only as a means by which to achieve her own ends. In order

to legitimize this assertion of her own will Helen further obscures her agency rhetorically, telling the Countess that she intends to apply not her own but rather her father's skill in treating the King (1.1.211). Questioning the viability of this plan, the Countess speaks in terms of trust and credit, expressing doubt that the King will "credit a poor unlearnèd virgin" with curative abilities when his own physicians had given up hope (1.3.226). Helen then doubles down on disavowing her own role in the application of medical knowledge, externalizing her proposed remedy and distancing it from her own mind and body. She characterizes it as a combination of powers external to herself, assuring the Countess that it is her "father's skill" and *his* "good receipt," and further that "there is something in't / more than my father's skill"—that the recipe is also "sanctified / by th'luckiest stars in heaven" (1.3.228-232). Helen gains assent from the Countess by projecting her own agency entirely onto these proxies, presenting herself not as a knowledgeable actor in her own right but rather as a passive vessel for knowledge that originated with an educated man and was blessed by heaven—doubly creditable for its imprimatur from these two forms of masculine institutional authority.

She repeats these rhetorical moves in Paris when she asks the King to let her apply her treatment "with all bound humbleness," presenting it first as her father's work and then, after he protests that other physicians have pronounced his case hopeless, insisting that it is the "help of heaven" and that to credit men for it would be "presumption" (2.1.131, 151, 171). Paradoxically, she goes out of her way to present herself as superlatively weak, her fitness as a passive vessel for the knowledge increased by her inherent lack of fitness for the task on her own merits: "He that of greatest works is finisher / Oft does them by the weakest minister" (2.1.154-5). She uses this disavowal of agency to press the King into setting her the kind of test of virtue usually associated with romance, insisting that divine power would simply work through her as an

instrument: “Of heaven, not me, make an experiment” (2.1.171-2). Although applying embodied knowledge—what Mary Floyd-Wilson calls “experiential knowledge [...] that anticipates an emerging scientific culture”—Helen declines to take credit for any positive outcome, ascribing it entirely to her fathers, both earthly and heavenly (29).

Many scholars address Helen’s claims to serve only as a vessel for heavenly assistance as if they are sincere,²⁶ but Helen preempts such a reading in her Act One soliloquy, when she plainly credits not divine intervention but rather her own agency—her “fixed intents” (1.1.212), her “merit” (1.1.210) and the remedies that lie “in ourselves” (1.1.199)—for these results. She recognizes that she is not merely a vessel for someone else’s will but rather that the power “which we ascribe to heaven” resides entirely within herself; it is *her* merit that she intends to show (1.1.200). By presenting herself as a passive vessel simply bearing cargo of men’s making, Helen sanctions her appropriation of knowledge for her own gain, shielding herself from the rebuke of a society suspicious of the knowing woman. Lisa Jardine lays out the dilemma of the early modern learned woman—an intelligent woman “capable of employing specialist knowledge customarily restricted to men”—whose knowledge is at the same time a “sexually and socially disruptive force” and a “token of female accomplishment and female virtue” (4, 10). This paradox stems from the early modern cultural perception that the knowing woman must be a *sexually* knowing woman—that a woman’s possession of intellectual or practical knowledge directly implies her sexual corruption. Some of Shakespeare’s earlier learned female characters resolve this paradox by cross-dressing; they make their fluency in masculine discourses socially acceptable by obscuring their femaleness, by “becoming” men while they exercise traditionally

²⁶ See, for example, Jean Howard, “Female Agency In *All's Well That Ends Well*”; Janet Adelman, *Suffocating Mothers: Fantasies of Maternal Origin in Shakespeare's Plays, Hamlet to The Tempest*; David Bergeron, “The Structure Of Healing In ‘All's Well That Ends Well.’”

male forms of agency. Helen takes the opposite approach: rather than male garb, her disguise is almost a caricature of prescriptive womanhood as passive, chaste, and deferential to men's will. Each strategy effectively obscures one of the contradictory premises of the paradox: whereas Portia, Nerissa, and Viola make their womanhood invisible in order to operate undetected within male-dominated power structures, Helen weaponizes the performance of conformity to a prescribed ideal of feminine passivity in order to make invisible her level of control over knowledge. Insincerely ascribing her own merit to acceptably masculine sources within the realms of medicine, law, and what Alison Findlay calls a decidedly "male-centred theological tradition" ensures that Helen remains uncontaminated by the possible sexual implications of the knowing woman, thereby protecting her from any backlash she might experience as an acknowledged agent for her own intentions (35).

For the audience, however, it is driven home clearly and repeatedly that Helen knows things she shouldn't know, and that this upsets the natural order. In one exchange, Helen even seems to channel the witches from *Macbeth*, offering her King not only knowledge but foreknowledge. Impressed by her confidence and professed certainty in her cure, the King asks Helen to predict how long her medicine would take to restore his youthful health and fend off impending death. Her response is almost comically witchy, invoking several mythological allusions, fire and damp, a chiasmus, and riddle-like constructions in what could easily be staged as if she were incanting a spell:

Ere twice the horses of the sun shall bring
Their fiery torcher his diurnal ring;
Ere twice in murk and occidental damp
Moist Hesperus hath quenched her sleepy lamp;

Or four and twenty times the pilot's glass
Hath told the thievish minutes, how they pass,
What is infirm from your sound parts shall fly,
Health shall live free, and sickness freely die. (2.1.187)

(So, two days. But they'll be very theatrical.) The King even seems to recognize the speech as a sort of invocation, imagining Helen as a bodily vessel for something supernatural: "Methinks in thee some blessed spirit doth speak / His powerful sound within an organ weak" (2.1.195). Findlay reads this scene as Helen redeeming Eve's curse "speaking from the Marian position of redemptive mediatrix," a narratively maternal function that I will unpack further in the final chapter (38). Given the stark difference in the contexts of this scene and the one in which Macbeth consults the witches, there is a surprising resonance between them.

Certainly if Helen has cast a spell on the King, it has worked; not only does he finally hear her, and believe her, but also he reads and articulates exactly the identity that she has been performing and narrating: a powerless and therefore unthreatening vessel, passively conveying cargo that originated with someone else. In another moment that recalls Macbeth and the witches, the King gestures weakly toward acknowledging that he *should* do more in the way of due diligence in terms of understanding the provenance and process of Helen's knowledge, before quickly dismissing the idea:

More should I question thee, and more I must,
Though more to know could not be more to trust:
From whence thou cam'st, how tended on; but rest
Unquestioned welcome and undoubted blessed. (2.1.226-9)

Here the King muses aloud that he should really ask Helen for more information about her background, lineage, and upbringing, but he reasons that such knowledge would not increase his trust, and allows her to remain “unquestioned” and “undoubted.” Instead he agrees to “make an experiment” on Helen’s terms; like Macbeth, in the final accounting he proves to be more concerned with the potential use value than with methods and materials.

Thus the King relents after Helen bets first her maidenly reputation and finally her life on the outcome of the test, and he agrees, for his part, to wager “what husband in [his] power [Helen] will command” (2.1.193). Despite her openly stated intention to “command” her choice of husband, as Helen selects from among the King’s wards during her later presentation at court, she is careful not to appear too eager to usurp the traditionally masculine prerogative of selecting one’s spouse. She calls special attention to outward bodily signs that would seem to indicate normative, even prescriptive, femininity—“the blushes in my cheeks thus whisper me: we blush that thou shouldst choose”—evoking not only modesty and hesitance but also reverent silence (2.3.66-7). Rather than speaking frankly, Helen calls attention to a mark on her body that supposedly serves as an indicator of virtue, narrating that physiological sign into being while at the same time implying that it speaks—very quietly—for itself. The audience understands Helen’s self-characterization in this line as ironic, since she has just proven the strength of her voice by successfully talking her way into a self-serving bargain with the King and is about to enact, in a few words, the lifelong erasure of Bertram’s will. In this context, Helen’s characterization of herself as whispering and blushing is thick with irony, recalling the opening scene of the play, when her tears ostensibly served as an outward sign of her status as a grieving daughter. These early hints of the possibility that outward physical signs on the body may not index what lies beneath—a further twist on both the witches and Shakespeare’s cross-dressing

heroines—foreshadow Helen’s surprise appearance in the final scene, but for now they seem to emphasize her awareness of irony and her ability to exercise an authorial kind of control by narrating herself as a character.

Her efforts to disavow agency have paid off, as the men in the play seem doggedly, almost desperately, determined to affirm that she functions only as a passive vessel for heavenly power and will. Awaiting the triumphant reappearance of the cured King, Lafew stands ready to read from a written statement celebrating this “showing of heavenly effect in an earthly actor” (2.3.23). This is an intriguing assertion on his part, as he had earlier marketed Helen to the King (chiding himself that he is “Cressid’s uncle that dare leave two together”) primarily in terms of the bewitching power he assigns to the female body (2.1.113-4). In a torrent of innuendo, he jokingly presents the attractive young Helen as a sort of drug with sexual effects:²⁷

I have seen a medicine
That’s able to breathe life into a stone,
Quicken a rock, and make you dance canary
With sprightly fire and motion, whose simple touch
Is powerful to araise King Pepin, nay,
To give great Charlemagne a pen in ’s hand
And write to her a love line. (2.1.84-90)

After Lafew’s teasing proposal to “quicken” and “araise” the King by leaving him alone with a young woman unexpectedly bears fruit, he seems to have a change of heart about the nature of

²⁷ For an analysis that examines the play’s sexualization of Helen’s cure in the context of early modern medical knowledge and practices, see Barbara Howard Traister, “Doctor She: Healing and Sex in *All’s Well That Ends Well*.”

her curative powers, concluding after all that they must originate outside her body rather than within it.

Why is this heavenly attribution so important? Certainly, as we have seen, a woman's mastery of medical knowledge would pose a gendered threat to institutions and hierarchies of power. This could be resolved by crediting her father, and yet the courtiers insist that the King's cure could only be the "transcendence" of human knowledge by the "very hand of heaven" (2.3.32-6). Lafew gestures toward the way in which the gendered threat comes about by expanding the boundaries of knowledge in general, musing about the dangers of *anyone* professing to have knowledge about what was once unknown or hidden, especially about origins (causes):

They say miracles are past, and we have our philosophical persons to make modern and familiar things supernatural and causeless. Hence is it that we make trifles of terrors, ensconcing ourselves into seeming knowledge when we should submit ourselves to an unknown fear.

(2.3.1-6)

In terms of rough intellectual histories, this speech seems to offer an interesting sequel to Bede's parable about the sparrow. Where Edwin's counselor advised converting in order to enjoy the comfort of Christianity's untestable claims about the supernatural world, Lafew advises clinging to that same faith even when rational inquiry produces new knowledge because, although the unknown is terrifying, we *should* be afraid of it. If Christianity replaced its predecessor as a knowledge system by offering a limited narrative about what lies beyond human sensory perception, Lafew seems here to express uneasiness at the possibility that its authority could be threatened by a less totalitarian knowledge system in which [natural] philosophers have the

power to demystify things that were previously unknown and relegated to the supernatural. What if the boundary is unstable? What if knowledge that can shift the boundary between life and death, which once belonged only to God, could become knowable by anyone: men, women, poor physicians' daughters, old bearded women on the moors...? No, thanks, Lafew seems to say; rather give us the terrors, and the unknown fear. The old courtier, unsurprisingly, favors the traditionally narrower distribution of authority and control over knowledge.

Helen, for her part, continues to present herself as empty of her own authority and power, opening her address to the King's wards by positioning herself again as a vessel rather than an actor—"Gentlemen, heaven hath through me restored the King to health"—and gently declining their praises by rhetorically resituating her value in her virginity—"I am a simple maid, and therein wealthiest / That I protest I simply am a maid" (2.3.65-9). The King makes it clear that he is giving Helen leave to make uncontested use of the double portion of power—"both sovereign power and father's voice"—he holds over these particular men: "Thy frank election make. / Thou hast power to choose, and they none to forsake" (2.3.55-7). Still, when Helen stands before Bertram, prepared to name him as her choice, she is careful to rhetorically position her claim over him not as a wielding of the King's sovereign and fatherly authority but rather as an offer to submit to Bertram's husbandly authority: "I dare not say I take you; but I give / Me and my service, ever whilst I live, / Into your guiding power" (2.3.110-112).

This scene also contributes to a pattern of botanical figures that drive home the play's investment in questions of control over both biological reproduction and narrative forms of cultural reproduction. Earlier in the play, when the Countess seeks to assure her ward Helen that she sees her as a daughter, she expresses the naturalness of her maternal affection with an horticultural metaphor:

I say I am your mother

And put you in the catalogue of those

That were enwombèd mine. 'Tis often seen

Adoption strives with nature, and choice breeds

A native slip to us from foreign seeds.

[...]

I say I am your mother.

(1.3.138-42; 1.3.151)

Her speech affirms that motherhood can be enacted not only through childbirth but also by choice, and it figures that choice as a means of exercising control over both biology (grafting one line onto another) and narrative (saying, cataloging) (1.3.151). In this configuration, the combination of *words* and *will* can function similarly to biological reproduction. The King uses these metaphors to similar effect in his conversations with Bertram. He speaks of Bertram's late father, recalling that "his plausive words / He scattered not in ears, but grafted them / To grow there and to bear," imagining the late Count's speech as figuratively embodied and generative, remaining perceptible to the senses and growing in meaning over time even in his absence (1.2.60-2). The contrast the King draws here between "scattering" and "grafting" as methods of propagating an idea seems to suggest that he admires the more deliberate, perhaps even more aggressively controlling, of the two. He demonstrates this more overtly after Bertram attempts to reject the marriage to Helen on the basis of her social status. The King dismisses such an objection as baseless, because as sovereign he has the authority to raise her social standing (inherently a function of shared knowledge) by fiat: "It is in us to plant thine honor where we please to have it grow" (2.3.166). These figures invoke both reproductive and authorial power; as Vin Nardizzi reminds us, "plant grafting [...] was regarded in sixteenth- and early seventeenth-

century gardening manuals as *both* an analogue to procreation *and* a form of writing” (83). These metaphors of planting and grafting seem to tie together the play’s ideas about both parentage and knowledge: as the King asserts this control over social rank in order to underwrite his assertion of power to determine Bertram’s reproductive futurity by compelling him to marry Helen. As King, he gets to decide where everything grows, including Bertram’s offspring.

Bertram attempts to reassert power both biologically and narratively when he runs off to the wars without consummating their marriage. The play here seems to imagine the fecundity of language itself as a potential threat to men’s control. In his farewell letter to Helen, Bertram writes:

When thou canst get the ring upon my finger, which never
shall come off, and show me a child begotten of thy body that
I am a father to, then call me husband; but in such a “then” I
write a “never.” (3.2.55-58)

Helen reads Bertram’s intentions correctly, lamenting, “This is a dreadful sentence” (3.2.59). Her dread confirms that she does understand that Bertram means permanently to separate from her. But rather than submit to his intent, she substitutes a new, bad faith reading of Bertram’s letter that allows her to fulfill her own intentions without openly disobeying her husband. Meet these two putatively impossible conditions? Challenge accepted: by way of the infamous bed-trick, Helen, disguised as Diana, will go on to obtain both Bertram’s ring and [possibly] his child, thus delivering on the terms of this sarcastic and seemingly unexecutable contract. Bertram articulates his intention to write into the word “then” the meaning “never,” but Helen disrupts his intentions here just as she will later frustrate his intentions with Diana, by recognizing that she can weaponize the duplicity of language to write the story the way she chooses. Here again, just as

befell Macbeth, the inherent fecundity of language—and his apparent inability to control it—poses a threat to Bertram’s authority.

This kind of wordplay is of course a hallmark of Shakespeare’s comedies, but Helen’s mastery of it also reiterates the specifically *gendered* boundary threat that characterizes the witches’ riddling and duplicity. Lorna Hutson argues for the centrality of rhetorical skill in the early modern ideal of masculinity, asserting that “the capacity to plot, write, and *be able to make use* of the erudition and wit of a comedy is central to sixteenth- and seventeenth-century conceptions of what it meant to ‘be a man,’” and that the ability to make use of persuasive language—both as a speaker and as an auditor—“as a discourse, an argument, to enhance their own agency” was considered to be an inherently masculine attribute (146). Rhetorical acumen, in the early modern conception of masculinity, was exclusively, even essentially, the domain of men. Hutson dissects Shakespeare’s comedic plot structure alongside that of the Terentian five-act play that was often the subject of rhetorical analysis in early modern education (of boys). She finds that the way in which men could utilize “the ‘credit’ of an ability to recommend themselves to strangers, a ‘stock’ of wit which they have learned from plays” informs our understanding of the way in which Shakespeare’s comedies “construct sexual difference by appealing to the male (because formally educated) mind” (147). She points out that Terence’s plays generally included “male protagonists who were... able, in moments of crisis, to improvise a temporary source of credit... that could defer disaster until the terms of the crisis had altered to bring in a fortunate conclusion” (147). In *All’s Well That Ends Well*, Helen repeatedly arrogates this ability in such a way that her reproductive intentions (and methods) become inextricably entangled with her mastery of various forms of knowledge.

Certainly Shakespeare plays with this gender-coded boundary even in earlier comedies, writing female protagonists who similarly use their wit to improvise creditability until the crisis passes—often by posing as men. But *All's Well* goes further, delivering in Helen a female protagonist who dispenses with male disguise and dresses herself instead in a costume of femininity as constructed by convention: literally and figuratively a passive vessel for masculine futurity. On the surface she is the chaste virgin, dutiful daughter, obedient wife, and prospective mother, obeying to the letter (and only to the letter) the social imperatives of womanhood and class. This performance allows her to appropriate ostensibly gated institutional knowledge without being seen as an agent. As Jardine points out, “all *is* well that ends well for the male world of the play in which Helen’s initial transgression is redeemed into chaste service” (12). In other words, Helen’s enthusiastic performance of submissive womanhood—especially maternity—is both recuperative and redemptive. It allows her to resolve the play’s manifold fertility crises on her own terms, and at the same time it shields her from condemnation for her otherwise transgressive willfulness. It effectively renders her active manipulation of knowledge invisible, occluding its subversiveness behind an outward appearance of passivity.

