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Naturalized Women and Womanized Earth: Connecting the Journeys of Womanhood and the Earth, from the Early Modern Era to the Industrial Revolution

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by
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This project is dedicated to
all the women burned so men could lay claim to science.

I would like to thank

my mother for
teaching me to trust my body,

my father
for catching me,

Grandpa
for pulling me for miles in a wagon,
Grannie
for convincing me there were tiny people living in the garden.

Eli, Amii, Tabetha, Lianne, Robert, Peter and Kris,
who said "yes" when I said "women and nature"
and pushed me to prove it.

The women in my life,
Margaret Schultz,
Christina,
Jill.

Julia, Camille, Ayla, Caily, Terrence, Amelia
for protecting me.

Lizzie,
(for you, I live.)
for watching over me.

Mary
for building family in this house, and for always believing in the coven.

Holly
for hunting me down, and taking me back, and never, ever leaving.

Mira
for having my back.

"It is not women I am learning about so much as men.
Even more, it is science."

— Evelyn Fox Keller

1. *See list of illustrations.*

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Preface

"The mother is not the true parent of the child
Which is called hers. She is a nurse who tends the growth
Of young seed planted by its true parent, the male.
So, if Fate spares the child, she keeps it, as one might
Keep for some friend a growing plant."[1]

This project began as the final answer to four years of the same question. "What does gender have to do with the environment?" Whenever I was asked this I explained how women are far more prone to the disasters of climate change, how in the Global South, women are responsible for more agricultural labor than anywhere else in the world, but simultaneously own less land than anywhere else.[2] How, in fact, there is not one country where women own fifty-percent of land.[3] How the poor are more susceptible to climate change because they depend the most on natural resources for their livelihoods, and how the majority of the global poor are women.[4] I tried to explain that women become entangled in environmental disasters in a way men do not, they are more effected by water shortages, and food shortages, that even though they are largely responsible for obtaining water for their families, they are often the last ones to drink.[5] If there is not enough food, women go hungry. If water is far, girls drop out of school to walk to wells.[6]

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[1] Aeschylus, "The Eumenides," in *The Oresteian Trilogy*, trans. Philip Vellacot (New York: Penguin Books, 1959), 169.
[2] The United Nations, "Gender and Land Rights Database," Food and Agriculture Organization of the United Nations; Cheryl Doss, *The Role of Women in Agriculture*, report no. 11-02, Agricultural Development Economics Division (n.p.: The Food and Agriculture Organization of the United Nations, n.d.), 4.
[3] The United Nations, "Gender and Land," Food and Agriculture Organization of the United Nations.
[4] The United Nations, "Gender and Climate Change, What is the Connection and Why is Gender and Climate Change Important?," United Nations Framework Convention on Climate Change; United Nations Women Watch, "The Threats of Climate Change are not Gender-Neutral," Women, Gender Equality and Climate Change, http://www.un.org/womenwatch/feature/climate change/.
[5] United Nations Department of Economic and Social Affairs, "Gender and Water," International Decade for Action 'Water for Life' 2005-2015.
[6] Shail Khiyara, "Why is the Global Water Crisis a Women's Issue and the Top Global Risk Over the Next Decade?," *The Huffington Post*, October 12, 2016.

Despite my answers, I also found myself asking this question. Is gender really that important to environmental studies?

It is. And, I believe, the connection between environmental studies and gender exists at a far deeper level than what my answers suggested. My answers never got to the root of it. What I really wanted to know was why we have a *Mother Earth*, and a *Gaia*, and *fertile* fields, and *barren* wastelands. Why we have *virgin* lands, and why we *penetrate* them. I want to know why men only plow two things, Woman and Earth. Why men only spread their seed on two things, Woman and Earth.

This project began when I started asking questions in response. What is it about environmental science that benefits from the alignment of women and earth? Why does language of the feminine abound in understanding of the natural? Why does language of the natural fit so securely in understanding the feminine? What purpose does it serve to understand women and the earth in the same way? Why can men be *with* nature, while women seem to be *of* nature?

Introduction

"What could there be in the generalized structure and conditions of existence, common to every culture, that would lead every culture to devalue women? ... Woman being identified with, or, if you will, seems to be a symbol of, something that every culture devalues, something that every culture defines as being at a lower order of existence than itself. Now it seems that there is only one thing that would fit that category, and that is 'nature' "[7]

The early modern era was a time of great change, both for natural philosophy, and the place of women in society. I wanted to see how shifting beliefs about women changed during this time period, and how the change of women's place in society affected the place of the earth. Did the witch craze, which mobilized suspicion surrounding all women, but especially women healers, influence the way early-modern natural philosophy would reconceptualize the earth in woman's image? How would the early-modern weaponization of womanhood for the means of natural philosophy come to influence the practical applications of this philosophy for industrial development?

In 1986, Joan Wallach Scott published the essay, "Gender: A Useful Category of Historical Analysis." In it she argued that instead of writing histories that include an analysis of gender, which she asserts is a less political way to signify the inclusion of women, gender itself can be used as an analytic category by which to understand and write history.[8] This theory is integral to the formulation of my project, as I attempt to use gender as a lens through which to understand man's relationship to the earth. By making use of gender not only as it pertains to realized bodies, but as a theoretical category, new questions and motives arise. For Scott, one of the primary questions is "How does gender

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[7] Sherry B. Ortner, "Is Female to Male as Nature is To Culture," *Feminist Studies* 1, no. 2 (Fall 1972): 10, http://www.jstor.org/stable/3177638.
[8] Joan Wallach Scott, "Gender: A Useful Category of Historical Analysis," *The American Historical Review* 91, no. 5 (December 1986): 1056, JSTOR.

give meaning to the organization and perception of historical knowledge?"[9] How does gender not only shape history, but also influence the way we perceive and digest history? In line with Scott's objectives, this project seeks to complicate historical readings of both women and the earth, by positioning different subjects together, and by using gender as an analytical tool by which to understand history. Using gender as an analytical category gives the feminist historian the ability to "disrupt the notion of fixity, to discover the nature of the debate or repression that leads to the appearance of timeless permanence in binary gender representation."[10] This project is not an attempt to search for the singular origin of women's alignment with the earth, or the single origin of women's or nature's subjugation. Instead, I seek to frame the dual history of womanhood and nature, subjects "so interconnected that they cannot be disentangled," nor should they be.[11]

One year prior, in 1985, Luce Irigaray asked, "Is the Subject of Science Sexed?"[12] For my entire education, I was told that the sciences are the realm of objectivity, fact, conclusions based on experiment. Now we may see, the wholly objective field of science is objective in so far as objectivity is truly just masculine anonymity. Irigaray posits that we may see this flaw in the imagined scientist, the secret "*common force of production;* (man) who does science."[13] In the project of constructing science as objective, we have purposefully obscured the doer of science, as well as the object of examination. Irigaray reminds us that when attempting to deconstruct the monolith of "science," we do not know who is before us, who to address or how to speak.[14] To uncover the true nature of

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[9] Ibid., 1055.
[10] Ibid., 1068
[11] Ibid., 1067
[12] Luce Irigaray, "Is the Subject of Science Sexed?," *Cultural Critique*, no. 1 (Fall 1985).
[13] Ibid., 74 (emphasis in original).
[14] Ibid., 74

science that has been decontextualized, constructed as so to seem ever-present, is to look for identity in what has been taken as objectivity. It is to pay attention to the way conductors of science reveal themselves historically, "through what is discovered or not discovered…in what science does or does not take to be the stakes of its research."[15] Now, I do not ask myself if science is sexed. I ask myself why science, specifically, environmental science and natural philosophy, is sexed or gendered, by what means, and with what end goal in sight. Now, to reconcile my deep investment in both environmentalism and feminism, I ask *why* it is useful to gender the earth, *how* did the earth come to be so completely gendered, and if this gendering led to the possibility for environmental destruction that would have otherwise been unthinkable. To answer such a question necessitates a historical examination of broad trends, including but not limited to changes and development in religion, natural philosophy, and industry.

The topics for the chapters of my project may at first glance seem like a collection of disparate themes. Yet, I put these three topics together, because they demonstrate the cultural transformation of womanhood that took place in the early modern era, the mechanism by which this new understanding of womanhood was translated into natural philosophy, and how environmentally dependent industry developed after the early-modern revolution in natural thought. To map out this journey, it was necessary to draw on information from different sites, times, and disciplines. Thus, this project begins with an analysis of the witch craze in tandem with the rise of medicalization in England, and how perceptions of womanhood, and specifically understandings of midwives were transformed to cloak women who had scientific and bodily knowledge with suspicion.

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[15] Ibid., 80-81

The second chapter will examine Francis Bacon, the father of modern scientific thought. It will specifically demonstrate Bacon's use of violent, gendered metaphors to understand the earth using the newly reformulated image of the secretive, evil woman. The last chapter will examine the transformation in the mining industry from antiquity through the Industrial Revolution, through the lens of womanhood, and the woman-as-earth metaphor.

I chose these three topics for a multitude of reasons. I wanted to look at midwives and witches, firstly for how they exist as a symbol for the overall transformation of womanhood in the early modern era, and how the witch craze can also be studied to learn about the rise of exclusionary empiricism. I chose to look at Francis Bacon, in part because he is the most widely renowned early-modern natural philosopher, and is regarded as the father of modern scientific thought, but also because he had tangible involvement in the witch hunts in England, as well as the mining industry, and employed gender in his understanding of the earth. I chose to examine mining because it is, simply, a penetrative industry. Additionally, the use of the womanly body as a metaphor for mining abounded prior to the Industrial Revolution, so tracing the use of and understanding of mining throughout the ages as a sexual (or not) act, reflects upon whether or not the earth was culturally digested through the symbol of woman's body.