Helen’s performance also enables her to recommend herself to other women in many of the same ways. Just as she had earlier secured the Countess’s help by insisting that she was simply a conduit for her father’s skill and divine will, she appeals to the Florentine women to help her recuperate her marriage to Bertram in part by positioning her reproductive function as lawful, dutiful, and holy. When she arrives in her pilgrim garb, she finds the Widow, her daughter Diana, and Mariana watching the officers’ march and discussing Bertram and Parolles. Helen arranges to lodge at the Widow’s home and promises to share some gossip about Bertram, who has propositioned the virginal Diana. Revealing at last that she herself is the Count’s

abandoned wife, she argues her case and convinces the Widow to help her complete the tasks that Bertram has inadvertently set her. She enlists help in setting up the play's infamous bed-trick, in which Helen secretly takes Diana's place in a sexual rendezvous with Bertram in an attempt to fulfill his conditions for acknowledging their marriage. Underscoring the propriety of her goals—"you see it lawful, then"—and offering a dowry for Diana into the bargain, Helen sells the Widow on the idea that together they can turn an indecent proposal into two fruitful marriages (3.7.34). The collusion among the women is explicit; Helen calls the scheme "our plot", and both she and the Widow educate Diana on what to expect from Bertram's advances—"we'll direct her how best to bear it"—and also how to negotiate them in order to get him to hand over his family ring (3.7.45; 3.7.20). After the encounter during which Diana successfully convinces Bertram to surrender the ring, she exclaims with apparent satisfaction, "My mother told me just how he would woo"—reflecting the utility of this shared womanly knowledge and counsel (4.2.70). When Helen thanks her friends for their labors on her behalf, she speaks of their bond as an eternal one: "Since you have made the days and nights as one / To wear your gentle limbs in my affairs, / Be bold you do so grow in my requital / As nothing can unroot you" (4.5.3-6). Recalling the Countess's language of botany earlier in the play, when she says of Helen, "if she had partaken of my flesh and cost me the dearest groans of a mother I could not have owed her a more rooted love," this root metaphor for attachment and fixity contrasts with the figures of grafting and envisions a kind of collective generativity that does not depend on men's management (4.4.9-11).

Still, even in her relationships with these other women, Helen presents herself as first and foremost a virtuous and dutiful wife. She presents her scheme to the Widow as a "lawful" one that upholds marital relations and honor (3.7.30). She even attributes her role within this

community of women to divine inspiration: “doubt not but heaven hath brought me up to be your daughter’s dower, as it hath fated her to be my motive and helper to a husband” (4.4.18-21).

Although the play, as Findlay points out, “creates a space to [present] women’s creation of a female trinity of mother, daughter, and spirit,” and although the outcome is due in no small part to the “triumph of female solidarity,” Helen is careful to situate her victory within the bounds of men’s institutional authority (35, 41). Outwardly she professes only an intention that is appropriate to her gender and her social position: to fulfill her duty by serving as a passive vessel for masculine futurity. This performance of submissiveness and an urgent desire to behave as a wife gives Helen cover for the otherwise flagrant assertion of her own will. Kathryn Schwarz unpacks the sense of uneasiness that Helen’s constancy of purpose surely generates for the early modern audience: “constant women,” she says, “know exactly what they’re doing, [and] knowledge of this kind unsettles the naturalized organization of power among men” (202). Knowing exactly what she wants is intimidating enough; being seen to actively pursue it would be decidedly transgressive. Helen must instead read the room, finding the points at which her desires and the priorities of her society intersect and then cultivating that intersection. Schwarz points out one such example in Bertram’s rebellion against the King’s command to marry: “Where Bertram’s willful tyranny puts individual masculine authority at odds with patriarchy’s common law, Helena’s willed submission reconciles the particular to the general” (203). Helen recognizes the conflict between Bertram’s will and the prescribed social order, and she manages to appear submissive to both by exploiting the double meaning in Bertram’s words.

Helen's ability to recognize the fecundity of language and exploit it to her advantage facilitates her control over the outcome of her own story. She cleverly navigates riddles²⁸ and wordplay both as a reader/auditor and as a speaker, and she makes strategic use of double meanings. In the final scene Helen herself takes the stage as the doubly-embodied solution to Diana's riddle, "one that's dead is quick," which not only gestures at the fact that Helen, presumed murdered, is actually alive, but also sets up her claim that she is "quick" with child (5.3.300). In one line, strangely dark for a riddle, Diana even figures Helen as a sentient corpse: "Dead though she be, she feels her young one kick" (5.3.299). The language here echoes the way that Helen had characterized herself earlier as one who "riddle-like lives sweetly where she dies" and continues the play's rhetorical doubling of birth and death, presences and absences (1.3.227). Although less spectral than the witches in *Macbeth*, Helen's relationship to the boundaries at either end of the human lifespan seems nonetheless unstable, unorthodox, and threatening.

After her triumphant resurrection, Helen asks Bertram if he will be hers now that he is "doubly won" (5.3.311). As Kathryn Moncrief points out, "[d]oubling is both 'a multiplication by two' as a pregnancy would be (and as she presents herself), and 'a deceitful or tricky action' as the bed-trick... might be characterized" (38-9). Certainly Helen has won Bertram twice, first through the bargain that she made with the King and secondly through the bargain he sarcastically proposed in his letter. But she has also won him *by* these various acts of doubling. In public she has successfully presented herself as merely a conduit for medical knowledge and divine will despite privately acknowledging her own agency. She has turned one virginity into two. And she has written a "when" into Bertram's "never." In doing so, she has answered the

²⁸ For an in-depth discussion of the ritual function of riddling in another of Shakespeare's comedies, see Phyllis Gorfain, "Riddling as Ritual Remedy in *Measure for Measure*."

rhetorical question she posed to Parolles in the opening scene, about whether there is “any military policy by which virgins might blow up men,” as she has indeed undermined Bertram and blown him up. In this final scene, although all “seems well” for the restoration of normative, reproductive social order that is expected at the close of a comedy, Helen’s reportedly pregnant body presents the solution to all the riddles in the play and also serves as an embodied metaphor for how a riddle works: a sort of doubling, one meaning hidden within another. Double, double, toil and trouble. After having spent the play rhetorically constructing herself as a vessel and instrument, she now appears to manifest that role in a physical sense. Her reportedly pregnant body (whether actually pregnant or not) looms as a testament to her successful appropriation of control over the conditions of both biological and cultural reproduction, and the audience recognizes Helen as the hidden author of the events that have led up to this climax. (I use the word “author” deliberately here, with the intent to invoke its multiple facets of meaning: in the two dozen times the word appears in Shakespeare’s works, it more often indicates agency than literal writing or speaking, and it twice serves as a metaphor for biological parentage.) As in *Macbeth*, this play similarly figures gestation and childbirth as sites and means of upsetting established economies of authority, knowledge, and power.

Following these metaphors onto the early modern stage highlights their broad relevance, and their circulation among diverse audiences. These two plays—one a tragedy that ties unorthodox modes of reproduction and incomplete control of knowledge to the downfall of a king, the other a “problem” comedy where an ironic caricature of a feminine ideal, characterized by completely passive participation in biological and social reproduction, provides cover for a gendered and class-inflected reversal of power—point to broader cultural anxieties about authoritative knowledge that find easy expression in these figures of monstrous, uncontrollable,

threatening reproduction. It is little wonder that such figures bubble up from this particular historical context, amid a milieu of various crises of authority. As we will see in the next chapter, some of these crises will soon culminate in a self-selecting group of wealthy English men “unsexing” Philosophy and declaring themselves to be the bearers of a superior method of producing authoritative natural knowledge, one that is organized around their claims to function best as a pass-through by which purportedly objective truth may bear itself out of darkness into the light of human understanding.

Chapter 3. Foreign Relations

“I see nobody on the road,” said Alice.

“I only wish I had such eyes,” the King remarked in a fretful tone.

“To be able to see Nobody! And at that distance, too! Why, it's as much as I can do to see real people, by this light!”

—Lewis Carroll, *Through the Looking-Glass, and What Alice Found There*

As we have seen, at the beginning of the seventeenth century, anxieties about access to knowledge and control over knowledge production find expression in figures of threatening maternity, hinting at the dangers inherent in exposing knowledge production to the potentially corrupting influence of the wrong sorts of bodies. Longstanding anxieties about “strange intelligence” and about marginalized bodies exercising control over biological and cultural reproduction were written into the foundations of modern science. In light of this, perhaps a better understanding of the rhetorical cargo carried into scientific discourse by reproductive metaphors of authorship that lament the permeability of intellectually “maternal” bodies could help inform our efforts to address the current crisis of scientific illiteracy and mistrust of expertise. This chapter aims to strengthen that understanding by tracing connections that exist among this reproductive logic of authorship, a matrix of gendered assumptions that underlie the language of science, and an array of geopolitical metaphors with which they are often entangled.

The regularity of terms like “citizen science” and “scientific citizenship” underscore the political logic by which both academics and the general public still conceive of regimes of knowledge.²⁹ These terms imply rights and responsibilities associated with access to certain

²⁹ For a discussion of these terms’ application in science communication, see Sarah Davies and Maja Horst, “Scientific Citizenship: The Role of Science Communication in Democracy.”

forms of knowledge about the natural world. The term “scientific community” generally refers in a limited sense to researchers, practitioners, and other professionals involved with the institutional production and application of a narrow array of sciences; the phrase posits and defends a friendly but distinct border between those credentialed professionals and the general public. “Scientific citizenship,” on the other hand, is a plastic term that sometimes extends rights and responsibilities of the scientist to the public—rhetorically, if not practically, democratizing science—and sometimes figures the scientist as a sort of supercitizen of the larger society, encouraging responsible application of their inherently powerful position. It often refers to communications and exchanges (of knowledge, trust, and credit) at the border between the scientific community and the general public, often troubling that boundary as it attempts to invoke it—a logic that also very often obtains in political rhetoric.³⁰ Borrowing the political category of citizenship to imagine a separation between science (as a profession and a practice) and the rest of society serves to justify the institutional priority of defending that border from erasure even while it narrates its intention to reach across it.

The implications of this metaphor and its intimate connection with authority, truth value, and political power can be better understood by tracing the origin of modern science’s culture of citizenship to its roots in the seventeenth century, during the so-called “Scientific Revolution.” This milieu of political and social contexts gave rise to both our modern understanding of citizenship and the institutional reorganization of authority over natural knowledge. During that time, the field that would become the foundation of what we now categorize as the sciences, was writing itself into being as the exclusive arbiter of truth about the natural world – grounded,

³⁰ For more on the implications of social exchanges that happen at the disciplinary boundary imagined between “science” and “non-science,” see Thomas F. Gieran.

ostensibly, in its method, which relied explicitly on observation and experimentation and implicitly on self-selecting investment of credit and authority. This method, modeled upon Francis Bacon's vision of scientific orthopraxy as a way to defeat the "idols" of thought that corrupt learning, gave rise to a modern notion of authority over nature that would end up being crucial for modernity and its increasingly secularized claims about states, sovereignty, and citizenship.³¹ Both rely on invoking an imagined separation between the public and private spheres, producing and reproducing a narrative that valorizes objectivity while investing real authority and power in specific bodies.

This chapter considers two works of seventeenth-century fiction, written by authors of scientific treatises, that focus on voyagers' discoveries of hidden societies and their engagement with the scientific knowledge production happening in each. Both Bacon's *New Atlantis* (1627) and Margaret Cavendish's *The Description of a New World, Called the Blazing World* (1666) narrate border-crossing adventures in which travelers enmesh themselves ritually, tediously, and imperfectly into new worlds. Both present models of organized, methodical inquiry into the natural world; both assign high importance to border control, connecting it intimately with conditions of knowledge production. While Bacon generates an austere and straightforward vision of masculine authority, later so pivotal for science's self-conception, Cavendish raises troubling questions about which bodies can be included in the production of authoritative knowledge and why. These two fictions reveal a tension between disciplinary gatekeeping and the very language of authority that writes this emerging discipline into being. A third text, Thomas Sprat's *History of the Royal Society of London* (1667), serves as an example of how the

³¹ As we will see, Bacon's vision (and his followers' adoption of it) was also explicitly driven in part by the insistence that authority should be wrested *from* the scholastic tradition.

experimental program of science relies, for its own disciplinary rationales and statements of purpose, on some of the same figures and logic that it purports to define itself against. In considering Bacon's and Cavendish's tales alongside their antipodal relationships to the Royal Society, I will focus on the implications of the figuratively reproductive body (and its strategic rhetorical erasure) on the early negotiation and boundary marking of what will come to be called "scientific citizenship." Although these texts offer only a fleeting snapshot of this period of institutional self-fashioning, they confirm that in one sense anxieties about the permanence of narrative marking are well-founded: they showcase examples of a persistent interpretive framework that still influences economies of trust and credit in institutions of knowledge. Indeed, our contemporary scientific community still struggles to overcome these implications as we wrestle with an array of life-or-death challenges that occupy the intersection of scientific knowledge, public authority, and global politics.

Public and Private

To unpack the logic of the term "scientific citizenship," I want to start by identifying some of the assumptions that the citizenship metaphor imports into discourses of science. Hannah Arendt posits a theory of citizenship that relies upon producing and maintaining the spatial and functional separation of public from private. In the public sphere,³² like the idealized conception of the Athenian *polis*, citizens interact and exchange ideas; the public represents a

³² Jürgen Habermas introduced this term into scholarly discourse with *The Structural Transformation of the Public Sphere*. His work generated substantial debates, especially among critics informed by feminist theory, such as Nancy Fraser; see, for example, Craig Calhoun, *Habermas and the Public Sphere*; Seyla Benhabib, "The Embattled Public Sphere." Julia Reinhard Lupton responds to Habermas and to some of these debates in *Citizen-Saints*, a literary study of citizenship that focuses on what she calls "generative scenes of civic invention" in Shakespeare's plays.

conceptual and literal space for discourse, a constructed “space of appearance” where people come together, recognize each other, and through reason make responsible joint decisions (198). The public sphere permits and encourages plurality, because it functions as a space where people can represent themselves to each other as individuals, irrespective of the social categories of identity that they inhabit by virtue of their bodies. This distinction structures the concept of citizenship that figures of political community rhetorically extend to disciplines of science. Distinct from other categories of political identification and belonging, “citizenship” generally implies reciprocity of duty that infuses rights with responsibilities—expectations as well as privileges, often viewed as mutually constitutive. In the Global Citizenship Observatory’s definition, citizenship confers both “rights and duties” and is both “a legal status and relation”—which is sometimes idealized as a way of being, an attitude, and an ethos, while at the same time it is policed as a received/assigned condition. Citizens are distinct from subjects in this way, and the status benefits from the term’s connotation of merit, which is to say that citizenship is imagined as a set of ideal behaviors as well as an assigned or otherwise passive condition. The status implies, and often requires, relational duties.

For all of these reasons, citizenship is implicitly bound up with policing borders and with categorizing bodies. The category of citizenship relies on imagining the body as a repository of the essential quality of belonging. This is evident in policies surrounding citizenship through descent, or *jus sanguinis* (“right of blood”), and birthright citizenship, *jus soli* (“right of soil”). The notion of “naturalized citizens” reveals the extent to which both forms of citizenship are imagined as organic states of being rather than artificial, rhetorically authorized conditions; implying that the body holds a “natural” citizenship obscures the agency involved in establishing this condition. And yet citizenship clearly also denotes a *relation* between the private body and

some external public which can determine its membership. Some boundary, in other words, must precede the authority that is required to adjudicate a person's relationship to it. Since authority to define inside/outside must come from inside, this rationale often makes use of an origin story—a history that establishes the founding condition or event from which the governing body derives authority to delimit citizenship. Sometimes such a story grounds its argument in present leaders' connections to previous leaders (either following them or defying them); other times the rationale follows from supposedly wise and/or valiant *acts*; and often a claim to religious designation serves to establish or to buttress a personal or dynastic claim. However arbitrary geographic political boundaries may be, an origin myth³³ often provides a guiding rationale, a narrative of how and why the current conditions of authority over inclusion and exclusion are right and natural. Heritage, heroism, or divine prerogative: there is always an Excalibur.

Disciplines of knowledge production must also be constituted by imagined boundaries, which undergo policing much as state borders do. Geopolitical metaphors are commonplace in intellectual histories; Michel Foucault and Bruno Latour, for example, organize their critiques around figuring disciplines as “regimes” and “fiefdoms” and other political power centers, stressing the extent to which scientific discourse reproduces these structures and relies on narrative to justify (often-concealed) practices of inclusion and exclusion (Foucault 133; Latour 8). As Lorraine Daston and Peter Galison put it, “As long as knowledge posits a knower, and the knower is seen as a potential help or hindrance to the acquisition of the knowledge, the self of the knower will be at epistemological issue” (40). In other words, the limiting conditions of “objectivity” (and by extension, one's imagined fitness to practice scientific citizenship) remain

³³ I am applying the idea of origin myths as Mircea Eliade conceives of them, in terms of their social function as primarily a way to account for, naturalize, and make sense of present conditions.

tied to the body and its relationship to inherently political boundaries. But while the body has long served both as a physical space and as an imagined entity that posits a boundary between private and public in political and scientific discourses, feminist critics have revealed this boundary to be constructed and unstable,³⁴ a division historically and conceptually reinforcing a gendered hierarchy of power that later served to reconcile Enlightenment ideals of individual liberty with the realities of social difference and hegemony.

Scholars agree that early narrative fiction was often invested in naturalizing the illusion of a clear and stable boundary between public and private. Elizabeth Maddock Dillon, for example, has shown how eighteenth-century fiction served as public reasoning documents, which circulated within an ostensibly disembodied “public” space while depicting the “private” realm on the page, discursively reproducing and naturalizing the split between public and private. A similar naturalization of a boundary between public and private, I argue, begins to structure even earlier fictional explorations of scientific praxis, shaping ideas about the forms and methods of knowledge production that we will come to call “science.” The “scientific community” still depends on practices rooted in the so-called “Scientific Revolution,” the sea change in practices of knowledge production that culminated in the calving of “science” from other forms of inquiry in the seventeenth century. Yet modern science’s origin myth takes an overtly gendered view of the mind and its products, one that is predicated on an imagined divide

³⁴ There is a wealth of scholarship that participates in this conversation: see, for example, Nancy Fraser, “Rethinking the Public Sphere”; Joan Wallach Scott’s landmark *Gender and the Politics of History*, which argues that the relegation of women to a feminized domestic sphere, separate from the political, is a tool of subordination; Catharine McKinnon, *Feminism Unmodified* explores gender, the body, civil rights, and the law; *Feminism, the Public and the Private*, edited by Joan Landes, offers feminist critiques from a variety of disciplines; *Languages and Publics*, edited by Susan Gal and Kathryn Ann Woolard, examines “the public” as a “language-based form of political legitimation” that is connected to the construction of authority (4).

between personal understanding and a shared public knowledge constructed by consensus (among qualified people). It relies on the naturalized hierarchy already imposed upon gender to elevate some bodies, and therefore some perspectives, above others. Although exclusion frequently gets rationalized by invoking some other factor, the history of the academy includes countless examples of how the body often forecloses belonging. Juxtaposing fictional narrative by Bacon and Cavendish foregrounds this naturalization and its fault-lines: Bacon, the imputed “father” of empiricism, imagines the abstraction of pure unmediated reasoning, while the marginalized Cavendish, as we will see, engages with the myriad ways in which some bodies must be excluded in order to sustain that fantasy.

The Royal Society: Citizens of a Public Science

In seventeenth-century England, The Royal Society of London, modeled on Bacon’s prescriptions, sought to claim for a self-selecting group of wealthy, well-connected men authority over natural knowledge.³⁵ Although its membership was closed, its ends were explicitly oriented toward the establishment of a shared understanding of nature that would transcend its own discursive community, in line with what Marlene Eberhart, Amy Scott, and Paul Yachnin describe as the “future-oriented” nature of publics in the early modern period (2). In what Eve Keller refers to as their institutional “myth of origins,” Sprat, a Fellow of the Society, writes a fawning history, apology, and virtual hagiography in language that vigorously and sometimes defensively argues for both the indispensability of the Society’s founding and the natural fitness of its members to serve as arbiters of such authority and to oversee what he calls “a design so

³⁵ For a thorough analysis of the connection between the institutional aims of the Royal Society and the historically specific priorities of the English upper class in connection with the Restoration, see P.B. Wood.

public, and so free from all suspicion of mean, or private Interest” (Keller, “Producing Petty Gods” 447; Sprat 434). The urgent need to mark this line by establishing an exclusive organization under royal decree, and to promote it in this way, suggests that this boundary and the authority it conferred were not otherwise extant. In fact, there was considerable skepticism, even among their learned peers, about the Society’s program. Proponents of experimental philosophy strove to distinguish it from other kinds of inquiry specifically by virtue of its methodological difference: Bacon’s model promised to correct what he referred to as “idols” of thought: the perverting influences of bodies (both individual and institutional, as we will see) and minds on the study of nature. They promoted experimental methods as a way to produce knowledge uncorrupted by subjectivity: in this vision, a practitioner was not the source of knowledge but rather a witness to the experiment’s trial of nature. The knowledge was disembodied, separate from the subject—public reason operating independently of the private body that offers, as Steven Shapin puts it, a “disengaged and nonproprietary presentation of authorial self” (*Social History of Truth* 179).

Claiming authority as a purportedly objective witness, however, requires creditability, some pre-existing belonging. The Royal Society grew out of an “invisible college” of natural philosophers who were already gathering before the official establishment of the Society (“History”). The term suggests an implied but “invisible” boundary around an established culture of citizenship,³⁶ which eventually became formalized—not only visible but sanctioned by the King and populated entirely through election, creating a closed pipeline controlled by current members. Envisioning the early Royal Society as a culture of citizenship reveals that its explicit

³⁶The very definition of the word “college”—“An organized society of persons performing certain common functions and possessing special rights and privileges”—carries the same connotations as citizenship (OED).

and implicit conditions of inclusion center the body in determining belonging. In his *History of the Royal Society*, Sprat makes an argument for the qualifications of Society members based on what he lauds as a kind of diversity—that they admit “Men of all religions” and “Of all Countries” and “Of all Professions” (64-65). However, other parts of the *History* reveal that there are considerable qualifications to these categories: he had earlier called for “all civil Nations” to join arms against the “common Enemy of Christendom” (57). Later language confirms that by “all religions” he means only sects of Christianity, and by “all Countries” he means only those nations that he deems “civil”; he further clarifies the location of that boundary: “there is little civility at present amongst men without the Pale of the Christian Church” (372). He follows this section with one entitled, “It consists chiefly of Gentlemen,” which takes for granted, essentially, that rich men are inherently virtuous and furthermore that wealth inoculates *against* corruption. According to Sprat, the Society ought to include only “such men, who, by the freedom of their education, the plenty of their estates, and the usual generosity of Noble Bloud, may be well suppos’d to be most averse from such sordid considerations” as personal economic interest (67).

Social standing, as a result, was a crucial factor in the Society’s evaluation of truth claims.³⁷ Sprat rationalizes this by arguing here that containing authority within this group³⁸—because it is made up primarily of men from certain bloodlines who have inherited wealth—solves the otherwise insurmountable problem of corruption in knowledge production. He explains that wealthy men are “free, and unconfin’d,” which he says protects against

³⁷ See, for example, Peter Dear, “*Totius in verba*”; Roger Chartier, “Foucault’s Chiasmus”; Shapin and Schaffer, *Leviathan and the Air Pump*, esp. Ch. 2, “Seeing and Believing.”

³⁸ For an examination of how the Royal Society evaluated reports from *outsiders*, including travel narratives and cases where only a secondhand report was available, see Barbara J. Shapiro, *A Culture of Fact: England 1550-1720*, esp. Ch. 3, “Discourses of Fact,” and Ch. 5-6, “The Facts of Nature [I and II].”

“corruptions” such as individual profit motive or an investment in already-existing institutional hierarchies (67). Following the logic of Elgin Isin’s theorization of *acts of citizenship*, this suggests that the Society’s founders were determined to “call established forms of responsabilization into question” and replace scholastic authority with their own form of gatekeeping (37). It was important to tether the logic of this gatekeeping to characteristics of the individual rather than to method, because, as Deborah Harkness and Pamela Smith have shown, the work of science largely developed out of practices of observation and craft already commonplace in the everyday lives of citizens. And as Harkness reminds us, “men and women of all nationalities engaged in the work of science, medicine, and technology” in Elizabethan London, their labor and expertise making possible the achievements touted by the virtuosi (9). Inclusion and authority did not follow naturally from this labor and expertise: the Society’s exclusion of women as Fellows was a given,³⁹ and Sprat takes no pains to offer an explanation or apology for it. By the time “notorious boundary-crosser” Margaret Cavendish—already a prolific natural philosopher in her own right—became the first woman to attend a meeting in 1667, she was crossing a well-defended border as an acknowledged outsider (Marchitello and Tribble xxxiv). The “indisposition of [her] body” rendered her alien even to an emerging field being defined by its attempt to separate authority over knowledge production from the body of the practitioner (Cavendish, *Observations* 249).

Their rationale for exclusion seems to center the qualities connected to one’s imagined fitness for participating in the public sphere, underscoring the importance of that division to the Society’s gatekeeping. Sprat says that the founders “labor’d to inlarge [the knowledge of Nature], from being confin’d to the custody of a few; or from servitude to private interests” (61). He pits

³⁹ The Royal Society did not admit any women Fellows until 1945.

private against public explicitly in describing the impact of the Protestant Reformation on textual archives, depicting it as a key turning point in an intellectual history that led naturally and properly to men like the Fellows of Society taking control of knowledge:

The First thing that was undertaken, was to rescue the excellent works of former *Writers* from obscurity. To the better performing of this, many things contributed about that time. Amongst which... the dissolution of *Abbyes*: whereby their Libraries came forth into the light, and fell into industrious Mens hands, who understood how to make more use of them, then their slothfull possessors had done. (23)

Sprat's language obscures agency: he begins with passive voice, then has an unnamed entity "rescue" texts, before shifting agency to the knowledge itself and finally to forces of nature—the libraries "came forth" and then "fell" into the right hands. Both the texts and nature itself seem to be choosing sides rather than being acted upon. He goes on to credit the "men of admirable Diligence" who then explicated and commented upon the texts in these archives, which he says will be "wonderfully advantageous to us, if the right use be made of them: [...] if they be imploy'd" (24). This characterizes the extraction of knowledge from scholastics' cloistered spaces not in terms of a democratization of that knowledge but rather as a process by which "industrious" men claimed control over resources in order to "make more use" of them than their animal-like former stewards. It echoes Bacon, who had criticized the scholastics as "learned, but idle and indolent, men" (*Novum Organum* 1.XCVIII). This romantic fable positions scholastics as private hoarders of knowledge and the Society as magnanimous conveyors of that knowledge out into a well-lit public square—but, given that the Society's membership was also closed and

its criteria for imprimatur somewhat inscrutable,⁴⁰ this proffered stewardship of “rescued” archives is more an appropriating move than a democratizing one, and so it is unsurprising that this language’s focus on the priority of utility and extraction, as we will revisit in the next chapter, rehashes the period’s many rhetorical rationales for the violent colonial project.⁴¹

Empires of Knowledge

Much of Sprat’s language, in fact, follows Bacon’s lead in mapping the processes and priorities of knowledge production onto those of empire building. Bacon names as the primary objective of his utopian scientific enterprise the “Enlarging of the bounds of Humane Empire” (291). Sprat seems to regard it in these same terms; in making a point about abstract learning versus knowledge with practical [economic] value, he hopes that scholars would not “prefer the Gold of Ophir, of which now there is no mention, but in Books, before the present Mountains of the West-Indies” (24-25). He again invokes colonial exploitation to make a related point about the conditions and creditability of knowledge production when he defends “those who dig in the Mine of Nature” from the presumption that such work relegates them to “as bad a condition as the King of Spains slaves in Peru” (27). This extractive metaphor, knowledge production as resource extraction, offers context for his earlier characterization of the “rescue” of knowledge from the scholars he deemed to be putting it to too little “use”: Sprat agrees that it does not serve for nature’s treasures to be endlessly dug out and sit idle (in temples, or abbeys) but rather the

⁴⁰ See Noah Moxham, “The Uses of Licensing.” For an analysis of how these practices laid the foundations for ongoing practices of scientific knowledge production, see also Moxham and Aileen Fyfe, “The Royal Society and the Prehistory of Peer Review.”

⁴¹ For a useful overview of the vast overlap in both the rhetoric and politics of early modern science with those of empire, see James Delbourgo and Nicholas Dew, eds., *Science and Empire in the Atlantic World*. Their introduction to the collection engages specifically with the language of Bacon’s *New Atlantis* to illustrate how these projects and their discourses were entangled.

endeavor must be made “answerable to the practical ends of Life” (27). The passage also reveals how methods and processes are imbricated with assumptions about the body and its imagined fitness to practice them. The next chapter will explore a related example of how the shared language of these two discourses of discovery relies on an explicitly gendered framework of power, but here it is worthwhile to note how the Society applies some of the same logic that structures colonial narratives to the “discovery” of natural knowledge, expressing confidence that if properly managed and controlled (by the right sort of people) and made to render up its secret treasures, it will prove extraordinarily fruitful (to the right sort of people).

This separation and hierarchy of domination is central to the analogy. Sprat characterizes the Society’s project as a philosophical “war” against the “barbarous Foes” of “*Ignorance*, and *False Opinions*” that is parallel to the holy war “against the common Enemy of *Christendom*”: he hopes to see “all civil Nations joyning their *Armies* against the one, and their *Reason* against the other” (57). He argues that the Society has turned knowledge of Nature into “an Instrument, whereby Mankind may obtain a Dominion over *Things*,” and advises that stewards of such knowledge “ought to have their eyes in all parts, and to receive information from every quarter of the earth; they ought to have a constant universall intelligence: all discoveries should be brought to them: the Treasuries of all former times should be laid open before them” (20). He advises taking as a model Pythagoras, Plato, and Aristotle, who, “[w]hen they travell’d into the East, collected what was fit for their purpose, and [...] brought home some of their useful Secrets” (49-50). Sprat further notes that in the days of the Holy Roman Empire’s expansion, “when Christianity began to spread into the farthest Nations,” the Empire thought it necessary “for its increase,” that its negotiators master the arts of rhetoric and argument “which were then in use, among the Hethen philosophers,” and he maintains that their ability to “speak plainer

about the Divine Nature” explains how they “easily got the victory” over those opponents, managing in this way to convince them “of the ridiculousness of their worships, and of the purity, and reasonableness of ours” (10). Sprat thus seems to acknowledge openly that regimes of knowledge are structured like political regimes, and that for the most part they pursue and achieve authority and influence (and profit) in the same ways.

If I can indulge in a brief callback to the previous chapter, it is interesting to consider Sprat’s analysis here—and much of the *History*’s language of conquest and the purging of old regimes—next to Bede’s story of the conversion of Edwin, which is a narrative of one of those “easily got” victories over “Hethen” philosophy to which Sprat refers. In Bede, the Northumbrian king Edwin asks his counselors (some of whom are priests) for their thoughts on the Gregorian missionary Paulinus’s pitch. As we saw earlier, one nobleman advises converting in order to have the comfort of an afterlife narrative, but the chief priest Coifi offers a very different rationale for supporting conversion: he argues, essentially, that he has already perceived, “this long time,” that the gods he serves must be false because although he treats them better than anyone else, he has seen “no profit” from it (129). He tells Edwin, “none of your people has been more devoted to the service of our gods than myself; yet there are many to whom you show greater favour, who receive greater honours [...] If the gods had any power, they would surely have favoured myself, who have been more zealous in their service” (129). If he has long perceived this, why then does the revelation only coincide with Paulinus’s presentation of a fully formed competing regime of knowledge? Coifi’s next move offers a clue to this timing: he appoints himself to destroy the holy temples and their idols, and to accomplish this task he requests two things that had been heretofore denied him as a priest of the old

religion: a male horse with intact genitalia, and weaponry.⁴² He mounts the king's own stallion and symbolically kills the old gods by penetrating their temple with the spear, thus securing his hold over the same level of religious authority within the new hierarchy—the one in which he is allowed a stallion and a spear—as he had enjoyed before. Meet the new boss, same as the old boss. Compare this with the figure of a monster-slaying Francis Bacon that Abraham Cowley draws as the hero of a fanciful romantic allegory in his dedicatory poem to Sprat's *History of the Royal Society*:

*Autority, which did a Body boast,
Though 'twas but Air condens'd, and stalk'd about,
Like some old Giants more Gigantic Ghost,
To terrifie the Learned Rout
With the plain Magique of tru Reasons Light,
He chac'd out of our fight,
Nor suffer'd Living Men to be misled
By the vain shadows of the Dead:
To Graves, from whence it rose, the conquer'd Phantome fled;
He broke that Monstrous God which stood
In midst of th' Orchard, and the whole did claim,
Which with a useless Sith of Wood,
And something else not worth a name,
(Both vast for shew, yet neither fit*

⁴² Bede specifies that this was a firm prohibition: “hitherto it had not been lawful for the Chief Priest to carry arms or to ride anything but a mare” (130).

*Or to Defend, or to Beget;
Ridiculous and senceless Terrors!) made
Children and superstitious Men afraid.
The Orchard's open now, and free;
Bacon has broke that Scar-crow Deitie;
Come, enter, all that will,
Behold the rip'ned Fruit, come gather now your Fill. (xiv-xv)*

It is telling that in Cowley's allegory, in which Bacon destroys actual "idols," only one turns out to be a clear personification of the language ("Air condens'd") of authority, which takes the form of a monstrous body that is neither fully spectral nor fully corporeal. The other is a statue of Priapus,⁴³ god of horticulture, male genitals, and fertility, whose enormous phallus is only "for shew," not "fit [...] to Beget." In this new version of the old fable, the identity-marking genitalia and tool are transferred to the idol, and the destroyer-liberator conquers the boundary-violating dead with "the plain Magique of tru Reasons Light" rather than a penetrative weapon. I will come back to the genital-obsessed grounds for religious authority in the next chapter, but it's important to recognize here how the logic of invasion, conquest, and usurpation of authority shapes the Society's mythmaking. The boundary around the orchard of knowledge is policed by these monstrous bodies until Bacon's magical light vanquishes them by force. In their respective works, Bacon and the Society share a conception of scientific inquiry as something akin to imperial conquest (with its only somewhat more obliquely figurative genitals), and this in turn informs their explicit gendering of prescribed methods of knowledge production.

⁴³ For more on the implications of this allusion, see Charles Butler, "The Stagirite and the Scarecrow."

A Masculine Philosophy

The priorities for this new method of inquiry, and its implicit restriction to an aristocratic, masculine authority, first receive their iconic articulation from Bacon in his philosophical works. In *Novum Organum*, Bacon puts forth a blueprint for reworking the methods of natural philosophy, which he characterizes as aiming to extract truth from matter in order to reclaim mankind's domination over nature. Sprat's *History* celebrates the experimental method as a corrective for specific defects of thought, the "idols" that Bacon enumerates in *Novum Organum*. Bacon's program of experimental philosophy was an explicitly masculinist one,⁴⁴ and one project of the Royal Society was to make that gendered separation key to what its members saw as a productive and socially beneficial hegemony over the production of natural knowledge. In the first sentence of *Novum Organum*, Bacon identifies its objective: "that a quite different way must be opened up for the human intellect [...] so that the mind may exercise its right over nature" (6). He goes on to reveal that theology serves as his grounds for positing such a right, citing the "pure and immaculate natural knowledge by which Adam assigned appropriate names to things," and refers back several times to this interpretive role (12). Throughout the text nature, traditionally gendered female, functions as matter upon which this new "logic" must be imposed, so as to form it into something useful (a structure that the next chapter of this dissertation will further unpack). The reproductive logic of authorship that the previous chapters have established

⁴⁴ For analyses of how pre-existing ideologies of gender inflect Bacon's language, see especially Evelyn Fox Keller, "Baconian Science: The Arts of Mastery and Obedience" in *Reflections on Gender and Science*; Carolyn Merchant, *The Death of Nature*; Sandra Harding, "Natural Resources" in *The Science Question in Feminism*. For further historicization of those ideologies and how they affected attitudes and behavior toward women in early science, see also Londa Schiebinger, *The Mind Has No Sex?*; for a look at the impact of early modern "self-fashioning," especially the selective repression of ascribed-feminine qualities, on Bacon's gendering of the mind, see Jan Golinski, "The Care of the Self and the Masculine Birth of Science."

helps make sense of this de-feminization of knowledge production: a mind that is behaving as a womb cannot “exercise” an overtly masculine-coded “right over nature.” Sprat echoes Bacon in articulating the Society’s goal of making natural knowledge an “Instrument, whereby Mankind may obtain a Dominion over Things” (62). He also makes explicit the Royal Society’s investments in masculinizing philosophy. Argumentation, Sprat argues, can “strengthen [...] and give a good, sound, masculine colour, to the whole masse of knowledge,” but experimentation is also required to “nourish, and increase” and “give new Blood, and flesh” to the “solid substance of science itself” (19). Its dedicatory poem muses that the personified Philosophy, gendered “she” in the classical tradition, ought to be “he” (Cowley xi), and it defines not only its processes but also its intellectual products as “masculine” in opposition to the “feminine” mode of poetry: “[A]s the feminine arts of pleasure, and gallantry have spread some of our neighbouring languages ... so the English tongue may also in time be more enlarged, by being the instrument of conveying to the world, the masculine arts of knowledge” (Sprat 129). Unlike “feminine” language that presumes to invent or create, their masculine-coded language simply “conveys.” The implicit claim of experimental philosophy, then, is that nature is telling its own story and that men—and their “masculine” methods—serve to reflect that narrative unmediated, uncorrupted, into the world; in this way, the role that their body plays in the narrative’s construction is rendered invisible.