These three chapters should be understood as intimately in connection with one another. If cultural transitions in the perception of women's relationship with the earth did not change in the early modern era, perhaps Francis Bacon would not have been able to so effectively employ the image of a secretive and dark woman-nature in his natural and industrial philosophy. Without the use of this specific iteration of womanhood, would

miners have been able to develop the industry with such vigor? If the earth had retained its previous connection to womanhood, as a revered and generous producer, not as a secretive and lecherous woman, would the industry have been able to penetrate so completely into the body of the earth without a second thought? If we are ever able to understand how we have reached the current norm of environmental destruction, we must first understand what it is that the earth represents, and why.

Chapter One
Empiric Superstition & Women of the Earth: From Midwife to Witch

> As soon as the Child is born, if the mother herself is not a witch, the midwife carries it out of the room as though she were going to set about reviving it, and, lifting it up to the prince of evil spirits (namely Lucifer) they offer it as a sacrifice to all evil spirits.[16]

> In a word, a midwife is an animal, who has nothing of the woman left…If instead of quacks…we have recourse to a real *Surgeon and Man-midwife*…he must be of tender and humane disposition, be endowed with sensibility of soul, and sympathizes with the evils and afflictions with which human nature is liable to…[17]

In early-modern England witchcraft was understood as an often inherited and innate ability to cast magic, influence nature, weather and fertility, mostly used to inflict harm through rites, rituals and spells.[18] Despite there being no mention of gender in the definition of witchcraft, the described witch is almost necessarily a woman, specifically in the early-modern European definition, a low class, perhaps illiterate, older woman.[19] She is unkempt, somehow wild, inherently in close proximity to nature. She is haggardly, a widow. She looks as though she is part of the natural world, self isolated from culture and community. Why does the image of the witch call to mind a "naturalized" woman? Despite the understanding of witchcraft as used to inflict harm, the term was left linguistically undifferentiated from healing and even in some cases, midwifery, until the

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[16] Heinrich Kramer and Jacob Sprenger, *The Malleus Maleficarum*, trans. P. G. Maxwell-Stuart (Manchester: Manchester University Press, 2007), 93.
[17] Louis Lapeyre, *An Enquiry Into the Merits of These Two Important Questions: I. Whether Women with Child Ought to Prefer the Assistance of Their Own Sex to that of Men-Midwives II. Whether the Assistance of Men-midwives is contrary to Decency; or Whether it can in any way Alarm the Modesty of the Fair Sex during Time of Their Being with Child, or in Labor?* (London, England: S. Baldon, 1772), 35, 43, Eighteenth Century Collections Online.
[18] J. A. Sharpe, "Witchcraft," in *Encyclopedia of European Social History From 1350-2000*, ed. Peter N. Stearns (New York: Charles Scribner's Sons, 2001), 3: 361-362.
[19] Ibid.

early modern era, because both healing and midwifery involved the use of magic and ritual.[20]

The historiography of midwifery in England likewise often calls to mind the image of a woman. Historians of midwifery, notably, Adrian Wilson argue that midwifery was the domain of women until the professionalization of the field in early-modern England.[21] Like most other historians of midwifery, Wilson presents a story wherein midwifery, and the process of birth were where women exercised their power, knowledge and built community.[22] It was common that neighbors attended each other's births, and birth was understood as a harrowing, yet natural process.[23] The main debate in the history of midwifery surrounds the rise of professionalization, and with it, masculine interventionist methods. Feminist scholars of midwifery tend to view this as a way to delegitimize capable midwives that also served to increase women's shame surrounding their bodies, whereas others tend to focus on the technology brought by the male-midwives, and thereby cast professionalization and masculine influence as a largely positive contribution.[24] Although I align with the accounts that posit male entrance into midwifery as resulting in the mass marginalization of capable and well-versed women, not all historians do. Despite agreeing with historians who posit a history of midwifery critical of male intervention, I also argue that the history of midwifery and women-centric

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[20] Edward Peters, "The Literature of Demonology and Witchcraft," Cornell University Library Division of Rare and Manuscript Collections, Witchcraft Collection.
[21] Adrian Wilson, *The Making of Man-midwifery, Childbirth in England 1660-1770* (Cambridge: Harvard University Press, 1995), 98, digital file.
[22] Linda A. Pollock, "Childbearing and Female Bonding in early modern England," *Social History* 22, no. 3 (October 1997): 288, JSTOR; Adrian Wilson, *Ritual and Conflict: The Social Relations of Childbirth in Early Modern England*, The History of Medicine in Context (n.p.: Taylor and Francis, 2013), 70.
[23] James C. Riley, "Did Mothers Begin with an Advantage? A Study of Childbirth and Maternal Health in England and Wales 1778-1929," *Population Studies* 57, no. 1 (March 2003): 5, JSTOR; Wilson, *The Making*, 15.
[24] Elaine G. Breslaw, "Giving Birth," in *Lotion, Potions, Pills and Magic* (New York: NYU Press, 2012), 118-119; Gail Kern Paster, *The Body Embarassed: Body and the Disciplines of Shame in Early Modern England* (Ithaca: Cornell University Press, 1993), 183-185, digital file.

healing and birth practices should not be isolated from the history of natural philosophy, as the way in which midwives, and birth in general were understood influenced perceptions of the earth.

Healers, and midwives, and those who would later be accused of witchcraft, were often the same women.[25] As the history of midwifery demonstrates, midwives were by and large women, until the rise of male intervention in the 17th century. Do we imagine healers and witches as women because women, although demographically part of cultural infrastructure and society at large, are understood as intimately closer to, or within, the construction of nature? Is womanhood subsumed within nature so seamlessly that we assume that she may be the only translator between the materials of nature, whether it is fertile fields, or the ripening belly of a woman, and men?[26]

The alignment of women with nature predisposed women to fill the role of healers, witches, and midwives, as these are roles that demand one to act as an intermediary between man and nature, whether that be to explain, or be the scapegoat for, unexpected climatic events such as droughts or storms, or to heal unexplained illnesses.[27] More destructively though, the defining of women into the culturally derived concept of nature allows for the joint exploitation of both women and the environment, by naturalizing women's subordinated position, and simultaneously feminizing the image of the earth. Does the role of woman healer, and the accompanying connection to the earth explain the gender disparity in the witch accusations, a vast majority of which were

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[25] Joseph Klaits, classic witches: the beggar and the midwife to *Servants of Satan: The Age of the Witch Hunts* (n.p.: Indiana University Press, 1985), 95.
[26] Ortner, "Is Female," 12.
[27] Rita Jo Horsley and Richard A. Horsley, "On the Trail of the 'Witches:' Wise Women, Midwives and the European Witch Hunts," *Women in German Yearbook* 3 (1987): 16.

against women?[28] Does it explain why the rise of morally structured midwifery regulations, borne from the fear of midwives and their proximity to nature and newborns coincide with the beginnings of the early-modern witch persecutions?[29]

This chapter will examine the reasoning behind superstition of women healers, why midwives were considered the most dangerous of the witches, and how the witch hunt of the early modern era, in tandem with the rise of masculine-centered medicalization, served to marginalize midwives and create a new and dangerous image of the natural woman. To understand the transformation in full, we will begin with Aristotle's binary distinction between man and woman in respect to procreation. The remainder of the chapter will include an examination of early-modern writings on witchcraft, midwifery, popular literature, and midwifery regulations.

Healers, the "Natural" Scapegoat

The naturalized binaries between man and woman that permeate Western thought should be read as an extension of the Aristotelian binary distinction between man and woman, first explained in theories of reproduction from Aristotle's *Generation of Animals,* dating back to approximately 350 B.C.[30] Aristotle's binaristic approach influenced the theory of Francis Bacon, St. Thomas Aquinas, Charles Darwin, and is still reflected in contemporary discourse.[31] Aristotle establishes the binary divide believed to

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[28] A dramatic majority of witches accused and persecuted were women, rising to levels as high as 85% in the case of the Scottish witch trials; Julian Goodare, "Women and the Witch-Hunt in Scotland," *Social History* 23, no. 3 (October 1998): 289.

[29] Monica Green, "Women's Medical Practice and Health Care in Medieval Europe," *Signs* 14, no. 2: 451, http://www.jstor.org/stable/3174557.

[30] Robert Robbins, ed., "Aristotle: On the Generation of Animals," Electronic Scholarly Publishing.

[31] Cera R. Lawrence, "On the Generation of Animals, by Aristotle," in *The Embryo Project Encyclopedia* (Arizona State University, 2010); Earlier this year, a bill was advanced through Ohio state legislation, requiring women to obtain the permission of the father of the fetus before getting an abortion. The bill's author explained that he understood that women "feel that it is their body" but in reality, they are merely "hosts." See, Sandhya Somashekhar and Amy B.

be present in reproduction by stating, the body "of the active partner and of the passive partner must be different."[32] He then immediately clarifies, "Now of course the female *qua* female is passive and the male *qua* male is active."[33] It is not shocking that Aristotle reasons that men and women's bodies must be different, nor even that men are active and women passive. More noteworthy is that he posits that in addition to different bodies, the active and passive partners must necessarily have different "logos," meaning reason, speech, or plan.[34] Thus in Aristotle's eyes, difference in body not only implies difference in activity with respect to procreation, but also represents an entirely different system of reason, logic and speech, divided only by gender lines.