In his utopian fable *New Atlantis*, Bacon makes this rhetorical erasure of subjectivity into one of the defining characteristics of Bensalem, where he will imagine a society built around his principles and practices of knowledge production. Bensalem, explains the narrator, is “knowne to few, and yet knew most of the Nations of the World,” situated in a “secret Conclave of a vast Sea,” where it is hidden from the sight and knowledge of other nations (272). The islanders

strictly enforce their entry policies with the narrator's company of travelers, first keeping them cloistered indoors and thereafter giving them freedom to roam only within a tightly controlled distance from the Strangers' House where they are lodged. The islanders explain that they prioritize "preserving the good which commeth by communicating with Strangers, and avoyding the Hurt" (280). They maintain strict secrecy measures when interacting with foreigners abroad or on their own shores, even obscuring their national identity when traveling, and they employ an armed patrol to guard their borders and control entry. At the same time, the islanders also tell of their own regular explorations overseas, through which they maintain the power advantage gained by the island's hiddenness: "We have Twelve that Sayle into Forraine Countries, under the Names of other Nations, (for our owne wee conceal); Who bring us the Bookes, and Abstracts, and Patternes of Experiments of all other Parts" (297). They send out explorers to report back "Knowledge of the Affaires and State of those Countries... And especially of the Sciences, Arts, Manufactures, and Inventions of all the World" (281). The narrator wonders at this asymmetrical invisibility, which does not seem humanly possible: "it seemed to us a conditioner and Proprietie of Divine Powers and Beings, to be hidden and unseene to others, and yet to have others open, and as in a light to them" (275). This aspect of Bensalem's stated project—no less than "finding out of the true Nature of all Things"—is essential to understanding Bacon's vision of an intellectually responsible praxis for producing natural knowledge; it also underscores the extent to which the story tacitly acknowledges the intimate connection between knowledge and political power (281).

In the apparent climax of the tale, the group elects the narrator to receive a private audience with one of the "Fathers" of Salomon's House, the pride of Bensalem, a learned (patriarchal) Society that would directly inspire the founders of the Royal Society. One Father

regales the narrator with a “Relation of the true State of Salomon’s House”: structured in an order that seems to anticipate what would become the template for a scientific paper, it includes an abstract, the “End of our Foundation,” the “Preparations and Instruments wee have for our Workes,” the “severall Employments and Functions whereto our Fellowes are assigned,” and finally the “Ordinances and Rites which wee observe” (290). The Father enumerates these elements—introduction, materials, methods, references—at length; there are over 100 sentences that begin “we have” or “we make” (“we” being the Fathers), detailing the resources, instruments, and labor that Salomon’s House employs in its project of extracting knowledge from nature. Interestingly, the narrator witnesses none of this himself: all of the knowledge of Salomon’s House derives from the relation he hears in private after his group elects him to serve as witness.

Reproducing Knowledge

Bensalem’s careful attention to controlling narratives and dissemination of knowledge echoes the commitments to the masculinized system that Bacon sets forth in *Novum Organum*. He admonishes experimental philosophers to avoid false “idols” of thought which arise in part from the “mode of impression” (40). As the first chapter discussed, his aphorisms on these idols betray a deep mistrust of the role of language in knowledge production: he bemoans that words are unstable vessels of meaning, and especially the way they can “impress” potentially contagious marks of subjectivity upon ideas. As we have seen, maternal impression is figured as an act of inscription—an analogue of authorship that gives form to what is *inside* the body and then puts it *outside* into the public sphere—and reproductive metaphors of authorship are freighted with this potential threat. Bacon’s aphorisms, and later the Royal Society’s origin story,

stress the importance of pivoting to a more “masculine” (and therefore uncorrupting) method of conveying knowledge out into the light of public knowledge. Just as the Society excluded women from participating in the activities that conferred imprimatur, so writers like Bacon and Sprat took care to exclude “feminine” language that threatened to link their intellectual methods with figurative maternity.

As we saw, in discourses of the “new science” in seventeenth-century England, experimental philosophers were invested in making their subjectivity invisible, or at least transparent, to the receiving public. They claimed authority in part by purporting to transmit nature’s own narrative unmodified, uncorrupted by generative language and by the private, embodied individual. Still, their anxieties about authoritative knowledge often surface in metaphors of reproduction, not only because both deal with bringing what is “inside” the body “out” but also because both threaten to pass on undesirable traits—errors or defects—by impressing them into new bodies or minds, thus carrying patterns of deformity forward through time. It’s not surprising, then, that prescriptions for preventing monstrosity by controlling “impression” pervade the discourses surrounding both the production of knowledge and the production of bodies. Such metaphors alternately structure and challenge both Bacon’s practical advice to natural philosophers and his work of fiction: echoing the above advice to pregnant women, he insists on the need to “fortify” one’s mind against corruption to keep the mind “clear” (40). He also signals general concerns about potentially monstrous generativity, which Sprat later repeats. Salomon’s House demands “pure” descriptions of nature, absolutely disallowing, “under paine of Ignominy and Fines,” any portrayal that is “Adorned or Swelling” or bears any “Affectation of Strangenesse” (297). According to Sprat, the Royal Society maintains “primitive purity” in its descriptions, with a “mathematical plainness” and a “close, naked, natural way of

speaking” without “swellings of style” (113). They share a horror of the “swelling” and figurative generativity that they associate with impurity—and with the language of the so-called feminine arts.

A similarly gestational logic structures the way the travelers in *New Atlantis* receive knowledge about Bensalem—gradually, and on a strictly regimented time scale. When the sailors wash up on the shores of Bensalem, the islanders prescribe several distinct stages of concealment and confinement that the travelers must follow before entering and being received into the public spaces of the island’s community. As we saw earlier, this economy of time strongly recalls Pseudo-Aristotle’s timeline of fetal development, the “forming of the child in the womb of its mother” (49). Bacon’s narrator characterizes the travelers’ situation during this waiting period as a space “betweene Death and Life; For we are beyond, both the Old World and the New,” a figuratively gestational liminality overlaid with a geopolitical framework (270). This implicitly gestational spatial logic and temporality structures the strictly controlled conditions under which they (and we) gain access to Bensalem’s public square—and eventually gain access to the relation of the inner workings of Salomon’s House, Bacon’s utopian vision of an ideal regime of knowledge production.

A reproductive framework for understanding knowledge production thus shapes the logic of Bacon’s vision. It is significant that the gendered nature of this division resonates with the gendering of public and private spheres, especially when considering the question of what is citizenship-like about “scientific citizenship.” In their 1985 book *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life*, historians of science Steven Shapin and Simon Schaffer argue that the Royal Society constructed a new understanding of scientific knowledge by creating a new *social technology* for evaluating knowledge claims, one which would appear

to operate as a sort of public square along the lines of Arendt's model, and a new *literary technology* by which the attendant witnesses disseminate their narrative. They point out that the experimental method, now naturalized and widely regarded as *the* scientific method, had to be striven for, argued for, and defended from criticism.

Feminist science studies scholarship has shown that the “objectivity” at its center also had to be constructed and naturalized, and that myths of gender provided a foundation. In *Modest_Witness@Second_Millennium.FemaleMan_Meets_OncoMouse*, Donna Haraway deconstructs the “modest witness” figure at the center of the Baconian ideals of the Royal Society, calling attention to the subject position that makes it possible. She points out that the mode of pass-through witnessing that rendered scientific knowledge “objective” was only possible for a narrow subset of people—white, male, upper-class gentlemen—and she suggests that Shapin and Schaffer's account of the Society's methods can be augmented by more thoroughly unpacking the implications of subject position (including gender, race, class, and national origin) on the construction of authoritative knowledge in seventeenth-century experimental science.⁴⁵ Certainly these categories come in and out of view in Sprat's *History*: for example, he emphasizes the importance of elevating “experiences” over “imagination,” right after laying out an argument for excluding most people from access to those experiences based on elements of their social identity (117). As Haraway points out, it was precisely these embodied categories of identity that allowed some men's subjectivity to be obscured, thereby producing the authority that we call objectivity.

⁴⁵ Here again it is instructive to consider recent scholarship that seeks to recover the myriad contributions of invisibilized participants who have been excluded from historical narratives of knowledge production. See for example, Harkness, *The Jewel House*; Julie Crawford, *Mediatatrix*; Michelle DiMeo, “Authorships and Medical Networks” and ““Such a sister became such a brother””; Carol Pal, *Republic of Women*; Elaine Leong, “Collecting Knowledge for the Family.”

A View From Somewhere

Enter Margaret Cavendish. The Duchess of Newcastle was an enthusiastic autodidact keenly interested in natural philosophy. As a royalist, her situation during and following the English Civil War and Interregnum heavily influenced the attitudes toward political power and authority that both her fictional and philosophical writings reveal. After returning to England upon the Restoration of the monarchy in 1660, Cavendish published (among other texts) *Philosophical and Physical Opinions* (1663), *Philosophical Letters* (1664), and an expansive critical commentary on experimental theory and practice titled *Observations upon Experimental Philosophy* (1666), which was printed together with a short novel entitled *The Description of a New World, Called the Blazing World*, a work of fancy/fiction that served as a companion piece to the serious treatise. Bound together, these sibling texts represent a gendered dyad, stereotypically masculine and feminine modes of delivering similar central arguments. Like Bacon's *New Atlantis*, Cavendish's *Blazing World* is preoccupied with discourses of natural knowledge and with how authority obtains both through relations among people across borders and through relations of knowledge, history, and intelligence.⁴⁶ Both feature travel narratives with utopian elements, both follow the adventures of strangers in a previously unknown land, and each explores a society centered upon the production of knowledge about the natural world—but Cavendish's *Blazing World* responds from a self-consciously outsider perspective not only to Bacon's work but to many of the prominent figures and practices of the new experimental methods of natural philosophy.

⁴⁶ For this multilayered understanding of the term “relation” I am indebted to Frances E. Dolan, whose 2013 book *True Relations: Reading, Literature, and Evidence in Seventeenth-Century England* takes up various connotations of the word—narration, reporting, association, connecting and being connected – to explore how both writers and readers invest texts with meaning, as well as the role that social relations play in constructing truth.

From the outset, *The Blazing World* unfolds its complex relationship with storytelling, gender, and political boundaries. The story opens with a border-crossing and the implications of being an outsider: “A Merchant travelling into a forreign Country, fell extreemly in Love with a young Lady; but being a stranger in that Nation, and beneath her in both Birth and Wealth, he could have but little hopes of obtaining his desire” (154). Rather than a first-person relation with the narrator purporting to tell his own story, as in *New Atlantis*, Cavendish gives us a third-person omniscient narrator, adding a degree of removal between the events and the reader. The first persona that the narrator mentions is the merchant: we hear about his identity, his desires, his companions, his intentions, his enumerated resources, his plans, and the obstacles in his path. It appears to be his story—until a few pages later when, after abducting the young lady and sailing off with her, he dies of exposure and abruptly exits the tale. It turns out that this is not his story at all; it is hers. While the polar cold kills everyone else on board, the lady survives “by the light of her Beauty, the heat of her Youth”—the same qualities that had incited her kidnapping (162). After drifting through a small portal that connects the poles of her world and the Blazing World, she encounters a group of Bear-Men, who lift her from the boat and convey her a great distance to the palace, where the Emperor, also taken with her beauty, marries her and grants her absolute power over the Blazing World. To this point she has exhibited no agency at all; her passivity is exaggerated, and her body’s status as an object of men’s desire—rather than her own subjectivity or intention—moves the story along until she transforms instantaneously from cargo to absolute dictator without ever being simply a participant.

After achieving political power through the only means available to her, marriage, the newly-appointed Empress sets her sights on knowledge, expressing her desire “to be informed” (163). Her first act is to establish schools and societies, encouraging her subjects—various races

of man-animal hybrids—to engage in academic occupations according to their “nature” (163). Physical characteristics and inclinations predispose each body type to a particular kind of work, and so each race follows a prescribed profession. She solicits briefings on their religion and politics—like Bensalem, the people of the Blazing World are enthusiastic monotheists, monarchists, and patriarchists—and she commands “true relation[s]” of natural phenomena, synthesizing and adjudicating the diverse perspectives that the various “Vertuoso’s” provide (165). This model depicts knowledge-making as discursive, situated, and relational, while also highlighting the role of political power in producing authority over truth claims.

The story portrays the dissemination of knowledge as similarly fraught. When the Empress feels she’s discovered (read: decided) enough about the natural world, she resolves to publish a book of knowledge and asks the body-less spirits that live in the Blazing World to find her a learned scribe. When she suggests a series of celebrated philosophers—Newton, Helmont, Descartes, etc.—as candidates, the spirits remind the Empress that these men would never agree to record a woman’s knowledge, and they instead nominate the Duchess of Newcastle (Cavendish’s mostly-autobiographical avatar—for clarity, I will continue to refer to the author as Cavendish and will reference the character as the Duchess). Ian Lawson suggests that *The Blazing World* is “typical of early modern travel narratives in that it has a ‘frame world’—the Empress’s home world—and a story world—the world to which she travels” (477). However, if one counts the Duchess’s separate world as implied frame, and Cavendish’s claim in the Afterword to be “Empress [and] Authoress of the Worlds I have made, both the Blazing- and the other Philosophical World,” the story is decidedly atypical in terms of the number, and arrangement, of frames (250). Far from erasing the authorial function of narrative-making, Cavendish writes herself into the story as a border-crossing, fourth-wall-breaking character who

travels between her own world and the Blazing World to serve as the protagonist's scribe, best friend, and sidekick. The two begin a sprawling series of negotiations and adventures that lead them in and out of various social and political situations, culminating in an invasion of the Duchess's world (using submarines for stealth), where the Empress burns cities to the ground in order to install ESFI—a nod to Charles II's kingdom of English, Scotland, France, and Ireland—as “absolute Monarchy of all that World” (241). While Cavendish's story nakedly advocates for the indispensability of a singular final authority—monarchism, monotheism, monism—it is full of scenes of consultation and collaboration, in which the Empress relies on intelligence reports from her subjects as well as expert counsel and reasoned discourse. It also calls repeated attention to its narrator being both a disembodied voice *and* an immutable human body. *The Blazing World* explores limits that exist both physically and conceptually over knowledge, especially the inseparability of the body.

In critiquing the “modest witness” figure at the center of seventeenth-century experimental science, Donna Haraway unpacks the gendered history of “modesty,” showing that this word connoted different qualities in men and women. Masculine modesty implied gentility and sophistication, an inclination in public to subordinate one's private self, which allowed such a man to serve as the “legitimate and authorized ventriloquist for the object world, adding nothing from his mere opinions, from his biasing embodiment. [...] His narratives have a magical power — they lose all trace of their history as stories, as products of partisan projects, as contestable representations, or as constructed documents” (*Modest_Witness@* 24). This kind of modesty serves to establish credibility for the gentlemen of the Royal Society: Sprat boasts of their “fair, and equal, and submissive way of registering nothing but histories and relations”—claiming authority through this purported passivity (116). Feminine modesty, on the other hand,

was about a different kind of submissiveness: staying out of masculine realms and roles, being relegated to the private domestic sphere—a physical erasure rather than a rhetorical one. This type features in Bacon’s *New Atlantis*, as the narrator recounts in exhaustive detail the ritual Feast of the Family, which honors any man in Bensalem who can boast “thirtie Persons, descended of his Body” (282). During the Feast, this patriarch is paraded before the crowd “with all his Generation or Linage” for an excessive display of pomp, the florid description of which encompasses a significant portion of Bacon’s text. Toward the end of a breathless description of this extravagant ritual, the narrator mentions, briefly and in passing, that “if there be a Mother, from whose Body the whole Linage is descended, there is a Traverse placed in a Loft above... Where she sitteth, but is not seene” (283). In publicly addressing his descendants during the celebration of his social impact on Bensalem’s community, the father refers to himself as “the Man by whom thou hast Breath and Life,” while the mother, her influence confined to her private body, is relegated to silence and invisibility in the rafters (283). This scene effects a clear distinction between the function of public and private spheres, and unlike Cavendish’s conscious acknowledgement of invisibility and spectrality, Bacon does not call further attention to this erasure in the narrative.

Their fictions, the texts subordinated to secondary “feminine” status, help to complete the picture of their respective views on philosophy, providing missing vantage points that reveal how “objectivity” requires erasure in each vision. Their inclination to imagine a shift in methodology through a rupture of political and geographic borders, with the travel narrative genre, underscores the inherently political logic of knowledge-making. And it’s intriguing that both Bacon and Cavendish use the utopian form, in particular, to sketch out their visions: *Utopia* means “no place,” and the genre is freighted with implications of impossibility, naïve idealism,

and self-conscious attention to artifice. As Debapriya Sarkar points out, these implications become crucial in particular to writers of travel narratives, who “established the realities of their discovered realms by distinguishing them from Utopia’s fictionality and its no-placeness,” a point to which we will return in the next chapter (“Utopian”). It is striking that both of these authors, who also wrote technical and scholarly works, chose to explore these ideas through this specific mode. Like Salomon’s House’s elaborate artificial trials of nature, speculative fiction allows for experimentation in a controlled environment: an imaginative “what if?” exercise. Whereas Bacon carefully glosses over the authorial role in that thought experiment—having his unnamed protagonist stumble upon it and report back—Cavendish openly paints herself as the inventor of both the Blazing World and her philosophy, creating and forming them into being, she says, “[out] of the most pure... rational Matter” of her mind, not hesitating to reveal the manifold marks of her own authorship (*Blazing World* 250). She is transparent about the formative power of the storyteller as maker and about narrative’s implicit dual function of relation and invention.⁴⁷

Utopia’s denotation of “no place” also calls to mind the topological fiction of what Haraway critiques as the impossible “god trick of seeing everything from nowhere” in science’s construction of objectivity and which even Bacon’s narrator acknowledges as properly a “Proprietie of Divine Powers and Beings” (“Situated Knowledges” 581; *New Atlantis* 275). Bensalem’s almost-magical geographical situation, and its strict maintenance of a one-way flow of intelligence that figures them always at the center, is rehearsed in the Royal Society’s claim to special authority: Sprat invokes Bacon’s *New Atlantis* by name in claiming for London the

⁴⁷ For a close look at the connection between these two fictional texts and evolving understandings of “invention” at this time, see Frédérique Aït-Touati, *Making Worlds: Invention and Fiction in Bacon and Cavendish*.

natural right to serve as the “constant place of residence for that knowledge, which is to be made up of the Reports, and Intelligence of all countries” (87). He argues that nature itself has uniquely positioned English gentlemen to produce a “universal intelligence,” as evidenced by the “situation of England... in the passage between the northern parts of the world, and the southern” (85). This absurd pronouncement encapsulates the un-self-conscious fantasy behind the claim of “objectivity”: of course England only lies between the northern and southern parts from the perspective of England itself. To claim the center is implicitly a claim to constitute the center. Cavendish pushes against precisely this kind of assumption in her *Observations*. In discussing Robert Hooke’s experiments with microscopy, in which he notes that different lighting conditions and angles produce wildly different images, Cavendish asks, “which is the truest light, position, or medium, that doth present the object naturally as it is?” (17). This inquiry gets at the crux of the problem of so-called objectivity: the authority to resolve this question—to answer which perspective offers the most accurate view—constitutes the power to *choose* what is true.⁴⁸ It is now commonly accepted that knowledge is always partial and situated, thanks to scholars like Haraway, Sandra Harding, Evelyn Fox Keller, and others, but Margaret Cavendish was spilling it out into view and fretting over it in multiple genres and forms as early as 1666. Long before terms like “situated knowledge” began circulating, she was reflecting on positionality and interrogating the social and political conditions of natural knowledge production in both fictional and philosophical writing.

⁴⁸ Loraine Daston and Peter Galison separate (in concept and in chapter organization) the two kinds of objectivity that I’m referring to here: the physical positions and interactions of body and instrument properly fall into their category “mechanical objectivity,” which is distinct from the way that they explore the construction of the scientific subject or “scientific self.” In seeming to conflate them, I am suggesting that Cavendish’s interrogations of mechanical objectivity, here and in *The Blazing World*, also enable her perhaps less direct interrogations of the construction of the scientific subject (*Objectivity*).

This is not to suggest that Cavendish's fiction manages, or even attempts, to make visible all of the implications of individual subjectivity in knowledge production, nor to suggest that it advocates for democratization or any universal equity: it is fundamentally a conservative vision centered on patriarchal and absolutist ideals. However, both Cavendish's *Observations* and her playfully satirical fiction offer a stranger's perspective that helps to complete the picture precisely because her analysis, as Eve Keller points out, is "spoken from outside the discursive and institutional forums it explores" ("Producing Petty Gods" 450). From the very beginning of *Observations*, Cavendish calls attention to the way that knowledge production depends upon access and authority. The preface bluntly acknowledges gendered differences in access to the resources of knowledge production, apologizing for shortcomings of her prose that she attributes to gender inequities in education: "many of our sex may have as much wit, and be capable of learning as well as men; but since they want instructions, it is not possible they should attain to it: for learning is artificial, but wit is natural" (11). She even speculates on how men like the fellows of the Royal Society might respond to a direct incursion into their intellectual territory:

were it allowable or usual for our sex, I might set up a sect or school for myself, without any prejudice to them: but I, being a woman, do fear they would soon cast me out of their schools; for, though the muses, graces and sciences are all of the female gender, yet they were more esteemed in former ages, than they are now; nay, could it be done handsomely, they would now turn them all from females into males: So great is grown the self-conceit of the masculine, and the disregard of the female sex. (249)

It's fun to ponder whether she penned those words at the same moment Cowley was writing that Lady Philosophy must be a “He, / For whatsoe're the Painters Fancy be, / It a Male Virtu seems to me” (xi).

Cavendish was not particularly marginal in terms of her ideas,⁴⁹ but her body still functioned to alienate her from the “learned body” of the Society and revealed the limitations of their purported commitment to diversity of perspective. Haraway’s “god trick” and “view from nowhere” critiques get at the same unpacking and disrupting of the Utopian mythology that Cavendish enacts in *The Blazing World*, where the intransigence of bodies serves to reveal much of what Bacon’s tale obscures about how knowledge production really operates: it is messy, partial, politically fraught, and unable to maintain stable boundaries. Where Bacon’s fiction attempts to erase subjectivity and obscure the centrality of the body, Cavendish answers this with a focus on the impossibility of disembodied knowledge: she shows how reporting and inventing are inextricable, and that a story can never really be told from the outside by someone who is themselves inside that story, as humans are inside of nature. Precisely because of her familiarity with exclusion, Cavendish offers a portrait of knowledge production that is more honest about the forms of erasure that keep outsiders out, about the ways in which unerasable bodies must struggle to gain access, and about the messiness—connections, shortcuts, partiality—of what goes on inside. In *The Blazing World*, her layering of worlds and narrators performs a metafictional exploration of the permeable boundary between imagination and reason that also rehearses her critiques of the selectively permeable boundary that purports to uncouple “science”

⁴⁹ For analyses that corrects earlier characterizations of Cavendish as an anti-experimentalist whose views on natural philosophy were fundamentally at odds with the Society’s, see Emma Wilkins, “Margaret Cavendish and the Royal Society”; Anna Battigelli, *Margaret Cavendish and the Exiles of the Mind*, Elizabeth Spiller, *Science, Reading, and Renaissance Literature*, esp. Ch. 4; Catherine Gallagher, “Embracing the Absolute.”

from philosophy. As an outsider, Cavendish provides a missing vantage point that makes visible the relationship between outsiders and insiders and highlights the ways in which the Baconian vision relies on erasure and exclusion.

Sprat was correct when he posited “an agreement, between the growth of learning, and of civil government”: making knowledge, whether citizen science or scientific citizenship, runs into the same body-centered boundary policing as voting, jury service, and other citizenry functions (29). Enlightenment political ideals and the experimental program of the new sciences both relied on discursive erasure of how regimes produce citizens primarily by excluding based on the body. Calls to democratize knowledge, diversify access, or attend to issues of identity and subject position and the political conditions under which knowledge is produced sometimes draw accusations of “politicizing science”—as if a self-selecting community claiming to report objectively from No-Place were not already inherently political—even as many of the threats currently facing the global community constitute a test not only of expertise and ingenuity but also of our willingness to reimagine our relationship to boundaries. Knowledge production and political power have of course always been intertwined; since both derive their authority through narrative-making, it is important to attend to those storytelling elements and set pieces that we have naturalized and that we take for granted.

Anxieties about the provenance of knowledge, and especially the embodied nature of its synthesis and reproduction, pervade the Royal Society’s overtly political autobiography in the form of reproductive metaphors. These same anxieties surface in Bacon’s and Cavendish’s fictions, both of which narrate models of ideal knowledge production in strikingly political terms, with an otherwise unsupportable obsession with political border crossing and defense. Both stories enact and reflect these connections and offer insight into the construction of what

institutions have presented as a disciplinary border constituted by method rather than identity and the body. The extent to which border crossings and political negotiations drive each story underscores how questions of who belongs on which side of a boundary, who controls that boundary, and by virtue of which embodied qualities, have always been central to establishing scientific authority. Reproductive metaphors of authorship functioned to map assumptions about gender and the body onto emerging discourses of knowledge production. In elevating what they called a “masculine” method, the Royal Society attempted to naturalize, by coupling it to a gendered divide already taken for granted, a rationale by which wealthy English men make uniquely competent *scientific* citizens, their unmarked identities permitting the “universal modesty” that makes some private bodies transparent. This kind of self-invisibilizing witnessing, the implied transparency of certain bodies, was crucial to the way that the burgeoning scientific community at its inception established the boundaries that continue to define scientific inquiry and regulate what counts as truth.

Chapter 4. Immaculate Conceptions

“And they were Mother Carey’s children, whom she makes out of the sea-water all day long. He expected [...] to find her snipping, piercing, fitting, stitching, cobbling, basting, filing, planning, hammering, turning, polishing, moulding, measuring, chiseling, clipping, and so forth, as men do when they go to work to make something. But instead of that, she sat quite still with her chin upon her hand. [...] ‘I am not going to trouble myself to make things, my little dear. I sit here and make them make themselves.’”

—Charles Kingsley, *The Water-Babies*

In the foregoing chapters, I have highlighted a pattern in which reproductive metaphors that naturalize a gender-based hierarchy frequently import anxieties about authority into discourses of knowledge production. In particular, the previous chapter identified ways in which language in literary and philosophical texts connects reproductive figures to various kinds of border crossings, tying concerns about authoritative knowledge not only to the gendered body but also to the policing of boundaries. In some cases, these texts specifically express concerns about control over knowledge in terms of establishing borders and defending them against penetration. This chapter will continue along the same path by focusing on one category of figurative language through which such concerns often get negotiated: metaphors of purity. What can we make of language that discusses the new science in terms of its purported purity, in contrast to corruption? What kinds of ideas about conception, the generative body, and hierarchical order do these figures import from religious and political discourses into discourses of knowledge production, and what are the implications for grounding scientific authority in such terms?

To follow this thread, the chapter will begin with a look back to the Middle Ages at an iconic example of how textual and bodily “purity” have long been imbricated with biological and cultural reproduction in the English religious imagination. It will then move forward to the mid-

seventeenth century to explore how that nexus inflects writing across disparate genres—religious epic poetry, political writing, and of course natural philosophy—as they reiterate and resituate (re-form and rebirth) that sacrificial fable about the indomitability of pure, uncorrupted truth. This jump forward in time is not arbitrary; rather, I hope that it will serve to illustrate that there is ample precedent for the persistence of the kinds of figures that I am examining. The bracketed ellipsis that it wedges into the literary history of England enacts an enormous elision, gesturing with apparent offhandedness at a period of profound political, social, and religious upheaval. I do this not to suggest that the vast changes that marked the intervening period were not formative but rather to call attention to continuities, to foundational understandings that transcended them. Figures of purity will serve as a final case study in how longstanding ideas about the gendered reproductive body get invoked, even imposed, as a logic that structures other contexts, including cognition and scholarship. The chapter will show how these figures signal concerns about authoritative knowledge that are less about content, or even method, and more about defending the kinds of borders that preserve an essentialist gendered hierarchy and the logics of exclusion that it engenders.

Earthen Vessels

Virginity as a proxy for “purity” creates the grounds for imagining “pure” cognition—a virgin birth of knowledge. As we have seen in previous chapters, discourses of knowledge production are inflected with a reproductive logic of authorship in which the mind functions like a womb that can mark and corrupt what it produces, and so it is important to guard against potential sources of corruption. Recognizing that seventeenth-century discourse about knowledge production is grounded in a reproductive logic of authorship, we can shed some light on the work

that figures of virginity perform in that discourse. The Reformation occasioned sweeping changes in how virginity functioned both as an embodied value-marker for the individual and in terms of a social good. The dissolution of monasteries, disparagement of clerical celibacy, derogation of celibacy in comparison to marriage, and demotion of the Virgin Mary all contributed to a pronounced shift in how virginity was thought about, figured, and represented. This chapter focuses on what persisted, on what did not disappear but rather was re-formed. Figurative virginity offers a way around anxieties about control and authority that get expressed in terms related to biological gestation and birth: if the womb is a potential site of corruption, figurative virginity can serve as a foil for, or cancel out, some of the conditions that enable and engender that corruption.

The blueprint for this logic is familiar across literary contexts; many religions, for example, include a virgin birth myth that gets around the problem of corruption in the embodiment of a god by evacuating the mother of biological influence, imagining her body not to have taken an active role in conception. In Jane Sharp's terms, a virgin mother who did not conceive in a shared sexual act would not contribute her own "seed" with its potentially problematic "forming faculty" that can mark and deform the child. It can remain uncorrupted by her body because she serves only as a passive vessel; it comes through her but is not "of" her. (Early modern debates about Mary's sacred status tended to hinge on whether *her* body, not his, was marked by the experience and thereby crossed the boundary between profane and sacred). In other contexts, metaphorical purity can serve as a workaround for a figuratively reproductive process that threatens to corrupt its products. This logic crops up in alchemy, religion, and of course experimental science's ideal of "objectivity," which, as we have seen, functions through a fantasy of unmarked, unmarking bodies. This chapter considers how the figure of purity operates

across various discourses of knowledge, in order to show it as a key way in which anxieties about boundaries ultimately become reconciled with a rationale for authority that is based on distancing the body of the knower from the process of knowledge production.

Our Bodies, Our Narratives

As we have seen, despite frequent attempts to distance their authority as nature's narrators from earlier forms of disembodied *Authority*, and to distance their bodies from the knowledge they produced, proponents of experimental science nonetheless employ figurative language linking authority to the body. The tethering of narrative integrity and "pure" narrative reproduction to the "purity" of the body is deeply embedded in England's religious history even outside of biblical interpretation. For one particularly illustrative example, we can look at the story of Saint Margaret of Antioch,⁵⁰ whose relevance in England weathered the Reformation and whose legacy is still visible in today's Anglican Church. Margaret's tale features standard themes that repeat across many saints' lives: the heroine's virginity as a sign of religious piety, the subordination of the physical body to the immortal soul, and the triumph of Christianity over paganism. But the specific threats that Margaret overcomes (and promises to help others

⁵⁰ More of England's churches are dedicated to Margaret than any other female saint besides the Virgin Mary. One of them, St. Margaret's in Westminster, has served as the parish church of England's House of Commons since the early 17th century, because of Puritan objections to Westminster Abbey's services (Wright et al). Another is the final resting place of Lucy Hutchinson: St. Margaret's in Owthorpe, also the site of a memorial to her husband, Colonel John Hutchinson. Curiously, in John Bale's report of Anne Askew's Examination for heresy there is a woodcut depicting the Protestant Askew (martyred in part for refuting the doctrine of transubstantiation, which itself imagines a kind of fluidity of bodily boundaries) styled as Margaret, with a pen in her hand and a defeated dragon at her feet (Bale; see also Watt 104). As Tiffany Jo Werth points out, this depiction produces a "composite figure, recognizable to both Catholic and Protestant eyes" (73).

overcome) demonstrate that hers is a story about the importance of preserving integrity in both *corporeal* and *narrative* forms of reproduction.

While imprisoned for refusing to marry the prefect Olibrius, who believes parts of the biblical story of Christ, but not his divinity, the virginal Margaret vanquishes a dragon that has appeared in her cell and attempted to swallow her whole. Olibrius first violates the textual integrity of the biblical narrative—and Margaret chastises him for cherry-picking the narrative in those texts, for affirming the parts that suit his purposes while discarding the rest as legend, not to be taken seriously. He then threatens the physical integrity of Margaret’s body, ordering his men to rip, slice, and mutilate her flesh. He wants to demonstrate that he can make both her sacred myth and her physical body permeable—breaking them into pieces to demonstrate their weakness (which is how he interprets the crucifixion). The theme of body-breaking continues as the dragon tells Margaret that when it’s not targeting virgins to get them to violate their chastity, it threatens pregnant women: if it learns of a woman who is with child it seeks to “brake it foote or arme” (“Stanzaic Life of Margaret” 222). It also articulates an explicitly narrative threat, telling Margaret that it has come there to deprive her of her memory and of her sanity—in other words, to take away her power to control the reproduction of her own story. Later, at her execution, she offers onlookers her protective intercession, particularly during childbirth, where she promises to safeguard the pregnancies of anyone who tells or hears her story.

Many pictorial depictions specifically recall the most controversial and contested feature of the tale: Margaret miraculously bursting forth from the dragon’s belly (Fig. 2). There is an easy connection to draw between this scene and her later offer to serve as an intercessor for birthing women in particular: her own safe delivery from the dragon’s belly rehearses, and comes to emblemize, her promise to ensure the intact delivery of a newborn. But later editorial



Figure 2. “St. Margaret.” Illuminated Manuscript, Book of Hours, Walters Manuscript W.168, fol. 222r. 15th century. (CC0). <https://www.flickr.com/photos/medmss/6984783557>

anxieties about the dragon scene and its overtly reproductive logic reveal a point of friction between the story’s internal commitments to textual integrity in the proper reproduction of Christianity and the reality that the successful reproduction of the story relies upon violating them. For example, in the *Golden Legend*, Jacobus de Voragine includes the dragon-bursting scene but editorializes it with a narrative interruption dismissing the possibility that this part of the legend (by then already declared apocryphal *in toto* for over 750 years) is historically accurate. After relating the story of Margaret’s consumption by the demon-dragon, he issues an

unambiguous disclaimer to his readers: “what is said here, about the beast swallowing the maiden and bursting asunder, is considered apocryphal and not to be taken seriously” (369). It’s worth noting that Jacobus’ caveat uncannily repeats the prefect’s complaint, within the tale itself, about the Christ myth: some parts are credible, while others defy serious consideration. It turns out that it is hard to get around the problem of authority by narrating the problem of authority.

Even Margaret’s mode of intercession is frequently treated in explicitly narrative-focused terms. In some versions, she offers in particular to help anyone who listens to, reads, or writes her story, remembering it and passing it on to future generations. Some extant manuscripts feature her legend inscribed upon thin strips of parchment, which midwives once wrapped around the bellies of laboring women to protect against harm or deformity (Reames). This ritual of applying parchment (itself torn skin) to the mothers’ body combines elements of sympathetic and contagious magic in imagining the protective power of the words, repeating the slippage in the tale’s depictions of bodily and textual integrity. Juliana Dresvina points out numerous mentions of Margaret’s story in liturgical contexts, suggesting that it had currency among diverse audiences, irrespective of literacy. In one manuscript, part of the Katherine Group, a collection of texts compiled for anchoresses, Margaret extends her offer of intercession to “whoever writes a book about my life, or obtains it written, or holds it and has it often in hand, or whoever reads it or listens eagerly to a reader,” imbuing the story itself with a kind of contagious sacred power (“Liflade”). This emphasis on reading as a potentially social, yet intimate activity seems to be in line with that manuscript’s focus on the virtues of virginity and a celibate life;⁵¹ it highlights the function of narrative as a mode of generativity, recognizing that cultural values can be

⁵¹ For context on the Katherine Group texts and their relationship to the duties and ethics of the anchoritic life, see Sarah Salih.

disseminated and sustained through reproduction of stories rather than only through reproduction of bodies.⁵² It is somewhat surprising that this version narrates the relatively rare scene of Margaret's pseudo-birth from the dragon, when it otherwise downplays much of the explicit language of childbirth that features more prominently in versions targeted toward laypeople. However, the birthing-like motif of enclosure, submission, and release is particularly appropriate for its audience, whose cloistered living situations, as Jennifer Wynne Hellwarth notes, repeated the typical lying-in chamber, a "kind of womb itself, fully enclosed, and [...] even more impenetrable" (8). Accordingly the text is full of references to binding, enclosure, and bursting forth triumphantly from a tight space. Additionally, the story's scene of Margaret emerging intact from a pseudo-womb dramatizes a distinctly one-way form of penetration, which imaginatively reiterates the fantasy of virgin birth, in the context of what is also a decidedly monstrous birth. As this version especially makes clear, Margaret's life presents storytelling as one mode of generativity, extending to its audience of virgin anchoresses, who do not have generative bodies, a crucial role in the reproductive economy of spiritual life.