To cement the comparison further he ends this section with this image, "we see that the one thing which is formed is formed from them only in the sense in which a bedstead is formed from the carpenter and the wood…"[35] By comparing the level of activity women have in reproduction to the contribution wood plays in the construction of a bedstead, Aristotle is relegating women to the position of inanimate material, material that is, not coincidentally, part of the natural world. In this composition, men and women are at opposite ends of the hierarchical ladder, but they are necessary to each other. Notably, in this binary, women were believed to have a connection with nature that men could not obtain, as their bodies were the literal material, as well as the delivery mechanism for such material. Important material, yes, but they were granted no agency, and would not be able to accomplish anything without the active force of manhood to

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Wang, "Lawmaker who Called Pregnant Women a 'host' Pushes Bill Requiring Fathers to Approve Abortion," *The Washington Post*, February 14, 2017, politics, accessed March 2017.

[32] Aristotle, *Generation of Animals*, trans. A. L. Peck (Cambridge, Massachussets: Harvard University Press, 1943), 11-113.

[33] Ibid.,

[34] Aristotle, *Generation of Animals*, 111-113; Logos, Philosophy and Theology," in *Encyclopædia Brittanica*, last modified 2009, https://www.britannica.com/topic/logos.

[35] Aristotle, *Generation of Animals*, 111-113.

build, shape and construct them. From the inception of the binary opposition between men and women, women were set up to act as a sort of interpreter between man and nature, positioning her as subordinate yet necessary to the men whose role it was to labor over nature and create organized systems of (re)production. This gendered binary code is seen reflected not only in cultural perception of the early-modern midwife, but in Bacon's understanding of nature as a woman's body, as well as the 19th-century attitudes towards the growing mining industry.

The alignment between femininity and nature served to make women natural healers and interlopers between men and the mysterious natural world. Prior to the scientific revolution in the 1600's, most weather events as well as illnesses were explained through religion and superstition.[36] Therefore there was no push to separate empirical thought until religious authority began to influence medicine. Now, in contemporary times, the separation between witchcraft, midwifery and homeopathic healing is clear.[37] Contrarily, for much of history, most healing practices were understood to be in some way magical or mystical. Additionally, until the early-modern era, not only were the categories of "healer," "midwife," and even sometimes, "witch" linguistically undifferentiated, they were also used interchangeably, because healers often had to take on a multitude of roles.[38] It was not until the 1600's that healing began to be separated

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[36] Dean Bell, "Natural Disasters and Religion- Looking Through a Scientific Lens," interview by Ashley Cullins, Helix Magazine, last modified May 2011, https://helix.northwestern.edu/article/natural-disasters-and-religion-looking-through-scientific-lens.

[37] It should be noted that contemporary "witchcraft" most notably, Wicca, has no factual connection to the practices of the European witches of the early modern era and earlier; Ronald Hutton, "Paganism and Polemic: The Debate over the Origins of Modern Pagan Witchcraft," *Folklore* 111, no. 1 (April 2000): 104, JSTOR.

[38] Green, "Women's Medical," 438; Because of the sheer amount of information available on midwives, despite the tendency to include them under the category of general "healer," specific discussions of midwifery as it pertains to witchcraft will be discussed in the following section.

from its mystical elements, and the traditional practitioners of the healing arts became marginalized, and suspected of wrongdoing.

Early healers had the combined responsibilities of curing sickness, as well as aiding all types of fertility, whether of humans or the earth.[39] These women were sought after in times of drought because they were thought to be able to bring rain and create fertile and bountiful land.[40] This ancient tradition at once celebrated the powers of healing women, while also setting them up to be convenient scapegoats for uncontrollable weather patterns. With this, a mechanism is born for partially understanding the seemingly inexplicable ways of nature that at once ingrained the connection between women and nature while simultaneously creating the image of both nature and women as potentially evil, chaotic and in need of controlling. This can be seen in the direct correlation between spikes in witch hunting and the most extreme peaks of what would come to be known as the Little Ice Age, demonstrating that the conception of witches transformed to explain this seemingly inexplicable climatic phenomenon.[41] It was nearly impossible to understand weather, or the earth without extreme moralistic connotations, which served to reformulate the healers; those relied upon to translate between man and nature as witches, ripe for scapegoating.[42]

As aforementioned, it is difficult to provide a clear distinction between witchcraft and healing, especially prior to the systematic destruction of witchcraft in the witch trials of early-modern England. Healers and witches often took on similar responsibilities, and later, healers and midwives were considered the most cunning of the witches, for their

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[39] Margaret Murray, *The God of the Witches* (New York: Oxford University Press, 1970), 153.
[40] Ibid., 153.
[41] Wolfgang Behringer, "Climatic Change and Witch-hunting: the Impact of the Little Ice Age on Mentalities," *Climatic Change* 43, no. 1 (September 1999): 335.
[42] Ibid., 336.

proximity to communities, and their knowledge of natural systems.[43] Before the large-scale medicalization of England and Western Europe, women who were understood to have knowledge of the earth or mystical powers were commonly turned to in times of crisis, and the technical distinction between healer and witch was largely unimportant to the laymen.[44] In fact even after medicalization and the spirit of empiricism infiltrated established healing practices, in the 1600's, witches and other healers could often solve problems that doctors could not, because they relied on long stores of traditional herbal knowledge.[45]

In times of relative peace, folk healers were revered for their ability to heal, to communicate with the earth and to soothe worried masses. But in times of unrest, healers fell under immense scrutiny. Thus, the most common targets of the witch-hunts were healers, whether they were folk healers or midwives, as both were under suspicion by authorities for making use of white magic, and under suspicion by their neighbors for causing change and upheaval in the local communities.[46] Although witch hunting increased in times of unprecedented political and climatic change, the rise of empirical thinking as it pertained to medicine in early-modern England also encouraged the marginalization of a class of women healers. A mechanism used to ensure midwives and healers would lose dominance in their fields was to propagate theories that they were aligned with the daemonic forces. This casting of midwives and healers as witches or otherwise suspect, uninformed or unqualified practitioners should be seen in relation to

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[43] Emma Wilby, "The Witch's Familiar and the Fairy in Early Modern England and Scotland," *Folklore* 111, no. 2 (October 2000): 289, http://www.jstor.org/stable/1260607.
[44] Goodare, "Women and the Witch-Hunt," 298.
[45] Barbara Ehrenreich and Deirdre English, *Witches, Midwives & Nurses, A History of Women Healers*, 2nd ed. (New York: The Feminist Press, 2010), 53.
[46] Ibid., 13.

the rising of the prominence of male-midwives, and Episcopal governing authority.[47] The rise of male-midwifery, and the role of religious authority must be examined in order to ascertain the complete picture as to how feminine healing practices came to be associated with the dark arts, and necessitated a need for male intervention, whether it was via the courtroom in a witch trial or the entrance of male-midwives into birthing chambers. To create a world wherein environmental degradation is the norm, feminine healers, Mother Nature's first translator and nature's closest companion must be put into an evil class, where the betterment of society depends on their eradication.

Midwifery and Episcopal Authority

To understand the relationship between midwives and English religious authority, laws that regulate medical practice, as well as midwifery regulations and oaths in particular will be examined. Firstly, midwives were understood as being in closer proximity to nature than other women healers because they were well versed in birth specifically, and thus thought to have an innate understanding of nature's tempo.[48] The entry for midwifery in the first ever publication of the *Encyclopædia Britannica* defines midwifery as "the art of assisting nature…"[49] Midwives were respected for their role in the birth process, but the process itself was understood to exist beyond them, as is evidenced from a 16th-century description of an ideal delivery,

> The midwife herself shall sit before the laboring woman and shall diligently observe and wait, how much, and after what means the child stireth itself, also shall with her hands first anointed with the oil of almonds, or the oil of white lilies.[50]

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[47] Klaits, Classic Witches: the Beggar and the Midwife, 95-96.
[48] Amanda Carson Banks, "Stones and Stools: An Early History of Birth Chairs and the Practice of Delivery," in *Birth Chairs, Midwives, and Medicine* (n.p.: University of Mississippi Press, 1999), 1,
[49] Ibid., pg. 5
[50] Thomas Raynalde, *The byrth of mankynde, otherwyse named the Womans booke. Newly set foorth, corrected, and augmented* (London, England, 1560), 141-143.

Despite being guiders of nature, instead of interventionists, women were able to establish a near monopoly in the field. Midwifery also acted as a useful tool in the building and maintenance of community between women who were often illiterate and excluded from learned society. The epistemology of midwifery is markedly different from that of the empirical sciences, considering most of this knowledge was traditional, had a tendency to be folkloric, and was mostly oral.[51] This put midwives under increased superstition, as medical sciences were undergoing a professional revolution, supported by English ideals of experiment-based empiricism. Because there was a marked lack of written treatises on the practice of midwifery, by women, for women, midwifery as a practice was easier to delegitimize as a suspicious "white magic."[52]

Even though midwives as a community had vast stores of scientific knowledge of useful herbs, reproduction, and even effective birth control, the lack of formal writing within the field presented a serious challenge to the midwife who wanted to legitimate her practice, and also shut her scientific knowledge off from being considered empiric, because it did not fit the mold of masculine, officiated empiricism. Additionally, prior to the professionalization of medicine in western Europe, men were barred from the delivery room, for fear that their witnessing birth made the women impure.[53] The lack of male oversight only served to heighten suspicion of what midwives did behind closed doors, as the birth chamber was one of the few spheres of living almost exclusively accessed by women.[54] Yet, by the 1700's, men almost completely replaced women as

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[51] Green, "Women's Medical," 459.
[52] Klaits, Classic Witches: The Beggar and The Midwife, 99.
[53] Jean Donnison, *Midwives and Medical Men: A History of Interprofessional Rivalries and Women's Rights* (New York: Schocken Books, 1977), 11.
[54] Wilson, *The Making*, 25-30.

attendants in all births, not only the dangerous ones over which they had previously presided.[55] How were men capable of such swift infiltration into a field that had previously been the domain of women?