Margaret, then, serves as a guardian of both narrative integrity and bodily integrity. The dragon, who both breaks babies' limbs in utero and swallows a virgin in an attempt to erase her memory from the earth, threatens to corrupt physical bodies as well as narratives both inside and outside the text. Margaret specifically asks that birthing women who call out to her be granted uncorrupted reproduction, their babies born "with alle the lymmes aryghte" ("Stanzaic Life" 318). Reading and retelling—narrative reproduction—functions to safeguard her story's

⁵² Also instructive here is Caroline Walker Bynum's *Fragmentation and Redemption*, a collection that reflects on tensions between fragmentation and making-whole, both in medieval saints' lives and in connection with method, with the necessarily fragmented narrative that we can construct of history.

integrity, and in this way she continues her victory over the dragon: her memory is preserved, and her story keeps its limbs and senses intact. And so it is fitting that, at the end of Margaret's life, as her body is about to enter the tomb from which she expects her spirit to be rebirthed, she invites onlookers to call upon her for help in childbearing. Margaret offers to protect the birthing child from physical damage or deformity, in the same way that she herself was protected from harm when the dragon attempted to devour both her body and her narrative legacy. The Margaret legend's overlaying of narrative and bodily integrity demonstrates how these concepts intersect as sites of reproduction, applying a reproductive logic to narrative and to the written text. The troubled connection between them speaks to the impossible ideal of the im/permeability of body and text: a virgin birth mythos, paradoxically, must reproduce without being penetrable. To reproduce an intact narrative of Christianity requires its opposite: a rupture, a 'braste'-ing of something. A reading practice of narrative rupture, a kind of sacrificial excision, is required to pass on the narrative without corruption. Margaret's tale reiterates the organizing redemption myth of the Christian religion, the redeemer-god's virgin birth, which serves to resolve an explicitly reproductive corruption that must occur and must then be ritually unmade in order to restore an original purity.

It is this element that makes Margaret's story especially instructive for understanding the extraordinary continuity of meaning-making that adheres to figures of virginity even through sea changes in social values. Like Olibrius, and like the dragon that consumes Margaret's body, external forces that seek to control bodies also seek to control narratives, and this story presents "purity" as a means of defense against both. Margaret's body-story promises that even in the face of violent confrontation by a powerful aggressor who is determined to subsume it or disable its reproduction, truth will out. This layer of meaning surely shines through in the woodcut of Anne

Askew styled as Margaret, holding her bible and standing over a defeated Pope-headed dragon (Fig. 3). Margaret's story rehearses a myth of *narrative* purity—a kind of reproduction that



Figure 3. From the title page of John Bale's "The First Examynacion of Anne Askewe" (1546). The Folger Shakespeare Library.

passes on knowledge entirely uncorrupted, unexpurgated, and unadulterated (the truth, the whole truth, and nothing but the truth)—which can function both to protect and redeem. A virgin birth of the word, this template will transcend the specifically Catholic-vs.-pagan context of Margaret’s story to be reborn in other contexts of struggle for singular authority and dominance.

“the Intellect made clean and pure”

That fantasy of narrative purity—of the possibility of passing on ideas intact, without deformity or corruption—is tenacious and resilient, and it later helps to structure early modern narratives of ideal knowledge production. This section will explore how it organizes the interpretive practices of an unlikely pair of writers whose respective texts strive in parallel ways toward the same end: pure truth. Peter Harrison has argued that seventeenth-century ideas of nature are made possible by the “collapse of the allegorical interpretation of texts” that had been ushered in by the Protestant reformers; “denial of the legitimacy of allegory is in essence a denial of the capacity of things to act as signs” (*The Bible, Protestantism, and the Rise of Natural Science* 4). The texts in this section—one by Francis Bacon, whose prescriptions for better understanding nature were the foundation of the new science, and the other by Lucy Hutchinson, a devout Puritan writing biblical exegesis—suggest the opposite: that both find figurative language indispensable in setting forth their respective visions of pure knowledge. Bacon and Hutchinson each come to their projects stinging with indignation at having been subjected to tutelage in philosophies from what Bacon calls the “darkness of antiquity”⁵³ (*Masculine Birth of*

⁵³ While Hutchinson gestures more broadly with the term “old Poets and Philosophers,” Bacon names Aristotle (“that worst of Sophists, stupefied by his own unprofitable subtlety, the cheap dupe of words”), Plato (“that mocking wit, that swelling poet, that deluded theologian”), the

Time 70); they each are gripped with a fiery zeal for their own method as the one path to truth; and they each display a keen understanding of the social reproduction that is necessary for a “spreading, true celestial Vine” to “spread like some lively vigorous vine” and choke out everything else (Hutchinson 1.193; Bacon, *MB* 62).

Francis Bacon opens *Masculine Birth of Time* (*Temporis Partus Masculus*) (c. 1603) with this prayer:

To God the Father, God the Word, God the Spirit, we pour out our humble and burning prayers, that [...] our human interests may not stand in the way of the divine, nor from the unlocking of the paths of Sense and the enkindling of a greater light in Nature may any unbelief or darkness arise in our minds to shut out the knowledge of the divine mysteries; but that rather the Intellect made clean and pure from all vain fancies, and subjecting itself in voluntary submission to the divine oracles, may render to Faith the things that belong to Faith. (196)

Bacon’s later works (which further develop and expand upon his ideas for a sweeping reform of natural knowledge production) feature revisions of the same passage, sometimes labeled as the “Student’s Prayer,” suggesting that it is more than simply his own entreaty but rather is also a model for all learners to adopt. In this petition, Bacon pits one category of knowledge against another in a sort of territorial contest over individual minds and over the field of human knowledge in general. He sees human and divine interests “standing” in potential opposition to

“narrowminded” Galen (“Plague of the human race!”), Epicurus (who, “like a man dropping off to sleep or with his attention fixed elsewhere, utters words at random”), and Hippocrates (who “utters nothing but a few sophisms sheltered from correction by their curt ambiguities, or a few peasants’ remedies made to sound imposing”) (*Order and Disorder* 3; *MB* 63, 64, 65, 67, 68).

each other; he imagines that the “paths of Sense” (a metaphorical image that we still use to describe neural activity) have been closed off and can be breached—“unlocked”—by knowledge, and he pictures darkness as an active force in its own right, one that can “arise in our minds” and disrupt their processes. Envisioning these threats looming over his intended project, he asks that human individual and collective intellect be “made clean and pure,” “subjecting itself” in “submission” in order to reproduce natural knowledge in such a way that it does not cross over prescribed bounds.

Bacon’s plea that the “Intellect be made clean and pure” echoes medical admonitions that pregnant women “take great care that their Imaginations be pure and clear” (*Aristotle’s Master Piece* 46). As we have seen, the early modern understanding of pregnancy was inflected by concerns about maternal impression, the belief that the imagination of a gestating mother could deform her offspring with “marks.” In this way, a disturbed or disordered mind could corrupt generation(s). We have discussed maternal impression in terms of the act of inscription that produces the visible mark, but it is important also to recognize that this inscription was imagined to happen in response to an experience, an emotion, a passion, a fright, a desire. It follows from the incursion of the stimulus in the first place: in other words, the threat to purity begins with the mother’s permeability. This imagined causal relationship between “purity” of the mind and the integrity of (literal or figurative) corporeal boundaries follows the image into its metaphorical applications in discourses of knowledge. Bacon’s concern about the mind’s purity carries forward into his later, more expansive prescriptions for reforming knowledge production; translated editions vary in their precise wording, but *Novum Organum* contains dozens of variations on the theme of purity, clarity, cleanliness, and spotlessness in connection with the mind. Even in this early invocation of its importance in producing knowledge, Bacon connects

purity to “subjecting,” “submission,” and strict observance of hierarchical boundaries that delimit realms of knowledge.

To offer some context for how the logic of purity enables the defense of imposing hierarchical order onto natural knowledge, we can also look at the way that figurative purity functions in other genres. A chapter focused on knowledge, purity, and boundaries in seventeenth-century England would hardly be complete without engaging with the biblical myth of the fall of mankind, which imagines an original purity undone by a single attempt to resist the gatekeeping of knowledge by accessing it without authorization.⁵⁴ We can look at Bacon’s *Masculine Birth of Time* next to another text that posits a masculine birth of Time: Lucy Hutchinson’s epic poem *Order and Disorder* (1679), a retelling of Genesis. The poem is a work of biblical exegesis that combines theology, a politics of reading, and a theory of knowledge. It is frequently read as, in part, a literary and theological response to Milton’s *Paradise Lost*, but it is also in conversation with contemporaneous discourses of natural philosophy and the construction of authoritative knowledge. Hutchinson’s preface identifies it also as a response to her own earlier translation of “the account some old Poets and Philosophers give of the original of things,” including Lucretius’ *De Rerum Natura*,⁵⁵ Hutchinson’s translation of which emphasizes, as Shannon Miller notes, the way that its narrative “displaces a male God’s organizing control over the universe” (3; “Maternity” 348). Scholars frequently focus on the poem’s recently uncovered female authorship, especially when setting it next to Milton’s *Paradise Lost*, as a way

⁵⁴ Philip Almond traces precedents for a specifically sexual incitement of the Fall, via Philo and Origen, but I find the direct invocations of knowledge and authority equally (if not more) compelling; I also find it significant that Hutchinson’s language presents original sin in terms of purity even without assigning it to a sexual act.

⁵⁵ For a fascinating comparison of Hutchinson’s approach to Epicurean atomism and that of Margaret Cavendish, see also Goldberg, *The Seeds of Things*, Ch. 4.

of accounting for elements within the poem. Julie Crawford pushes against this tendency and points out that within *Order and Disorder*, “issues of sexual difference and hierarchy are subsumed” for the most part “into larger allegorical and typological visions” (“Transubstantial Bodies” 78). Still, in her preface, Hutchinson narrates her own authorial relationship *to the poem* in a surprisingly unmaternal tone. As Katherine Maus has shown, much early modern poetry reflects an association between poetic creativity and the female body; many seventeenth-century male poets especially figure poetic inspiration in terms of the generative female body.

Hutchinson, by contrast, declines to imagine her writing process as agentively generative; instead she positions herself as an inert pass-through, insisting, “I have not studied to utter any thing that I have not [...] taken in” (5). Instead, her poem pours out its maternal logic into its interior, in her rich and varied invocations of figurative maternity as an exercise in various kinds of submission, as the poem presents a vision of divine creation in gendered terms, the chaos of a passive feminine Nature forcibly ordered and regulated by a masculine divine Power. It is intriguing that she couches her passivity as a translator in terms of uttering only what she has taken in, terms that recall the declared priorities of experimental philosophers in [re]producing natural knowledge. Both place high priority on maintaining an appearance of passivity and submission.

The poem retells the book of Genesis, and so the Garden of Eden is central to Hutchinson’s exploration of knowledge, the reproductive logic of belonging and exclusion, and the devastating implications of challenging established hierarchies. Hutchinson’s ideas about writing (narrative, translation) and the body of the knower—especially how knowledge about the living world is best produced by a “clean and pure” mind whose contents are put into order,

separated, and organized by a higher power—resonates with Bacon’s. An apostrophe early in the poem almost perfectly recapitulates the gist of Bacon’s prayerful invocation:

O thou eternal spring of glory, whence
Jam. 1.17. All other streams derive their excellence,
From whose Love issues every good desire,
Quicken my dull earth with celestial fire,
And let the sacred theam that is my choice,
Give utterance and musick to my voice,
Rom. 1.15. Singing the works by which thou art reveal’d.
What dark Eternity hath kept conceal’d
From mortals apprehensions, what hath been
Before the race of Time did first begin,
Deut. 29.29. It were presumptuous folly to enquire.
Let not my thoughts beyond their bound aspire,
Time limits mortals, and Time had its birth,
Gen. 1.1. In whose Beginning God made Heaven and Earth. (1.31-44)

“Let not my thoughts beyond their bounds aspire,” she pleads. The bounds she is invoking—where “Time limits mortals”—are those of birth and death, our old friends womb and tomb, boundaries that she maps both onto the individual human life and onto Time itself. These lines refer to the divine as “an uncreated spring” (66)—unique for its un-birthed-ness, whereas “mortals” are *constituted* by their suspension between birth and death, the unencroachable limits that Time imposes upon them. She figures herself in gendered terms, as “dull earth” asking to be

“quicken[ed]”⁵⁶ from above so that her voice will be imbued only with her “sacred” subject matter. She clearly differentiates between the womb-to-tomb span of Time, which she sees as fair game, and “what hath been / Before the race of Time did first begin,” which is “kept conceal’d from mortals apprehensions” and is therefore off-limits. In other words, she is keen not to repeat, while retelling it, Adam and Eve’s violation of the boundary imposed upon knowledge. Like Bacon, she prays for that border to be defended from her own presumption: both writers seem enthusiastic about enforcement of the boundary around *natural* knowledge. One is a Puritan woman writing biblical hermeneutics in poetic form, the other a politician putting down the first scratchings of what will later burgeon into a comprehensive plan to overhaul the whole exercise of producing natural knowledge. And they each begin with a gesture of submission to prescribed boundary-marking, asking a higher power, essentially, *please police my thoughts; keep them in their place.*⁵⁷

Both Bacon’s and Hutchinson’s pleas for externally imposed mental discipline are organized around the figure of purity and cleanliness, which suggests an expectation of confronting some potentially corrupting or dirtying influence. As Madeline Lesser points out, Hutchinson first introduces her reader to humankind through a “blazon” of Adam’s figure in which she emphasizes his body’s porosity and permeability; Lesser notes that “each description Hutchinson gives of a sensory opening as sensory barrier fails,” recalling with apparent horror

⁵⁶ The term “quicken” implies “to come or bring to life” and is also often used to describe the point at which a pregnant mother can feel the fetus’ movements distinctly from her own (“quicken” v.1, OED).

⁵⁷ It is interesting to contrast these with Lucretius’ invocation of Venus in *De Rerum Natura*, which seems to delight in images evoking boundary violation (she “injects,” “pierc[es],” “implants,” and “inspirits” the land and the sea; she “scatters the clouds” and causes the sky to be “flooded with effulgent light”) and contagious, unbounded wildness (when she enters, the “door to spring is flung open,” the breeze “released from imprisonment,” and “wild creatures bound over rich pastures and swim rushing rivers”) (2-3).

the language of Lucretius' *De Rerum Natura* (which Hutchinson had earlier translated into English) and its discussions of various types of penetrable, porous matter freely insinuating into each other ("Unbinding the Maternal" 390-1). But in the poem these "sensory openings" seem also to admit social and emotional traffic, reminiscent of concerns about maternal impression as it collapses examples of sensing and feeling together in the inventory of possible external, disturbing influences:

- 1 Joh. 2.26. Here Love takes stand, and here ardent Desire
- Mat. 5.28. Enters the soul, as fire drawn in by fire,
- 1 Pet. 2.14. At two ports, on each side, the Hearing sense
Still waits to take in fresh intelligence,
But the false spies both at the ears and eyes,
Conspire with strangers for the souls surprize,
- Jam. 5.11. And let all life-perturbing passions in,
Which with tears, sighs and groans issue again. [...]
Nor do those Labyrinths which like brest-works are,
About those secret Ports, serve for a Bar
To the false Sorcerers conducted by
- Pro. 1.10-12 Mans own imprudent Curiosity. [...]
And opening the Vermillion Curtains shows
The Ivory piles set in two even rows,
Before the portal, as a double guard,
- Pro. 25.11. By which the busie tongue is helpt and barr'd;
- Eccl. 12.11. Whose sweet sounds charm, when love doth it inspire,

And when hate moves it, set the world on fire.

(3.75-104)

This passage imagines the human sensing body as a permeable mesh, perforated all over with multiple entry points, its outer layers useless as a “bar” or “guard” against the incursion of “intelligence” and “life-perturbing passions” into the mind, aided and abetted by one’s own “imprudent Curiosity.” Importantly, in Hutchinson’s depiction, the sensory organs seem already to anticipate an assault and intrusion: the hearing “waits” to be infiltrated by plotting “strangers” and “false Sorcerers.”

This anxiety about the mind’s vulnerability to outside influences recalls Bacon’s warnings about the “idols” of the tribe (human nature) and marketplace (society); both authors seem to imagine these sources of corruption to be inevitable. Still, permeable as their bodies are, Hutchinson’s Adam and Eve were not unprotected from these incursions; they had a “defence” in the form of a figurative outer garment, constituted by their continued obedience. We see this in Hutchinson’s description of the disastrous aftermath of the serpent inducing them to challenge divine authority over boundaries imposed upon knowledge:

While they remain’d in their pure innocence

It was their robe of glory and defence:

But when sin tore that mantle off, they found

Their members were all naked, all uncrown’d;

Their purity in every place defil’d,

Their vest of righteousness all torn and spoyl’d.

(4.255-260)

Here Hutchinson positions "pure innocence" (which of course, in this mythos, is constituted by abstinence from restricted knowledge) as a robe, mantle, or vest—a tearable garment that functions as “defence” for an internal state of “purity” and also as the site of visible marks that bespeak its defilement. In that latter sense, it works rather like a hymen, functioning primarily to signify, through its absence or presence, that a border has or has not [yet] been breached.⁵⁸ Like virginal “purity,” only perpetual vigilance and policing of the boundary can keep it intact; half-measures are total failures, as only a single lapse undoes it all. And of course, in this case, the incursion that defiled, tore, and spoiled their membrane of purity was their attempt to access restricted knowledge that they were not authorized to have.

This metaphor of boundary marking serves as a bridge between this and the foregoing chapter, in which we looked to Thomas Sprat’s *History of the Royal Society*, including Abraham Cowley’s dedicatory poem, to examine how the logic of invasion and benevolent takeover shapes the Society’s narrative of their project. The boundary around the trees of knowledge in Cowley’s garden allegory is similarly defended until Bacon’s magical light vanquishes the ghostly and idolatrous gatekeepers, “frees” the orchard, and opens it to “all that will.” We will return to both of these gardens, but it will be helpful to first lay the groundwork for understanding what kind of work is being done in this language of defense, defilement, and despoiling. The previous chapter established that Bacon and the Royal Society share a conception of scientific inquiry as analogous to colonial conquest and exploitation. As an experiment, let us put that framework to the test by embarking on a voyage of discovery to gather fruits of knowledge. To explore one rich example of how the shared language of both

⁵⁸ I am indebted to Margaret Ferguson for this understanding of how the hymen functions narratively rather than biologically. It has been a privilege to hear her discuss her work in progress on the “myth of Hymen,” in formal and informal settings during my time at UC Davis.

discourses of “discovery” assumes and builds upon the same explicitly gendered framework of power that features in Hutchinson’s poem, let us journey to the Americas.⁵⁹



Figure 4. “Allegory of America, from *New Inventions of Modern Times (Nova Reperta)*, plate 1 of 19.” Jan van der Straet, and Theodoor Galle, engraver, ca. 1600. Metropolitan Museum of Art, NH (Stradanus), part III.323.i, p. 6. (CC0)

⁵⁹ Louis Montrose, in discussing the persistent gendering of the New World throughout the 16th century, unpacks the visual metaphors in Jan van der Straet’s drawing (Fig. 4) of a personified America being “discovered” by Vespucci, whose name would soon be imposed upon her, as one of many examples of allegorical images in which America is represented by a nude, reclining female figure being confronted by an imposing European man. It is instructive to consider this image, which includes both an astrolabe (an instrument of science) and a sloth (the animal to which Sprat compares the scholastics as justification for supplanting them as custodians of knowledge), beside some of the imagery (also discussed in the previous chapter) in Sprat’s lengthy and pointed discussions of who should control knowledge and why.

“the name of a virgin”

Bacon’s *New Atlantis* begins: “Wee sailed from Peru” (265). The narrator’s traveling party begins their voyage in what was at the time a Spanish colony; then, when they land on an island and the inhabitants reach out to them in multiple languages, they select Spanish as the language in which to respond. When the narrator later sees one of the “Fathers” of Salomon’s House, the latter is wearing a hat “like a Helmet, or a Spanish Montera” and is carried by servants in a litter adorned with “emeralds of the Peru color” (289). The colonial implications here are clear, but why invoke the Spanish colonial project in this context, and why Peru specifically? The islanders at one point explain that they were once challenged militarily by an expedition from “Peru, then called Coya,”⁶⁰ and that their former king had “cut off [the invaders’] land-forces from their ships, and entailed both their navy and their tamp with a greater power than theirs,” eventually forcing them to “render themselves without striking stroke” (277-8). This narrative of spurning an invasion—an effective *barricado*, to call back to the pseudo-Spanish term that Shakespeare’s Helen used as a sexualized military metaphor—is central enough to the islanders’ self-narrative to be included in the highlights of national history that they offer the travelers. They were not conquered, and this episode created the conditions for a later policy that directed their priorities in exploration toward knowledge rather than materials:

⁶⁰ It is puzzling that pre-conquest Peru, in Bacon’s story, should have been “called Coya,” since the Incan word *Coya* apparently meant “Queen,” but I have been unable to find an answer to that mystery, except to note with some amusement that in parts of Peru and Bolivia, a colloquial term for a miner (as in, a mine worker) is *coya loco*. This term confuses Google Translate until you add quotation marks, at which point it begins to recognize the phrase as a figurative expression: add an open quotation mark, and the translation changes to “fuck crazy”; add the closing quotation mark, and it changes to “crazy cunt.” At that point, having neglected to bring a canary along with me down that rabbit hole, I thought it best to return to the surface.

they “maintaine a Trade not for Gold, Silver, or Jewels; Nor for Silkes; Nor for Spices; Nor any other Commodity of Matter; but onely for Gods first Creature, which was Light” (281). This history essentially establishes that they are empowered to gather knowledge and intelligence from all around the world in part because they did not let another nation breach their border.

In Bacon’s own lifetime Peru’s relationship to foreign invasion was of course quite different: it had been invaded and was still occupied, and its people subjugated, by Spain. Walter Raleigh invokes Peru repeatedly in his narrative of “discovering” Guiana in 1594, positioning the colony and its exploitation as both a factor in Spain’s strength as a political threat and a foil to the as yet un-ruined Guiana. Addressing the queen’s advisors directly, and Elizabeth herself indirectly, he compares the Spanish king to a destructive “storme” that threatens to “keepe vs from forraine enterprizes, and from the impeachment of his trades,” and argues that the King of Spain’s ability to hinder England’s economic interests is rooted primarily in his possession of Peru:

these abilities rise not from the trades of sackes, and Civil [Seville] Orenge, nor from ought else that either Spaine, Portugal, or any of his other provinces produce: It is his Indian Golde that indaungereth and disturbeth all the nations of Europe, it purchaseth intelligence, creepeth into Councils, and setteth bound loyalty at libertie, in the greatest Monarchies of Europe. (xiv)

This recognizes access to certain kinds of knowledge (“intelligence”), and the power it confers even back at home, as one material outcome of Spain’s lucrative colonial project.⁶¹

⁶¹ For a study of how this important connection between control over knowledge and control over land and other material resources was later crucial to the development of Britain’s empire, see Sarah Irving, *Natural Science and the Origins of the British Empire*.

Perhaps most significant is the way in which Raleigh explicitly genders the land in order to make his case for Elizabeth's pursuing it.⁶² He writes that "*Charles the fift* [...] had the Maydenhead of *Peru*," citing this figuratively sexual conquest as the inciting event that paved the way for Spain's present domination of the economy of power in Europe. Invoking a presumed universal nationalism, he describes Guiana as "a way [...] to answer every man's longing, a better Indies for her maiestie then the King of Spaine hath" ("every man" seems to mean "every Englishman"), and, in a much discussed passage, he further expresses a wish, again applying a gendered metaphor, that the neighboring Guiana not "be left to the spoyle and sackage of common persons" (ix; x):

Guiana is a Countrey that hath yet her Maydenhead, never sackt, turned, nor wrought; the face of the earth hath not beene torn, nor the vertue and salt of the soyle spent by manurance. The graves have not beene opened for gold, the mines not broken with sledges, nor their Images puld down out of their temples. It hath never been entred by any armie of strength, and never conquered or possessed by any Christian Prince. (96)

In Raleigh's narrative, then, Peru serves as a perfect foil for Guiana: Guiana is still a metaphorical virgin, while Peru has had its "earth [...] torn" and its "virtue [...] spent" (not to mention its idols and temples, but we have already trodden that ground) by Spain, who is now using those spoils to gain advantage over the rest of Europe.

Raleigh also purports to lament Spain's treatment of Peru's indigenous population, and one of his arguments for invading Guiana references a thirdhand relation of a prophecy that

⁶² For scholarship that focuses closely on gendered language of "discovery," see Louis Montrose, "The Work of Gender in the Discourse of Discovery"; Margaret Ferguson, *Dido's Daughters: Literacy, Gender, and Empire*, esp. Ch. 7; Shannon Miller, *Invested With Meaning*, esp. Ch. 4-5.

supposedly foretells the Incas' eventual liberation by the English: "there was found among prophecies in *Peru* (at such time as the Empyre was reduced to the Spanish obedience) in their chiefest temples [...] which foreshewed the losse of the said Empyre, that from *Inglatierra* those *Ingas* shoulde be againe in time to come restored, and delivered from servitude" (100). In addition to positing, rather preposterously, a Spanish-language prophecy existing in an Incan temple before the Spanish invaded, Raleigh later appears to make another attempt to engage Elizabeth's investment in this colonial project by suggesting that she might serve, for the indigenous women of neighboring territories, as an exemplar of an explicitly feminine-coded strength:

Her Maiesty hereby shall confirme and strengthen the opinions of all nations, as touching her great and princely actions. And where the south border of *Guiana* reacheth to the Dominion and Empire of the *Amazones*, those women shall hereby heare the name of a virgin, which is not onely able to defend her owne territories and her neighbors, but also to invade and conquere so great Empyres and so farre removed. (101)

In this argument, Raleigh seems to imagine two varieties of virginity: one that is in need of protecting in order to prevent or remediate others' violence against it, and another that confers protection (a remarkable parallel to the ways in which St. Margaret's story once functioned in literature compiled for celibate anchoresses, particularly since in this example the protective function is invoked by Raleigh's declaration that "women shall hereby heare the name of a virgin"). As Shannon Miller observes, any such protection would ultimately come only through the "substitution of male control" for Elizabeth (herself often compared to an Amazon), who is present here only as a narrative placeholder: in the execution of any such arrangement, the *idea*

of the Virgin Queen would be exchanged for the actual bodies of male governors, and their weapons, resulting in the “resurrection of a new European and male-dominated rule” in the Americas (*Invested With Meaning* 177). It was always, in other words, a narrative fiction, in which Elizabeth (and her purported virginity) was just as much a signifier of exchangeable potential value as Guiana’s figurative “maydenhead.” Although much critical attention has been paid to this gendered metaphor, its full significance comes into better view by placing it in context, recognizing that *both* the literal and figurative virginities work to structure Raleigh’s speculative narrative as a sort of prelude to a romance,⁶³ inviting Elizabeth to imagine herself as its hero.

These observations also help give context to Bacon’s many invocations of South America and the Spanish colonial project in *New Atlantis*. Claire Preston observes that Salomon’s House, the College of the Six Days Works, “inaugurated a literary trope of invented and described scientific place” (102). This is indeed true, but in his imagining Bacon also rather follows Raleigh, who also invented and described a virgin, never-conquered land: both *New Atlantis* and *The Discovery of Guiana* are, essentially, speculative fictions.⁶⁴ I mean this not only in the usual application of this phrase, in that the story itself is speculative, but also in the sense that the story is *about* a kind of speculation. In Raleigh’s view, Guiana’s identity and value reside entirely in its

⁶³ For an expanded study of how tropes borrowed from the romance genre operated in early modern “New World” literature, see Joan Pong Linton, *The Romance of the New World*.

⁶⁴ As Lord Chancellour to James I, who executes Raleigh after his second expedition, Bacon ends up being central to the story of how Raleigh’s later failure to deliver Guiana’s “maydenhood” (or at least convincing proof that he had in fact seen the land’s bounty and could vouch for it, and that it was not entirely fictional) contributes to his downfall and death. Raleigh’s own story, then, collapses the metaphorical sexual prize and his own creditability together, hinting at the troubled boundary that exists between intangible knowledge and “commodities of matter” (the category that Bacon contrasts with “Light”), when narrative authority always comes back to a question of trust. For a close study of Raleigh’s struggle to establish credibility, see Rachel Winchcombe, “Authenticating El Dorado.”

potential to come under the control of “any Christian prince”: he is convinced that it would confer a competitive advantage to its taker, and so he is determined that Elizabeth have it. Within his sales pitch there is also a warning: “whatsoever Prince shall possess it shall be greatest, and if the king of Spayne enjoy it, he will become unresistable” (101). The significance of this figurative maidenhead, then, is that it marks the site of an almost inevitable breach; it is a sign that marks an object’s potential value, constituted by the object’s availability for someone’s exclusive taking.⁶⁵ Guiana’s continued sovereignty is not on the table; the question is never whether or not it will have a “taker” but rather which Christian prince (or common persons) it will be. Will Elizabeth take it and protect it and spend its treasure for England’s purposes, or will Spain take it and become “unresistable” as an adversary? Or will it be taken by “common persons” who will spoil and sack it? With the “maidenhead” metaphor Raleigh especially emphasizes the importance of exclusivity, of being the first [read: the first Christian sovereign] to dominate it, rather than leaving it to be taken by a competitor, or worse, spoiled by “common persons” (100). The specter of potential taint, spoil, waste, or corruption resulting from either the strategic actions of foreign powers or the imputed negligence or incompetence of its native people (and the implicit assumption that all of those extractive, exploitative behaviors would constitute something other than taint, spoil, waste, or corruption if performed by the English) underscores that these figures mainly express anxieties about the wrong sorts of bodies being in control of reproductive futurity—even, and perhaps especially, their own.

⁶⁵ Again here, I am reminded of how Margaret Ferguson connects the signifying function of the hymen specifically in the context of marriage (an institution structured around exclusivity of control over reproductive futurity) with “concerns surrounding Queen Elizabeth’s position as the always-potential bride” (“Hymeneal Instruction” 99).

And so we see the other function of the figure of purity: it marks a site of enclosure and therefore selective exclusion. We can follow Helen de Narbonne's lead here in mapping out this understanding of how virginity functions as an asset: it represents an opportunity for investment that is intended to give its holder exclusive control over its increase. Like a bodily equivalent of land enclosure, it purports to guarantee exclusivity of access and use. In this conception, purity is not a state of spotlessness, of unmarkedness, but rather the opposite: it is itself a mark, signifying an embodied quality of restricted availability. In the ideal patriarchal marriage economy it is akin to an uncontested deed of ownership, imagined to have a material counterpart that can be claimed only by the initial investor. In that sense, what it represents (and what it is imagined to advertise) is exclusive control over reproductive futurity.

“Nature’s troubled womb”

With this understanding, we can revisit Hutchinson's poem and Bacon's philosophy to show how they each conceive of threats to “purity.” Let us begin in the beginning, on land whose figurative maidenhead is even more exhaustively commented upon: Eden, in the period of original prelapsarian purity. In a slight deviation from her source text, Hutchinson imagines the garden to *begin* with an act of enclosure and exclusion, as God separates it from the land surrounding it:

The whole Earth was one large delightful Field,
That till man sin'd no hurtful briars did yield,
Gen. 2.8. But God enclosing one part from the rest,
A Paradise in the rich spicie East
Had stor'd with Natures wealthy Magazine,

Where every plant did in its lustre shine,
But did not grow promiscuously there,
They all dispos'd in such rich order were
As did augment their single native grace,
And perfected the pleasure of the place,

(3.135-144)

Hutchinson's embellishments of the garden's description in *Genesis* offer further hints about how she envisions purity ideally to manifest (or, more precisely, to be produced). First, there is the enclosure of one part of the "large delightful field" to mark it as separate from the rest; and then everything within it needs to be ordered. In this garden, the plants grow in an orderly fashion, not "promiscuously" (pollination, one imagines, was regimented and purposeful). They are "dispos'd in such rich order" as to "augment their single native grace," in other words, as is appropriate to the unique inborn characteristics of their respective species. This passage sets up an image of Paradise as a "wealthy," "rich," prescriptively landscaped, rigidly-ordered, gated community.⁶⁶

The first residents of the garden did their part to keep things pure on these same terms: "every bird and beast [...] only union with its like pursued," and they lived "[a]ccording to their several species too"; "As several households in one City do, / So they with their own kinds associate": for example, "The ravens, more their own black feather love, / Than painted pheasants, or the fair-neck'd dove" (3.248-58). In case those examples don't sufficiently drive

⁶⁶ I am being somewhat flippant here, but my underlying suggestion—that there is a correspondence between these types of spatial/resource exclusion and expectations of "native" heterogeneity—is in earnest.

home the point, Hutchinson's extrabiblical explication continues to expound on the importance of maintaining other kinds of segregation besides gender:

'Tis only like desires like things unite:
In union likeness only feeds delight.
Where unlike natures in conjunction are,
There is no product but perpetual war,
Such as there was in Natures troubled womb,
Until the sever'd births from thence did come,
For the whole world nor order had, nor grace
Till sever'd elements each their own place
Assigned were, and while in them they keep,
Heaven still smiles above, th' untroubled deep
With kind salutes embraces the dry land,
Firm doth the earth on its foundation stand;
A chearful light streams from th' ætherial fire,
And all in universal joy conspire. (3.263-276)

Mixing unlike natures produces only war, comparable to the jumbled chaos that existed “in Nature's troubled womb” before God ordered its parts and “assigned” them “each their own place.” Further, they must “keep” in their place in order to avoid violent retribution. It is instructive here to recall the centrality of rigid category distinction to Protestant, and especially Puritan, identity. As Frances Dolan reminds us, anti-Catholic discourses often invoke the uncertainty of such categories of identity and belonging as a looming threat: “Representations locate the threat of Catholicism in the perception that Catholics are rarely one thing or another,

but usually both, thus blurring needful distinctions between categories. The categories that they combine most disturbingly, and those that are most often used to describe them, are the familiar and the strange” (*Whores of Babylon* 18).

The promise of smiles, salutes, and cheer quickly pivots to a threat that attempts at miscegenation not only will “unfix” everything but also will elicit punishment:

But if with their unlike they attempt to mix,
Their rude congressions every thing unfix;
Darkness again invades the troubled skies,
Earth trembling, under angry heaven lies;
The Sea, swoln high with rage, comes to the shore
And swallows that, which it but kist before;
Th’ unbounded fire breaks forth with dreadful light,
And horrid cracks which dying nature fright,
Till that high power, which all powers regulates,
The disagreeing natures separates,
The like to like rejoyning as before,
So the worlds peace, joy, safety doth restore.

(3.277-288)

In other words, Hutchinson’s reading prescribes segregation—separate, homogenous, tightly regulated realms. Erin Murphy maintains that Hutchinson’s apparent disgust at miscegenation should not be construed as pertaining to embodied identities, because Hutchinson elsewhere argues for the transformative power of marriage to produce bonds that transcend the national identity of individuals. This interpretation rests mainly on Hutchinson’s discussion of her own

family's mixed heritage: she is descended from both Anglo-Saxon and Norman ancestral lines. I am inclined to resist Murphy's reading, which seems overly generous, especially given the poem's frequent references to "seed" as bearing essential qualities of likeness or opposition. Emily Griffiths Jones threads the needle, determining that "while Hutchinson imagines that mutual love within an *intercultural* marriage may nurture the growth of a godly state, the discordant values within an *interfaith* marriage cannot" (171). Privileging the first boundary (implied by "inter-") over the second may have been useful for Hutchinson in terms of reconciling her personal history with the religious views that conflict with it, but the discrepancy demonstrates how the myth of purity is untenable, in practice or even as a narrative. For a contemporary reader, it is difficult to disentangle this language from rhetoric that still couples "culture" to essential, embodied qualities, and, specifically, that still invokes religion and culture as proxies for race. Less anachronistically, it is difficult not to draw an alarming connection between what Hutchinson implies later in the lines, "Pure waters which through stinking channels run / Become corrupt in their declining stream" (7.182-3), and the doctrine of *partum sequitur ventrem*, already law in Virginia, which was used to justify enslavement as a hereditary status.⁶⁷ The poem's proposed solution seems to circumscribe the problem: describing "Nature's troubled womb" as a place of "perpetual war," Hutchinson identifies segregation as the only remedy, and if mankind does not maintain it by choice, "that high power, which all powers

⁶⁷ In the English colonies of North America, beginning in Virginia Colony in 1662, the legal concept of *partus sequitur ventrem* ("what is born follows the womb") positioned the mother's body as a source and site of individual political identity, affirming the womb's power to mark its products with the legal status of the mother, independent of the father's legal status. In other words, when an English man raped an enslaved woman, the condition of enslavement passed from mother to child via the womb (which was of course imagined to mark its offspring indelibly). For detailed unpacking of this legal precept, its logic, and its implications in the American Colonies, see Jennifer L. Morgan, *Laboring Women*, and Morgan, "*Partus Sequitur Ventrem*."

regulates” will wrest choice from them and restore the “peace” and “universal joy” that comes from eliminating dissent and difference.