For an answer, we must look back to the first large scale attempts to regulate midwifery. Almost two centuries before the proliferation of forceps, and the ensuing male domination of the field, a change in religious authority over medical practitioners provided the first step towards mass marginalization of female midwives.

The Catholic Church was granted official authority over midwives through the Act of 1512, passed by Henry VII, which gave the Church licensing power for the practice of surgery and medicine.[56] Yet a mere twenty-two years later, Henry VII split England from the Catholic Church and established himself as the sole head of the Church of England, through the first Act of Supremacy, issued by parliament in 1534.[57] Despite the monumental religious changes that characterize England in the early modern era, the Act of 1512 remained and therefore, religiously moralistic regulations on midwives did as well. At large, the Act of 1512 was intended to regulate physicians, surgeons and practitioners of "manual arts" who were feared to have a lack of understanding or formal training.[58] This moment is significant, because the Act of 1512 coalesced the Catholic Church and the increasingly professional medical field into one body that could regulate traditional knowledge forms when no other country in Europe had such a governing

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[55] Lisa Forman Cody, *Birthing the Nation, Sex, Science and the Conception of Eighteenth-Century Britons* (Oxford: Oxford University Press, 2005), 477.
[56] Wendy Perkins, *Midwifery and Medicine in Early Modern France, Louise Bourgeois* (University of Exeter Press, 1996), 2, digital file.
[57] D. G. Newcombe, *Henry VIII and the English Reformation*, Lancester Pamphlets (London: Routledge, 1995), 57, ProQuest Ebook Central.
[58] Elinor J. Clark, *Law and Ethics for Midwifery* (London: Routledge, 2015), 54, digital file.

mechanism.[59] It could be argued that The Act of 1512 improved the practice of midwifery, as it was the first piece of legislation that aimed to regulate methods, but its effects were not positive for all practitioners. As aforementioned, before this point, midwifery relied on oral history, herbal knowledge, and folk ritual with scientific grounding. Because midwives also built communities and taught amongst themselves, most often through first hand experience in birthing chambers, few were learned in official capacities.[60] Where midwives lacked university led experimentation, they had first hand experience. Nevertheless, the lack of officiated practice, made it difficult to obtain the licensing now available through the Act of 1512, as it benefited those who could demonstrate official knowledge or documentation, despite the fact that male midwives were comparatively new to the practice.

Another roadblock in midwives' ability to be recognized as medical professionals was a parliamentary act put forward in 1421 which barred women from practicing medicine, stating, among other measures, "that no Woman use the practyse of Fisyk [medicine] undr the same payne" of "long emprisonement" and a monetary fine.[61] The act of 1512, despite the fact that it was immediately followed by the establishment of a midwifery licensing system, implying that midwives were definitely included in its measures, must have been confusing to practicing midwives, who were barred from being recognized as medical professionals since 1421, but suddenly came under regulation with physicians and surgeons.[62]

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[59] Perkins, *Midwifery and Medicine*, 2.
[60] Green, "Women's Medical," 470.
[61] Green, "Women's Medical," 449.
[62] Ornella Morscucci, *The Science of Woman, Gynaecology and Gender in England, 1800-1929* (New York: Cambridge University Press, 1990), 43, digital file.

Because of their lack of documentation, it was difficult and often times cost prohibitive for women midwives to obtain licensing. But, due to the nature of their work, and establishment within their smaller communities, the Act of 1512 was rather hard to enforce amongst practicing midwives. Parish midwives were not expected to have official licensing, as it was uncommon that their clients were concerned with licensing from religious or medical authorities, and the traditional education by means of apprenticeship was widely accepted. Therefore, most midwives remained unlicensed.[63] The hardship associated with obtaining official licensing separated midwives from medical establishments, but perhaps more importantly, separated them from the Catholic Church. Simultaneously, the Catholic Church, and later the Church of England was able to give medical licensing to those who could fit into their regulations, most of them being male.

Despite the separation begun by act of 1512, out of sheer necessity, midwives remained important to the Catholic Church, and later the Church of England, as the health of newborns and mothers depended on them, and male midwives had not yet reached a majority, nor were they entirely trusted by the populous. Thus, it is telling to examine the rules and regulations set by the church as a medically officiating body onto midwives for their practice, if they were to remain in good favor. The three main rules placed onto practicing midwives were as follows: They must have good character, they must vow not to perform abortions and they must vow not to use any magical rites.[64] These three rules have relatively little to do with birthing practices and are instead largely

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[63] Samuel S. Thomas, "Early Modern Midwifery: Splitting the Profession, Connecting the History," *Journal of Social History* 43, no. 1 (Fall 2009): 116, JSTOR.
[64] Donnison, *Midwives and Medical*, 5.

concerned with moral standards, religious doctrine and a fear of magic. An English midwife's oath from 1567 demonstrates the moral tone of midwives' promises, as well as the obsession with the potential for dark magic. Eleoner Pead received her licensing from the Archbishop of Canterbury after swearing,

> …I will not use any kind of sorcery or incantation in the time of the travail of an woman; and that I will not destroy the child born of any woman, nor cut nor pull off the head thereof, or otherwise dismember or hurt the same, or suffer it to be hurt or dismembered by any manner of way or means…[65]

The remainder of the oath contains no information about the actual process of giving birth, but does include detailed description about proper baptism practices, as well as a promise to prohibit any woman to "name any other to be the father of her child than only he who is the right and true father"[66] Purity, for the mother, the baby and the midwife were of major importance, whereas, judging from midwifery oaths alone, medical practice, experience and even cleanliness were not important enough to be mentioned. Coincidence or not, the earliest record of midwife regulation and oath is from the mid 15th century, and coincides with the beginnings of the early-modern witch craze.[67] Prior to the establishment of the Catholic Church as a ruling medical body, almost all midwives employed what would come to be seen as dangerous magical rites and ointments in their practice, as these were believed to be truly helpful, especially when considering that the act of giving birth was often regarded as a dangerous, and even potentially spiritual act in and of itself.[68] Not only were their tactics believed to be helpful, but they often did make a difference. The use of ointments, and herbal infusions

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[65] "Midwives in the Time of Elizabeth," in *The Boston Medical and Surgical Journal*, ed. Francis H. Brown and F. W. Draper (Boston, United States of America: David Clapp and Sons Publishers, 1873), 256, digital file.
[66] Ibid.,
[67] Green, "Women's Medical," 451.
[68] Thomas Rogers Forbes, *The Midwife and the Witch* (New Haven: Yale University Press, 1966), viii.

was based on long stores of knowledge and served to make labor faster and less painful.[69] This herbal knowledge remains reflected in modern pharmaceuticals. For instance, midwives commonly used Belladonna to stop uterine contractions when they believed women were in danger of miscarrying. Now, it is used as an anti-spasmodic. The same can be said for the fungi, ergot, once used to lessen labor pains, now derivatives of ergot are used commonly to help in the childbirth recovery process.[70] This knowledge, obviously scientific and grounded in experiment, was not deemed as empirical, even though by modern standards it qualifies as such, and instead was relegated to the world of magic.

Midwives, the Most Dangerous of the Witches

Midwives were commonly the population most suspected of witchcraft.[71] As a group, they had the tendency to be older women, or widows, both of whom were already suspicious, for their lack of familial connection.[72] Midwives were both necessary for baptismal services, but also came in close contact to materials of birth closely associated with witchcraft, placing them in a situation where they were at once indispensible, and under great suspicion.

The most famous book on witches, *The Malleus Malificarum* posited that midwives were the single most dangerous category of witch, and presented the greatest threat to the Catholic Church.[73] *The Malleus Malificarum,* or, *The Hammer of the Witches*, was published in 1487 by "Witch Theorists," the inquisitors Heinrich Kramer

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[69] Thomas, "Early Modern Midwifery," 118.
[70] Frances Lang, "Witches, Midwives, Nurses," *Off Our Backs* 3, no. 3 (November 1972): 27.
[71] Richard A. Horsley, "Who Were the Witches? The Social Roles of the Accused in the European Witch Trials," *The Journal of Interdisciplinary History* 9, no. 4 (1979): 708-709, JSTOR.
[72] Klaits, Classic Witches: The Beggar and The Midwife, 95.
[73] Kramer and Sprenger, *The Malleus*, 93.

and Jacob Sprenger.[74] It is widely regarded as the most influential primary source on witchcraft ever written, and some scholars on the subject go as far as to say that the dissemination of the ideas written in *The Malleus Malificarum* led directly to the mass hunts of the 16th and 17th centuries.[75] Although *The Malleus* is a German book, it impacted witch hunting around the entirety of Europe, and is even credited as the source that cemented popular belief in witchcraft and sorcery amongst the layman.[76] Between 1487 and 1520 alone, the book sold out sixteen editions, and by 1669 an additional 16 editions were published.[77] The first English edition appeared in 1584, and came to influence the methods of witch trials, as it was widely read by inquisitors as well as judges.[78] *The Malleus* influenced witch trials for over 200 years, and was second in sales only to the Bible until 1678.[79] Although not all treatises on witchcraft contained such rampant misogyny, the reliance on gender by Kramer and Sprenger should not be written off as a singular act. Because *The Malleus* was such a successful book, and the first major work on witchcraft, it all but created the English and continental image of witchcraft.[80] An examination of *The Malleus* demonstrates the strength of the connection between midwives and witches.