Later, in Canto VII, Hutchinson describes the horrors of the period a few generations after Adam and Eve’s expulsion from the garden:

They cast off all pure reverential awe
And broke the fence of matrimonial law.
His neighbour’s wife each potent lecher took,
Each wild adulterer his own forsook;
No more could modest flight secure from rape;
Chaste virgins could not ravishers escape.
Promiscuous lust polluted every bed,
Children were to uncertain fathers bred (7.43-50)

This language makes concrete what Hutchinson zeroes in on as the most salient long-term consequences of violating purity: order has reverted to chaos in explicitly reproductive terms. The first two lines present two examples of hierarchy—submission (“reverential awe”) and boundary defense (“the fence of matrimonial law”)—as would-be guardians of order; when these are rejected, all hell breaks loose. Hutchinson conflates adultery with rape and situates them both within a general category of promiscuity that “pollutes” the (properly hierarchical) marriage bed and results in cuckoldry. In the poem this serves as a foil for the prescribed, patriarchal model in which women obtain protection against some forms of sexual violence in exchange for the exclusivity of sexual access that would enable men to easily identify which children they have authored, and more generally, which bodies are theirs to control. For Hutchinson, the alternative

to that *order* seems to be this *disorder*, in which women are “left to the spoyl and sackage of common persons.”

I show all of this not to posit the groundbreaking revelation that Calvinism could be considered illiberal, but rather to present a sketch of Hutchinson’s underlying logic of original purity and its defilement within the story she is retelling, in order to use it as a kind of reading rule, or guide map, for understanding her articulation of a theory of ideal knowledge production. In other words, because she is performing this exegesis for the purpose of enlightenment, her interpretation of the story sheds light also on her theory of knowledge. In her preface, she describes writing the poem as an attempt to “reclaim a busie roving thought from wandring in the pernicious and perplexed maze of human inventions”; this spatial metaphor positions biblical exegesis as a way to discipline her thought, personified as a roving wanderer who will not stay in their proper place. She is especially referring here to her earlier study and translation of Lucretius’ *De Rerum Natura*; she goes on to lament that it had so “fill’d my brain with such foolish fancies, that I found it necessary to have recourse to the fountain of Truth, to wash out all ugly wild impressions, and fortifie my mind with a strong antidote against all the poyson of humane Wit and Wisdome” (3). This is a richly layered figure. It first imagines her mind as a vessel that Lucretius’ text had filled with “fancies” that had left “ugly wild impressions” and needed to be washed out.

The fountain of Truth is necessary not only for washing the mind clean but also for inoculation: protection against further marking. She goes on to unpack the “impression” image further, remarking that she “cannot but bewail, that when we are young, whereas the lovely characters of Truth should be imprest upon the tender mind [it is] so fill’d up” with other ideas that it becomes necessary to “cleanse out all the rubbish, our grave Tutors laid in when they

taught us to study and admire their inspired Poets and divine Philosophers” (4). This elaboration of the metaphor clarifies that the problem is not that impressions are being left but rather that *other* impressions are being left: Truth did not enjoy exclusive impressing rights.⁶⁸ One after another, it seems, the tutors’ poets and philosophers could be “laid in” to the mind and make all their “wild” impressions,⁶⁹ but “the lovely characters of Truth” require that all other marks (especially those associated with the comparatively disordered Lucretian model) be washed away.

Within the poem, Hutchinson more directly invokes the figure of the mind as a womb, and again she imagines it as passive but as offering privileged access:

But my weak sense with the too glorious rays
Is struck with such confusion, that I find
Only the worlds first Chaos in my mind,
Where Light and Beauty lie wrapt up in seed,
And cannot be from the dark prison freed,
Except that Power, by whom the world was made,
My soul in her imperfect strugglings aid,

⁶⁸ Hutchinson’s marginal glosses with corresponding bible verses are also instructive here: her annotation for the line in Canto I in which she first mentions the “spreading, true celestial Vine” directs the reader not to its first appearance in Genesis but rather to John’s vision of it in Rev. 22, where hierarchical order has been restored and the foreheads of all God’s servants are marked with his name (1.193).

⁶⁹ This word choice invites further attention, of course, and I can only gesture toward its implications here. The various connotations of “wild” line up with many of the rationales by which this ideology, this scarcity economy of truth and value, has authorized violence and oppression. The OED lists, among others, these uses: “uncivilized, savage”; “uncultured”; “produced naturally”; “uncultivated or uninhabited”; “resisting the constituted government”; “Not submitting to moral control; taking one’s own way in defiance of authority”; “not under, or not submitting to, control”; “resisting control”; “[Of game:] avoiding the pursuer”; “taking, or disposed to take, one’s own way”; “unconventional”; “of strange aspect.”

Her rude conceptions into forms dispose,
And words impart, which may those forms disclose. (22-30)

Here Hutchinson imagines her own mind as a microcosm of the universe at the outset of Genesis—the “world’s first Chaos” that preceded “Time’s birth.” She depicts it as confused and disordered, fertile but unfertilized, a “dark prison” containing the “seed” of knowledge that awaits the contribution of external masculine Power to give form to her “rude conceptions” so that they can be narrated.

That narration is also strictly disciplined; Hutchinson’s preface explains that she will use “plain” language to reproduce the story in her poem. She notes that the reader “will find nothing of fancy in it; no elevations of stile, no charms of language, which I confess are gifts I have not, nor desire not in this occasion” (4). Following David Norbrook’s attribution of the poem to Hutchinson, correcting earlier misattributions and convincingly establishing its female authorship, scholars have largely viewed Hutchinson’s deference to scriptural language at least partly as a “necessary acquiescence to [feminine] modesty topoi” (Lesser 378). But it also, as the previous chapter attests, resonates with the implicitly masculine “modest witness” figure that guides the narrative habits of the seventeenth-century men of science who proclaim Philosophy to be a male virtue and purport to serve as passive pass-throughs for Nature’s own self-deposition. In laying out what she sees as the imperatives of the interpretive role in reproducing knowledge, Hutchinson’s language is strikingly similar to Bacon’s (and the Royal Society’s): she is as disdainful of “fancy” and “elevations of stile” in biblical exegesis as they are in scientific writing, preferring to serve as a more passive conduit for the subject matter. They maintain that “plain” language assures purity, which is a way of rhetorically positioning one’s mind as

clean[ed] and pure, the next best thing to a figuratively virgin mind, through which knowledge can pass uncorrupted.

“a teeming brood of error”⁷⁰

Earlier chapters have discussed the categories of “idols” of the mind that Bacon sets forth in *Novum Organum* as obstacles to learning: idols of the cave (individual experience), tribe (human nature), marketplace (language), and theater (received wisdom). These generally serve as the basis for discussing Bacon’s objections to earlier systems and methods of knowledge production: they are distilled and pithy, and the metaphors make them easy to remember. But there are also several turns of phrase in *The Masculine Birth of Time* that provide additional insight into how Bacon imagined the nature of some of these “idols” that can corrupt the mind and the knowledge it brings forth. First, like Hutchinson, Bacon is concerned about mixing. One of the first things he promises to his reader is that he does not intend to impart a “mixture of religion and science” (62). In the litany of individual attacks on specific philosophical figures that follows, he chastises Paracelsus for exactly this transgression: “By mixing the divine with the natural, the profane with the sacred, heresies with mythology, you have corrupted, O you sacrilegious imposter, both human and religious truth” (66). For Bacon, this is unacceptable; each must stay in its place. After all, Bacon notes that his “only earthly wish [is] to stretch the deplorably narrow limits of man’s dominion over the universe to their promised bounds” (62). Those “bounds” must be clearly marked and enforced (recall that his opening prayer specifically

⁷⁰ I borrow this turn of phrase from another of Bacon’s reproductive metaphors in *Masculine Birth of Time*: “The fact is, my son, that the human mind in studying nature becomes big under the impact of things and brings forth a teeming brood of error” (70).

asks God to help him perform that task) in order for the grantees to exercise dominion over the promised portion.

Bacon also takes exception to the idols blocking traffic. “[A]ll the approaches and entrances to men’s minds are beset and blocked,” he complains, by “idols—idols deeply implanted” (*MB* 62). “A new method must be found for quiet entry into minds so choked and overgrown” (62). This topos of the overcrowded mind resonates with Hutchinson’s fretting about the proliferation of “impressions” left in hers by classical philosophy—which includes some of the same “idols” that Bacon enumerates in his list. Similarly to Hutchinson’s concerns, Bacon sees this crowding as a threat to purity of thought; he despairs of there being any clear ingress for truth among the chaos, doubting “that any clean and polished surface remains in the mirror of the mind on which the genuine natural light of things can fall” (*MB* 62). This figure of the mind as a mirror perfectly sums up the way that Bacon, and his later acolytes, imagine intellectual purity to function: it passively obscures itself in favor of reproducing (ideally without modification) whatever comes into it. It does not participate or add anything of its own. But in this analogy taken as a whole, Bacon is expressing a concern about competition for access in a scarcity economy of authority, a concern that he will repeat in other places in deriding “disputation” and other practices that invite intellectual diversity. These metaphors make a problem of heterogeneity of thought, setting up a situation where the solution must be absolutist.

“Who from impurity can pureness bring?”⁷¹

For Hutchinson, the answer to this riddle is, of course, Christ. The story that she retells in the poem, of the “world made and undone,” is the first of two acts; it sets up the problem that

⁷¹ Hutchinson, *Order and Disorder*, 7.188.

must then be resolved in the New Testament by the virgin birth of a redeemer who can undo the curse. Lauren Shook discusses this structure in terms of Puritan typology and Hutchinson's mother-centered approach to it, arguing that the poem tells the story primarily by following its mothers and telling their stories: "Hutchinson develops a matriarchal typology of elect Genesis mothers who help forward the Christian redemption narrative as they recapitulate and supersede their typological ancestor Eve while anticipating Mary, the virgin mother. [...] Mothers and their wombs, then, anticipate Mary who corrects Eve's curse" (181, 186). In the poem—although it focuses for the most part on characters, events, and plot points from the Old Testament—this foreshadowing of a future resolution gets figured, as did the scene of its inciting incident, in the language of reproduction and purity:

alone could Eve to Adam breed
Whose sin and curse was fixed all in his seed;
And to recover its corrupted fruit
It must be set into a nobler root (6.41-5) [...]
When God did into human nature come,
Vesting himself in a pure virgin's womb,
Whence he a second stock of mankind grew
That dead grafts set in him might life renew. (6.49-52)

Hutchinson returns here to her earlier characterization of purity as a garment or vestment signifying an internal condition of integrity that is constituted by the narrative of an un-breached boundary. God unmakes the curse by "vesting" himself in a virginal womb, which repays the loss of the robe/mantle/vestment of purity that had been "torn," "defil'd," and "spoil'd" in the garden. The next step of this more-successful vestment is also explicitly reproductive, and it

shows why it matters that Mary's womb is "pure": having dressed himself in a virgin womb, Jesus can now wield its purifying contagious magic to generate a new stock, a blessed race,⁷² that is worthy of life because of the purity he bestows upon it. Order and singular supremacy, in other words, have been restored. For those who had been distraught about all the miscegenation and non-marital sex and borders not having fences, this is good news.

Bacon's proposal for redeeming natural knowledge from its impure state follows a similarly reproductive logic: he writes that the "only hope is in the regeneration of the sciences [...] building them anew" (71). Throughout *The Masculine Birth of Time*, Bacon directly addresses (and sometimes ventriloquizes) his reader, whom he calls "my son," making explicit the logic of the text itself as a means of cultural reproduction, and also invoking a related logic of inheritance: the "son" is a placeholder for all of the heirs to this theory of knowledge.⁷³ He imagines his reader asking him, "Do you think that you can supply the place of all those whom you reject?" (71). In response to this imagined query, Bacon flips the terms of the question. Rather than proposing to "supply the place" of all the disputative philosophers and other idols that beset and penetrate the mind, he promises to make the mind itself into the active partner: "My dear, dear boy, what I purpose is to unite you with *things themselves* in a chaste, holy, and legal wedlock; and from this association you will secure an increase beyond all the hopes and prayers of ordinary marriages, a blessed race of Heroes or Supermen" (72). Only through

⁷² The OED gives this figurative usage of "stock," derived from the botanical sense: "3a. The source of a line of descent; the progenitor of a family or race. In Law, the first purchaser of an estate of inheritance."

⁷³ Farrington accounts for this similarly, albeit in different terms, in a footnote. He points out that Bacon writes this piece in *initiative* as opposed to *magistral* form, addressing "the sons, as it were, of science" in order to signal its overarching concern with what I would categorize as the *reproductive futurity* of knowledge, and which Farrington describes as its "continuation and progression" (61, note 2).

figurative reproduction (within “chaste, holy, and legal wedlock,” an arrangement constituted by hierarchy and exclusivity of control) can knowledge be redeemed, the competing suitors (the corrupting and defiling idols) cleared away and this familiar model of hierarchical order restored. As Eve Keller reads this passage: “if the mind is pure, receptive, and submissive in its relation to God, it can be transformed by God into a forceful, potent, and virile agent in its relation to nature” (“Baconian Science” 38). In other words, Bacon proposes to “supply the place” of the rejected philosophers by marrying his chosen “sons” to Nature herself, to beget a new, pure “blessed race” of knowledge.

Like Hutchinson’s relation of the redemption story, the reproductive vision of Bacon’s promise begins with a purity that is gained by enclosure and exclusion, policing boundaries of the mind and of realms of knowledge. And it ends with a similar assurance that this “blessed race,” this superior race of knowledge, “will make you peaceful, happy, prosperous, and secure” (72). Who counts as “you,” the intended beneficiaries of this prosperity? Bacon provides clarification on this point when he refers to the text and its contents as a “compliment reserved to some of the choicer spirits among you” and insists that “science must be such as to select her followers, who must be worthy to be adopted into her family” (70, 62). In other words, like Hutchinson, he imagines an elect (chosen first by himself and thereafter by “science”) participating in the reproductive futurity of now-pure knowledge.

This would seem to put the lie to Cowley’s idealistic proclamation, in his allegory of Bacon overthrowing the old authorities in the orchard of knowledge: “Come enter, all that will” (xiv). A promise to select “choicer,” “worthy” followers sounds more like a blueprint for the kind of exclusive, self-selecting club that the Royal Society became, achieving homogeneity through exclusion and enabling a narrow group to assert authority over what would become ever

wider claims of intellectual territory. And as we have seen, that authority frequently gets rhetorically erased and/or naturalized. In Cowley's next stanza, "Bacon," having destroyed the old gatekeepers so that we can gather our fill, quickly directs our next move:

*From Words, which are but Pictures of the Thought,
(Though we our Thoughts from them perversly drew)
To Things, the Minds right Object, he it brought,
Like foolish Birds to painted Grapes we flew;
He sought and gather'd for our use the Tru* (xv)

Since "we" are foolish, and perversely draw understanding from words, he selects and gathers and presents us with what is true. He goes on to turn "chosen Bunches" of that knowledge-fruit into wine: he "prest them wisely the Mechanic way, / Till all their juyce did in one Vessel join" (xv). The poem underscores the complementary elements of this method; he pressed them "wisely" but also "the Mechanic way," evoking synthesis of expertise and craft. But the figure glosses over the agency exercised in the "choosing" of bunches by turning the verb into a descriptor, "chosen," and highlighting instead the action "prest" and the outcome "did join." Cowley's winemaking analogy, of course, features a fictionalized Bacon, but it closely echoes Bacon's own language in *Novum Organum*:

others, both ancients and moderns, have in the sciences drank a crude liquor like water, either flowing of itself from the understanding, or drawn up by logic as the wheel draws up the bucket. But we drink and pledge others with a liquor made of many well-ripened grapes, collected and plucked from particular branches, squeezed in the press, and at last clarified and fermented in a vessel. (*NO* 1.CXXIII)

This boast at first seems antithetical to Bacon's many exhortations to strive for direct and immediate access to things: he appears to look down on the idea of drinking, figuratively, straight from the stream or well, in favor of a heavily mediated product resulting from manifold interventions. But again the grammar tells the story: he erases the agent of the verbs "make," "collect" and "pluck." Both of these winemaking metaphors focus on the outcome of the juice all joining together (becoming homogenous) and elide the powerful authoring, editorial agency that inheres in choosing, collecting, and selectively plucking. Implicitly, these metaphors lay claim to an inherent authority to adjudicate who and what gets included and excluded at every step of the process.

Bacon advises his reader: "On waxen tablets you cannot write anything new until you rub out the old. With the mind it is not so; there you cannot rub out the old till you have written in the new" (*MB* 72). Margreta De Grazia examines the conventional invocation of this metaphor of the mind as wax—the "signet/wax apparatus symbolized the mystery of how the outside world entered the mind and stayed there"—and explains that this figure also evinced what I have been calling here a reproductive logic: it was "repeatedly evoked to illustrate a similarly mysterious phenomenon: not only how world entered mind to produce thought, but also how man penetrated woman to produce children" (66). She unpacks the significance of the figure's gendered structure: "the form-giving seal was male and the form-receiving wax female. The male bearing down on the female left a foetal imprint [...] The signet and wax apparatus, then, served to illustrate both processes of conception: the having of thoughts and the having of children" (66). Bacon's reconfiguration of roles in this gendered metaphor, which in his version depicts learning as a process by which narratives compete for dominance, is a vivid example of how such figures had to be twisted and strained to suit this new application.

Especially coming directly on the heels of his promise to wed his followers to a dominated Nature in “chaste, holy, and legal wedlock” that promises an “increase,” Bacon’s vision of proprietary marking in gendered terms carries forward the patriarchal logic of sexual purity that we saw in gender-coded metaphors of “discovery” and purported stewardship of resources that gets idealized as a relationship reminiscent of coverture. It also, then, provides a reading rule for figures of intellectual purity, demonstrating that they signal concerns about exclusive control over reproductive futurity. Hutchinson’s concerns about “wild” impressions and Bacon’s warnings about idols reveal a shared insistence that competing knowledge claims can be cleared *only* by installing a single authority and enforcing its supremacy by either excluding or subsuming everything else. This helps to account for how the new science, despite aiming to differentiate itself in terms of reading methods and discursive practices, ended up operating in some ways like an institutional system of belief, based around a myth of original purity and a need for hierarchical order. It seems little wonder that we continue to wrestle through crisis after crisis of authoritative knowledge—reformations, rebirths, and renewals—and still struggle to break that sacrificial cycle.

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