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[74] Walter Stephens, "Witches Who Steal Penises: Impotence and Illusion in Malleus Maleficarum," *Journal of Medieval and Early Modern Studies* 28, no. 3 (1998): 495.
[75] Tamar Herzig, review of *Malleus Maleficarum*, *Magic, Ritual and Witchcraft* 5, no. 1 (Summer 2010): 135. ; Euan Cameron, review of *Witches and Neighbours: The Social and Cultural Context of European Witchcraft*, Reviews in History
[76] Lewis Spence, "Malleus Maleficarum," in *The Encyclopedia of the Occult*, 2nd ed. (London: Bracken Books, 1988), 265.
[77] New World Encyclopedia Contributors, "Malleus Maleficarum," in *New World Encyclopedia* (New World Encyclopedia, 2014); Rosemary Ellen Guiley, "Malleus Maleficarum (Witch Hammer," in *The Encyclopedia of Witches and Witchcraft*, 2nd ed. (New York: Checkmark Books, 1999), 221.
[78] Guiley, "Malleus Maleficarum," 221.
[79] Ibid., 220
[80] Ibid., 221

This book was designed to be a thorough dissection and diagnoses of what makes a witch, how to identify behavior of witches, and how to correctly prosecute them.[81] The organizational structure of the book foreshadows the anatomization of feminine bodies that is to come in the name of truth and scientific advancement. Its chief purpose was to be useful to the general population in their efforts to identify witches, and thus the structure rigorously dissects the subject material within the book so it can be used easily and efficiently. The table of contents is divided into three main sections, the first is eighteen specific questions about witches, the second is nine short chapters made of information useful to identifying and understanding the methods and acts of witches, and the third is thirty-five questions covering the appropriate ways to rightly prosecute witches.[82] This organizational tactic is of the utmost importance, and will call to mind Baconian principles for scientific organizing. Not only was the book designed to designate all categories and type of witch, but it was crafted to be usable by the laymen, just as scientific exploration, as we will see in the forthcoming chapters, should be accessible to all men who yearn for the truth. The book contains such chapters as, "Do Witches Employ Illusion to Trick People Into Thinking That Men's Penises Have Been Entirely Uprooted from their Bodies?" and "Midwives Who Work Harmful Magic Kill Foetuses in the Womb in Different Ways, Procure a Miscarriage, and, When They do not do This, Offer Newly Born Children to Evil Spirits."[83]

There is a dual obsession throughout *The Malleus Maleficarum.* It is deeply concerned with the midwives' threat to the structure and existence of proper catholic

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[81] Hans Peter Broedel, "Abstract," in *The Malleus Maleficarum and the Construction of Witchcraft, Theology and popular belief*, Studies in Early Modern European History (Manchester University Press, 2003).
[82] Kramer and Sprenger, *The Malleus,* v-x.
[83] Ibid., v-ix

families, while also being concerned with protecting masculinity from the threat of the witches. The fear that witches were directly threatening to masculinity in such an explicit way, that men thought their penises were in danger of being stolen, is reminiscent of the fears of midwives by the masculine empirical authority, as both are related to the suspicion surrounding communities of women that men did not have access to. *The Malleus Maleficarum* also determined guidelines for torture methods, guidelines for who could suitably be a judge of the witches, and eighteen separate methods for pronouncing a sentence.[84] Because of the utter thoroughness of this work, it went a long way in establishing a foundation for the ways those accused of witchcraft were to be understood and prosecuted, and undoubtedly contributed to, and served to legitimate suspicion of midwives coming from the Catholic Church, and later from the Anglican Church, because *The Malleus* remained widely read.

Although all witches were under suspicion for devilish acts, midwives were often portrayed as the most dangerous, for several reasons. Firstly, a general suspicion of a knowledgeable woman who can exert control over labor immediately connected midwives with the occult. In fact, some of the crimes midwife-witches are accused of include such disturbing claims as, "They devour the child, or offer it to an evil spirit." They are suspected of infanticide and the use of evil as well as herbal means to interfere with birth.[85] The acknowledgement of the use of herbal remedies by the midwives is especially interesting, as it is a complete acknowledgement that midwives were well versed and knowledgeable in the herbal remedies for birth. Yet, this acknowledgement of their skill does not contradict their danger, as it is ultimately concluded that,

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[84] Ibid., v-x
[85] Ibid., 92.

> Witch-midwives cause more serious damages in these matters [the killing and sacrificing of newborns], as penitent witches have often told me and others. They say, 'No one does more harm to the Catholic faith than midwives. When they don't kill the children they take the babies out of the room, as though they are going to do something out of doors, lift them up in the air and offer them to evil spirits.[86]

Charging that those midwives contaminated by witchcraft are the single most threatening group of witches to the Catholic Church is a lofty claim, but underscores the true danger of midwives' proximity to vulnerable newborns, and the deep seated fear of their unfaithfulness. *The Malleus Mallificarum* expands upon this claim by accusing midwives of learning "from suggestions made by evil spirits how to make up from children's body-parts ointments which are suitable for their purposes."[87] The sheer proximity of midwives to the perceived tools of the witches scared more than the authors of *The Malleus*.

Francis Bacon himself wrote about the ways in which witches make use of infants in their craft. In his *Slyva Slyvarum; Or A Natural History in Ten Centuries*, he includes an entire aphorism about the ointments used by witches, and writes, "The ointment that witches use, is reported to be made of the fat of children digged out of their graves; of the juices of smallage, wolf-bane, and cinque foil, mingled with the meal of fine wheat."[88] Without directly mentioning the work of midwives, Bacon legitimated the fear that witches maintained close contact to infants for purposes of the dark arts. Bacon, although commonly regarded as the father of empiricism, was not without a deep superstition of the occult. The unquestioning acceptance of this idea demonstrates the total fear and

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[86] Ibid., 93.
[87] Ibid., 166.
[88] Francis Bacon, "Slyva Slyvarum, Century X," in *Volume I* (London: Henry G. Bohn, 1854), 198, digital file. Some scholars read "children digged out of their graves" as the "fat of new born babes," See, Fannye N. Cherry, "The Sources of Hawthorne's 'Young Goodman Brown,'" *American Literature* 5, no. 4 (1934): 343, JSTOR.

misunderstanding of midwives of this period, even by the most educated members of society.

James I also connected the most dangerous of witches to those well versed in science and healing practices. In *Daemonologie,* James I explains that the most dangerous of witches are those who are versed in the healing sciences and the arts.[89] He says this with little further explanation, but refers to the hypothetical witches who are knowledgeable about sciences only using feminine pronouns. By breaking literary tradition and referring to an unspecified person using "she" James demonstrates that he clearly believes these witches are women. He then solidifies this belief in his dialogue and states,

> 'But before yee goe further, permit mee I pray you to interrupt you one worde, which yee have put me in memorie of, by speaking of Women. What can be the cause that there are twentie women given to that craft, where ther is one man?'
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> 'The reason is easie, for as that sexe is frailer then man is, so is it easier to be intrapped in these grosse snares of the Devill, as was over well proved to be true, by the Serpents deceiving of Eva at the beginning, which makes him the homelier with that sexe sinsine.'[90]

Although James does not mention the midwives, by explaining that the most dangerous of witches are those who understand the sciences and arts, by using female pronouns, and by explicitly stating that women are more susceptible to witchcraft than men, James' implications are clear. Additionally, because women were not accepted in institutions devoted to learning medicine at this time, most women with scientific knowledge were either midwives or healers. Earlier in this same work, James explained that the fallen spirits of Lucifer, which the witches use, reside in the four premier elements of the earth:

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[89] King James I of England, *Daemonologie, In the Form of a Dialogue* (Edinburgh: Bodleian Library, Oxford, 1597), 16-17, PDF.
[90] Ibid., 28

water, wind, fire and earth. To be able to conduct their magic, the witches must have a relationship with the natural world, as well as understand how to make use of these elements. Again, midwives seem most capable of doing so. If not, it remains interesting that James aligned witches so intimately with the workings of nature.

The midwife-witch was a legitimate fear, not only encouraged by literature of the time, but also because midwives had religious responsibilities, and came in contact with material that was understood to be the tools of witches. Among other things, they were responsible for baptizing newborns that were not going to live long enough to make it to a priest.[91] The infant's entry into heaven was dependent on their baptism, and thus the midwife had an incredibly important religious and familial duty. This role made the midwife susceptible to the worst suspicions, because if the midwife did not baptize the baby, the infant would surely go to hell, which in addition to being an unforgivable horror to the family, was believed to be exactly what the witch aimed to do, because the baby, not forgiven through baptism could be sacrificed to the devil when the midwife carried it out of the room under the guise of attempting to resuscitate it, as is described in the opening quote of this chapter.[92]

These sacrifices were not just done to stillborns, or babies in grave health, but also with perfectly healthy babies, who the general public believed were taken by the witches in order to be raised as such, or sacrificed in the midwife's place, so that "Consequently, the Last Judgment, according to which the women will be assigned to everlasting tortures, is deferred until even later."[93] The sacrificing of children was of special concern,

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[91] Donnison, *Midwives and Medical*, 4.
[92] Kramer and Sprenger, *The Malleus*, 92.
[93] Ibid., 166.

considering fertility and population were so tenuously balanced during the early modern period.[94] In fact, a dramatic rise in witch prosecutions in the mid-sixteenth century corresponds with the new legislative measures to meet infanticide with the punishment of death.[95] Women were more likely to testify against other women during the trials when the accusation pertained to a matter of fertility, and especially the suspected sacrifice of otherwise perfectly healthy new born.[96] The testimonies of other women in the community were understood as more reliable if they pertained to issues of fertility or infanticide, in part because all fertility, of women and the earth was unreliable.

In another similar accusation of sacrifice, Francesco Maria Guazzo in his 1626 manual, *Compendium Maleficarum* declares, "After the child is born the witch-midwife, if the lying-in mother is not alone, pretends that something should be done to restore the strength of the baby, carries it outside the bedroom, and elevating it on high to the Prince of Devils, that is to say, Lucifer, and to all the others."[97] Even if midwives with seemingly upstanding moral character were not immediately suspected of being witches, because men were not permitted into enter the space where women were giving birth, there was little official or trusted way to ensure that the midwives were not getting in contact with the devil, during or after birth, by use of the baby's body or by other means.[98]

Mothers were not exempt from suspicion of witchcraft as it was commonly thought that if a woman bore a child with severe deformities, it was because she had

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[94] Lyndal Roper, "Fertility," in *Witch Craze, Women and Evil in Baroque Germany* (New Haven: Yale University Press, 2004), 135.
[95] Ibid.
[96] Ibid., 136
[97] Forbes, *The Midwife and The Witch*, 128.
[98] Donnison, *Midwives and Medical,* 4.

impure intentions, polluted the fetus with her evil ways, or was herself a witch.[99] John Leake was a learned physician, man-midwife and member of the Royal College of Physicians.[100] He was a prominent midwife in London, and hosted a series of lectures about childbirth and delivery. He also advertised his childbirth teaching machines in London newspapers, where he claimed his machines could demonstrate an "exact imitation of real Women and Children."[101] He advertised widely for his lecture series, wherein students would practice all parts of delivery on mechanized women and fetuses. This representation of women's bodies as artificial machines is diametrically opposed to the teaching of traditional midwives, and represents the height of early-modern mechanization and medicalization. Notably, Leake who prided himself on his machine-centered approach to midwifery instruction was also one of the first to dispel the belief that women could pollute their fetuses with their impurity. Yet, he disproved this in a way that did not diminish suspicion or malice towards women. He said,

> A woman's mind, from the delicacy of her bodily frame, and the prevalence of her passions, is liable to so many excesses and inordinate motions that had such causes been productive of marks or monsters, they would certainly have been much more frequent.[102]

This explanation, coming from a learned and official man-midwife makes reminds us that even the most learned and respected of medical practitioners fell to the suspicion of their times. Leake knows that women cannot turn their babies into monsters, but he doesn't know this because he is a professional, he does not rely on celebrated and officiated

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[99] Ibid., 5.
[100] Pam Lieske, "'Made in Imitation of Real Women and Children' Obstetrical Machines in Eighteenth-Century Britain," in *The Female Body in Medicine and Literature*, ed. Andrew Mangham and Greta Depledge (Liverpool: Liverpool University Press, 2011), 77, digital file.
[101] Ibid.
[102] John Leake, *A lecture Introductory to the Theory and Practice of Midwifery* (London: Baldwin, 1782), 25-26.

empiricism. Instead, he knows it is impossible because considering women's faculties, if it were possible, it would happen much more often than it does now. Leake was a man-midwife to the Westminster New Lying in Hospital.[103] He had access to the most modern medical knowledge of the time, and was an inventor himself of mechanized representations of women's bodies. Yet, his contestation that women could not bear monsters does not come from scientific proof, it comes from the doubt of women's inherent goodness, and the belief that if women could influence the formation of their fetuses, more monstrous births would surely be witnessed.

The paranoia surrounding witches and midwives extended far and wide, creating an atmosphere where no woman, especially one involved with birth or pregnancy was safe. This combined with the cultural stigma against men in birthing chambers added to a general air of mystery and extreme fear surrounding the faith and sanctity of midwifery, and women's reproduction in general. Overall the combination of intimacy and fear that the church had with midwives served to create an atmosphere of paranoia, wherein midwives were necessary and valued when they fulfilled their moral and medical responsibilities, but were also feared and suspected of communicating and working with the devil, because they existed in such close proximity to the tools of the witches.

Man-Midwives, Medicalization, and the Spirit of Intervention

The fear of the proximity of midwives to the tools of witches was only one factor that contributed to the suspicion surrounding their practice. Midwives were also thought to be more likely to succumb to witchcraft because they were understood as less skilled

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[103] Lieske, "'Made in Imitation," 77.

than the growing minority of man-midwives that could more easily obtain licensing, so it was determined that they must need to rely on old means, such as witchcraft to compensate where they lacked modern medical knowledge. Yet, the reason that they were not easily licensed is because they were not admitted into university, creating a self-fulfilling prophecy, where the midwife is uneducated, often poor and thus cannot easily obtain licensing, yet because she is prohibited from obtaining a license she can never join the unions of more educated people. Midwives' bad reputations, borne of suspicion of their lack of knowledge and connection with demons also made even the most innocent midwife a convenient scapegoat when deliveries were not successful.[104]

The masculine approach to midwifery, although at first unsettling because it conflicted with accepted notions of gender divisions surrounding birth, quickly gained male-midwives prestige in the field. By the 1700's, not only were male-midwives the majority of those practicing, but they, as well as other naturalists interested in birth used the Royal Society to publish and in turn legitimize their findings in the field of women's reproduction.[105] The use of public means to legitimize the work of male-midwives is a direct contradiction to the epistemology of the field of traditional midwifery, as midwifery had been a field that relied on oral history and communal learning. Using the Royal Society as a mechanism for publishing works on women's reproduction not only professionalized male midwives, by making their findings accessible to the learned public, but it also places midwifery in the same sphere as natural philosophy, thereby designating women even farther into nature, and encouraging men to be the force by which nature can be influenced and "discovered." The bringing of midwifery to the

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[104] Forbes, *The Midwife and The Witch,* 126.
[105] Cody, "The Politics," 480.

public sphere not only marginalizes women who do not have access to such institutions, but it also plays directly into the Aristotelian binary discussed earlier, which affords men the public sphere, and women the private.

For the field of midwifery, this divide also meant that from the beginning male midwives had an economic advantage over their female peers. Because of the rich history of defining of women into the "natural" workings of her body, it was a common claim that midwifery was only the domain of women because child labor, or the rearing of children comes innately to women.[106] This argument was also used to excuse why midwifery was less capitally productive for women than men, because it is part of their nature.[107] Because men do not have access to this knowledge, and must appropriate the means of women's reproductive ability, they act outside of their own bodies, and therefore their work is understood as truly productive, instead of an extension of natural reproduction.[108] Thus, the sheer presence of men in the field of midwifery not only changes the traditional mechanisms for the dissemination of knowledge, but it also officiates the profession as capitally valuable.[109] Of course, while the addition of men to field makes it more prestigious, the added institutional prestige served to make it far less accessible to the traditional practitioner, that is women, understood to be naturally inclined while simultaneously unlearned.[110]

Male-midwives could not rely as readily upon communal knowledge, that is, their knowledge of birth was not centered on communities of men who witnessed birth and

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[106] Maria Mies, *Patriarchy and Accumulation on a World Scale, Women in the International Division of Labor*, 2nd ed. (New York: Zed Books, 1998), 53.
[107] Ibid.
[108] Ibid.
[109] Banks, "Stones and Stools," 27.
[110] Ibid.

learned from other, older, experienced men. Therefore, the mechanisms by which they learned of female reproductive capabilities can shed considerable light upon the ways in which male-midwives were trained, and how this, in contrast to women midwives, bred a detachment from their patients. From the 1660's onwards, much of the male-midwife's training was based off of analogous reproductive systems in other mammal's bodies. Not only does this foster a detachment from the *human* women that are being served, but because the skills were learned from animals, it served to delegitimize even women's claims of having innate or "natural" authority in the field. Female-midwives' learning, which did not fit the confines of the early-modern picture of professionalism, was more easily understood as superstition and magic because male midwives were able to learn all birth practices off of other animals.[111] Furthermore, the use of animals as experimental ground reflects upon the spirit of the early-modern natural sciences, focusing on experiment, not "superstition" in the eyes of male-practitioners, or historical and scientific knowledge in the eyes of traditional female midwives.[112]

This detachment is again seen in the difference in educational materials surrounding birthing processes. All images in the 1771 edition of the *Encyclopaedia Brittanica* for midwifery and reproduction are images only of infants within the opened mother's womb. The woman's body is non-existent, or severed at the thigh and abdomen, to only show the portion where the fetus is.[113] Of the few earlier treatises, authored by women, largely for women audiences, the entirety of the woman's body, not simply her detached womb is included in pictures describing pregnancy.[114] This is demonstrated by

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[111] Cody, "The Politics," 479.
[112] Ibid.
[113] Cody, *Birthing the Nation*, 168.
[114] Ibid., 169

Jane Sharp's *The Midwives Book or The Whole Art of Midwifry Discovered,* published in London in 1671.[115] This was the first published midwifery manual written by a woman.[116] *The Midwives Book* is informational and ranges from discussion of anatomy and the process of conception to the actual birth process, and how women should be "governed" after giving birth.[117] In Sharp's book, images describing pregnancy include the entirety of the woman's body, including her hands and face, with a small flower placed over her vulva.[118] The only time her body is removed, and focus is placed only on the womb is when the discussion turns to the different ways fetuses are arranged within the womb, and what arrangements are dangerous, and how to tell the arrangement of the baby by the way the woman herself is lying.[119] In contrast to the holistic image depicted by Jane Sharp, the depictions of women in the *Encyclopedia Britannica* and male authored treatises, not only removes women from the question of reproductive capacity and agency, but it also dissects the female body in an undoubtedly violent, and arguably Baconian way. By zooming focus into the womb, midwifery education becomes solely focused on process, not personhood. This move, on the macrocosmic scale is relived in the development of the mining industry, away from the sanctity of the earth as a feminine body, and towards a labor-intensive industrial endeavor focused on production, less than 30 years later.

A notable moment in the history of midwifery that demonstrates the force of masculine intervention in the field is found through a brief look into the history of

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[115] Catherine Morphis, "Swaddling England: How Jane Sharp's Midwives Book Shaped the Body of Early Modern Reproductive Tradition," *Early Modern Studies Journal* 6 (2014): 166.
[116] Ibid.
[117] Jane Sharp, *The Midwives Book or the Whole Art of Midwifry Discovered*, ed. Elaine Hobby, Women Writers in English 1350-1850 (Oxford: Oxford University Press, 1999), 7-9.
[118] Ibid., 121
[119] Ibid., 154-155

forceps. Forceps were invented by Peter Chamberlen, the eldest son in a family of notable surgeons, and were kept secret by the family for approximately 150 years, before they became widely used by other medical midwives.[120] Because of the safe-guarding of the family secret, the rise of the forceps was slow, and reserved mostly for troubled and difficult births, but still they only began being used routinely in difficult labors around 1720.[121] Nonetheless forceps remain an incredibly significant symbol for the medicalization of midwifery that resulted in marginalization of large swaths of midwives. Even after the period of the familial safeguarding of forceps ended, this tool did not disseminate into all midwives' practices. The forceps remained a tool largely used by male midwives during dangerous births, as female midwives were often barred from being trained in forceps practice.[122] For most of their early usage, forceps remained purposefully mysterious, even when male practitioners used them, they were always brought into the birthing chambers under a fabric cover, as to not give away the secret of the tool. This safeguarding of the primary tool used to infiltrate a largely traditional field is emblematic of the differences between man and women midwives. Whereas the history of midwifery was predicated on women's ability to build community and pass down knowledge, the forceps were immediately understood as a tool for fame and material gain, and were treated as such. The knowledge of forceps was kept within the Chamberlan family, unless a high price was offered, and if they sold their technology the buyer had to take an oath that he would not speak of the tool.[123] Secrecy was so extreme

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[120] James R. Purdy, "Axis Traction Forceps," *The British Medical Journal* 2, no. 2501 (1908): 1672, JSTOR.
[121] J. H. Aveling, review of *The Chamberlens and the Midwifery Forceps*, *The British Medical Journal* 2, no. 1139 (1882): 847, JSTOR.
[122] Donnison, *Midwives and Medical Men,* 14-16.
[123] Wilson, *The Making*, 96-98.

that the forceps were carried around in a highly ornate and locked box.[124] When a member of the Chamberlan family entered the room, the lights were dimmed and the woman blindfolded, and during the process, noises were made to stifle the sounds of the tool.[125] The use of forceps almost exclusively by male midwives is significant because it is one step which further aligns the newly rising group of man-midwives with activity, intervention, use of tools and thus a changing, developing and helpful culture, while the secrecy ensured that a community would not be built around this knowledge, nor could midwives with generational experience help develop the forceps to be safer. Additionally, because male-midwives' use of technology, they were mainly called for difficult births, and in turn developed an understanding of birth as a highly dangerous process, which furthered the push for intervention-based methods. If male midwives could advocate for the use of forceps at all births, they could necessitate their presence in the birthing chamber and dispel the popular notion that, as Hugh Chamberlan said, "when a man comes, one or both must necessarily die."[126]

The fear of intervention-based methods amongst the general population was also reflected in literature of the time. Perhaps the most elucidating example of the cultural digestion of this new trend is in "Tristam of Shandy," published in 1759, a mere thirty-nine years after the forceps began infiltrating birth practices.[127] In this novel, the narrator, Tristam, details his own life from the beginning. The initial conflict between his mother and father over who should be present at his birth demonstrates the gendered divide that

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[124] Banks, "Stones and Stools," 31.
[125] Ibid.
[126] Alfred M. McClintock, ed., *Smellie's Treatise on the Theory and Practice of Midwifery* (London: The New Syndenham Society, 1876), I: 250, digital file.
[127] Julie Coleman, "The Life and Opinions of Tristram Shandy, Gentleman," Glasgow University Library Special Collections Department, last modified October 2000.

was a real issue for people of the time. Tristam, in the telling of his birth says, "It is very strange, says my father…that my wife should persist to the very last in this obstinate humour of hers, in trusting the life of my child…to the ignorance of an old woman…"[128] The reason why Tristam's mother does not want a man in the room is assumed to be for the preservation of her modesty. Yet, as we found out later, the man-midwife, Dr. Slop, is eventually called because the birth is becoming harrowing, and after hours of labor, the baby, Tristam, is finally removed with forceps that crush his nose "flat as a pancake to his face" and Dr. Slop resolves to creating a prosthetic bridge out of cotton and whale bone.[129] This dramatic story of birth, although meant to be sensational and humorous also demonstrates the understanding that male-midwives, although called in times of trouble, could not always offer immediate care, and that the use of forceps was more about symbolic power and intelligence than tangible effectiveness in the birthing chambers.

Despite cultural commentary on the use of forceps, the trends continued and the divide between man midwives and woman midwives widened. Man's connection with new technology also sprang from men midwives being far more likely to engage in official medical training, which largely focused on intervention based birth, or emergency birthing scenarios, much like the training of modern day obstetricians, which pays shockingly little attention to natural, vaginal birth.[130] Men's dominance with new birthing technology was an important step in their further categorization as the active sex. Men had an avenue through which to demonstrate their ability to bend, manipulate and coerce nature, using means women did not have. The use of forceps did not always mean

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[128] Laurence Sterne, *The Life and Opinions of Tristam Shandy, Gentleman*, ed. Günter Jürgenmeier (London: J.M. Dent and Sons, 1912), 88-89, http://gutenburg.org.
[129] Ibid., 193.
[130] *The Business of Being Born*, directed by Abby Epstein, 2008; when interviewed, the majority of ob/gyn medical students testified that they had never witnessed a natural birth.

a safer birth for mother or child, but it worked to bolster the symbolic weight of male midwives.[131]

This rise of empirical thinking, the dangers of which are detailed in Tristam Shandy, was ushered into midwifery by way of a renewed interest in anatomy but, it could not fully take place without a disavowal of the old ways. The easiest way to disavow the old ways was to align midwives and practitioners of traditional medicine with evil, instead of convincing an entire society that this new way of thinking was the answer to medical woes. Empiricism had infiltrated many scientific fields with great success, and produced wondrous results that should not be diminished, but empiricism could only get a proper foothold in the realm of birth and women's medicine by pushing out the very women who practiced these arts, as they embodied the old ways, and were largely barred from learning the new ways. But the empiricist's tools did not always make births safer.

Dr. John Maubray, was the first to publicly lecture about midwifery in England, and is also known as the first to advocate for the building of lying-in hospitals, known now as maternity hospitals, although he did not live long enough to see this come to fruition.[132] Dr. Maubray was one of the few practicing male-midwives of the 18th-century to acknowledge the practical failings of forceps. In his 1724 work, *The Female Physician*, he says of male midwives who insist on using forceps,

> And what is most unaccountable and unbecoming a Christian is that, when they have perhaps wounded the mother, kill'd the infant, and with violent

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[131] Donnison, *Midwives and Medical Men*, 29.
[132] Alfred H. M'Clintock, "An Address Delivered At The Opening Of The Section Of Obstetric Medicine," *The British Medical Journal* 2, no. 1075 (August 6, 1881): 215; Herbert R. Spencer, "The Fitzpatrick Lectures On The History Of British Midwifery (1650-1800)," *The British Medical Journal* 2, no. 3488 (November 12, 1927): 854.

> Torture and inexpressible pain, drawn it out by piece-meal, they think no reward sufficient for such an extraordinary piece of mangled work.[133]

Yet, the presence of tools gave the impression that all possible avenues to ensure a positive birth outcome were being explored. As midwifery was undergoing a process of professionalization, this must have been reassuring to the mother, as the use of tools legitimated the male-midwife. On the other hand, it also created a cycle wherein male midwives were thought to be more experienced, because they had tangible and modern tools to bring to labor, and therefore these modern tools, regardless of their effectiveness came to be expected in delivery rooms, and thus male midwives were more readily chosen and women midwives became more marginalized.[134] Male midwives of the time were also known for exaggerating the dangers of childbirth, frightening women into believing they needed extreme medical attention, and explicitly denigrating the reputation of midwives, through placing blame on them for anything that went wrong.[135] The use of birthing tools almost exclusively by men also supported long held beliefs of men as active agents and women as passive bystanders, reminiscent of Aristotle's theories.

Furthermore, because birthing tools and interventionist methods became the norm, women who performed successful births without tools came under even greater suspicion of using magic to influence the process. If tools were the regulated and accepted, the only explanation for why women could facilitate healthy births without

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[133] John Maubray, *The Female Physician, Containing all the Diseases Incident to that Sex, in Virgins, Wives, and Widows: Together with Their Causes and Symptoms, Their Degrees of Danger, and Respective Methods of Prevention and Cure: to Which is Added, The Whole Art of New Improv'd Midwifery, Comprehending the Necessary Qualifications of a Midwife, and Particular Directions for Laying Women, in Cases of Difficult and Preternatural Births, Together with the Diet and Regimen of Both the Mother and Child* (London, 1724), 181-182, digital file.
[134] Donnison, *Midwives and Medical Men*, 29.
[135] Ibid., 29

them was not because tools were not necessary, but because the midwives were employing old world magic. Magic, we must remember, that was prohibited legislatively through midwives' moralistic regulations, and culturally through masculine professionalization.

Women Resistors and Feminine Expectations

The second factor that worked along with the rise of professionalization and empiricism was the rise of commercial farming and industrialization in the 1700s.[136] Although the connection between the changing image of midwives and increased commercial farming may be less obvious, it remains an important example of the interconnectedness between treatment of nature and the resulting change in the perception of women. The commercialization of agriculture in this period gave farmers the ability to make a substantial living selling crops, which led many women from being their husband's partners in craft work, or independently working in other fields to contribute to income, to being relegated to the domestic sphere. Before this rise in prosperity there was often the need for women to work, which was also a contributing reason as to why they became midwives, as it was one of the few occupations they could partake in that would make a reasonable contribution to their family's economic security.[137] With the rise of industrialization of agriculture, not only were women largely discouraged from seeking outside employment, but many women's ability to partake solely in leisure and domesticity was a reflection on her husband's success in the newly emerging realm of commercial farming. Women were encouraged to conform to a feminine ideal which restricted their access to gainful employment, as is seen paralleled

[136] Ibid., 21
[137] Ibid., 21

by the exclusion of women from the mining industry in the mid 19th century. This is not to say that all midwives were eliminated by the rise of commercial farming and the growth of industry, but the areas where women midwives still dominated the field tended to be in small rural communities, where there was less of a learned male presence. These communities were also the ones that experienced initial profit from the increase in commercial farming. Thus, when women continued to act as midwives, it was no longer viewed as a helpful contribution to their family's income, or as a mechanism for further independence, but was more generally understood as a comment on their husband's failure to profit sufficiently off of the commercial farming revolution.[138] Simultaneously, those who were profiting off of agriculture were under pressure to hire male-midwives, because it reflected positively on their class, as it was a public demonstration that they could afford the higher price.[139] The image of a workingwoman was now seen as the product of a failed husband, pressuring more and more women to remain in the domestic sphere, to maintain the image and presentation of their families, whether or not this life was fulfilling to them did not matter. The push for women to conform to leisurely ideals of femininity is seen mirrored in the experience of 19th century British mine workers, who were ushered out of their industries for similar reasons.

All of these broader cultural trends happened along with a technical change in the training of midwives. By this time, men were largely responsible for the "official" training of midwives, and this training was mostly done only for graduates of colleges

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[138] Donnison, *Midwives and Medical Men*, 21; Robert Whaples and Randall E. Parker, eds., *Routledge Handbook of Modern Economic History* (London: Routledge, 2013), 311, PDF.
[139] Donnison, *Midwives and Medical Men*, 22.

that women were barred from entering until the twentieth century.[140] There were still those midwives who were not trained by official educational means at all, but it was increasingly difficult to make a proper income without official training, and thus more women attempted to gain knowledge through the training courses that were open to them, or by organizing their own out of fear of male infiltration into the field.[141] Yet, even these courses did not result in equal training. It was alleged that male practitioners trained women less thoroughly, and trained them specifically to be in service to midwives, not to be the midwives themselves. This would ensure dependence on men, and a further reduction of respect for midwives in the eyes of the public.[142]

A telling example of the unwillingness of male medical practitioners to improve the practice of midwifery for all can be seen in the male-midwife, Thomas Dawkes' 1736 book, *The Midwife Rightly Instructed.* In this work, written in the form of a dialogue between a surgeon and a midwife, the surgeon completely refuses to explain how to deal with a hemorrhage, instructing the midwife not to desire "beyond the capacities of a woman."[143] By ensuring that women were less well trained than men, and strictly upholding the cultural norm that midwives not learn how to use tools, male-midwives ensured that they would be more highly respected, and would begin to be called upon for all births.[144]

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[140] Joyce Burnette, "Women Workers in the British Industrial Revolution," in *Economic History*, ed. Robert Whaples (Economic History Association), last modified 2008.
[141] Donnison, *Midwives and Medical Men*, 24-25.
[142] John Blunt, *Man Midwifery Dissected; Or, The Obstetric Family- Instructor, For the Use of Married Couples, and Single Adults of Both Sexes* (London, 1793), 180, digital file.
[143] Thomas Dawkes, *The Midwife Rightly Instructed, or, The Way, Which all Women Desirous to Learn, Should Take, to Acquire The True Knowledge and be Successful in The Practice of, The Art of Midwifery* (London, 1736: J. Oswald), 88-89, digital file.
[144] Edmund Chapman, *A Treatise on the Improvement of Midwifery: Chiefly With Regard to the Operation* (London: L. Davis and C. Reymers, 1759), xi, digital file.

Another male-midwife, Edmund Chapman encouraged women to stay away from the tools of labor in his 1735, *Treatise on the Improvement of Midwifery* when he explained that women should know how to do only the simple manual operations of labor, but if a need for tools arises, men should immediately be called and women should "not delay to send for a man of character and experience."[145]

The rise of the male-midwife does not come without resistance. Elizabeth Nihell was a British midwife in the 18th century, best known for her polemics against male-midwifery.[146] Her most famous work, *A Treatise on the Art of Midwifery Setting Forth Various Abuses Therein, Especially as to the Practice with Instruments* was published in 1760 and sharply criticized male infiltration and prosperity in the field of midwifery.[147] She declared that women naturally have more connection to birth, and thus have the patience to wait on nature, whereas men felt the need to use tools to save their own time, representing a complete misunderstanding of birth. Nihell argued that by ignoring women's nature, male-midwives created a "prostitution of their persons" and reduced them to scientific and sexual objects only.[148] It is not coincidental that Nihell chose to highlight how at the hands of male-midwives, women are at once sexualized and naturalized. To Nihell, not only do male midwives understand women as sexual objects, but also as sexual objects belonging to nature, thus available for interference and penetration at the hands of men. The simultaneous sexualization and naturalization of women works to make their bodies unquestionable grounds for experimentation, as is

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[145] Chapman, *A Treatise*, preface.
[146] Anna Bosenquet, "Elizabeth Nihell, the 'Anti-Obstetric' Midwife," *The Practicing Midwife* 12, no. 10 (November 2009): 46.
[147] Ibid.
[148] Elizabeth Nihell, *A treatise on the art of midwifery. Setting forth various abuses therein, especially as to the practice with instruments: the whole serving to put all rational inquirers in a fair way of very safely forming their own judgment upon the question; which it is best to employ, in cases of pregnancy and lying-in, a man-midwife; or, a midwife* (London: A. Morley, 1723), 236.

evidenced both by Bacon's natural philosophies and the mining industry in the Industrial Revolution, as will come to be seen. The understanding of women's bodies as naturally sexual and ripe for experimentation could not have been translated onto a macrocosmic scale without first exercising it on the microcosm of the single pregnant body. Yet, Nihell's criticism was not widely held and women's natural connection to labor was no match to the symbolism of tools, which fell perfectly in line with professionalization, medicalization, and the higher value of men's labor, leading men to fill what Nihell calls the "usurped office" of high-standing midwife, even though this was more naturally fitting to women.[149]

Perhaps unsurprisingly, responses to Nihell were violently misogynistic. Tobias Smollett, in his publication *The Critical Review* claimed Nihell was "not lucid" and a "lunatic."[150] He continued by arguing that her *Treatise* was proof that Nihell had no idea of the qualifications of male midwives, and went so far as to accuse her of lesbianism, in saying "How far Mrs. Nihell's shrewd, supple, sensitive fingers, may be qualified for the art of titillation, we shall not pretend to investigate."[151] These accusations are important because they play into several themes consistently used to debase women in general as well as women midwives. He attacks her with accusations of hysteria, lack of information, and sexual perversion, all symptoms of dangerous and deranged women, or witches. A sure way to cause midwives to lose favor is to convince the public that they

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[149] Elizabeth Nihell, *A Treatise,* 28.
[150] Tobias George Smollet, review of *A treatise on the art of midwifery. Setting forth various abuses therein, especially as to the practice with instruments: the whole serving to put all rational inquirers in a fair way of very safely forming their own judgment upon the question; which it is best to employ, in cases of pregnancy and lying-in, a man-midwife; or, a midwife*, *The Critical Review Or, Annals of Literature* 9 (1760): 188, digital file.
[151] Smollet, review, 196.

are uninformed, crazy, or sexually deviant, and thus threatening. Smollet does not hesitate to do all three.

Conclusion

Religious suspicion, as well as the rise of authoritative and exclusionary medical professionalism acted in combination to marginalize the early-modern midwife. These factors resulted in the disintegration of a class of once valuable woman healers and midwives into two factions. One, were the witches. Those midwives who remained in practice but were under great levels of suspicion by church authority and by scientific communities for their use of traditional strategies, and their lack of official qualifications. The midwife-witch was under suspicion first from the Catholic Church, then authoritative empirical bodies that delegitimized the traditional epistemology of the field, and male-midwives who were working to gain prominence. The image of these women was twisted into one of evil, one of conscription with the devil, one that ignored the modern rules of society. With the transition from midwife to witch, the women and their practices within birth chambers did not drastically change, but that was part of the problem. What was once valued and celebrated as women's power and knowledge was now feared as women's connection to the occult, which threatened Christian values and new scientific modes of thinking, all which depended on the exclusion of women to function.

The second class of women borne out of the transition of the image of midwives were those who also remained in the craft, but were twisted into an image of nature's slave.[152] Women who did not change their practice drastically to align with the new

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[152] George Crabbe, *The Parish Register*, (1807). Quoted in Donnison, *Midwives and Medical Men*, 38.

virtues of manhood and empiricism, but could not be proved as witches, were defined even further into their "natural bodies" and were thereby categorized as uneducated and unhelpful slaves to nature, who simply were at the mercy of nature's ways. While the witch presented the perfect contrast to Episcopal authority, the natural woman was the perfect converse to the male-midwife, as the men, because of their use of tools, their official status from licensing bodies and their connection with the learned classes were seen as "those who could bend nature to his will."[153] With these perfect opposites, the choice became clear. With men resided the power to control nature and intervene in the birthing practices with active medical tools, while women remained in the past, as slaves to nature, who stayed passive despite the existence of medical tools and training.

The calculated marginalization of women healers and midwives into two classes, the dangerous and daemonic witch, or the slave to nature is the first step in creating a society which can excusably sanction the destruction of nature for material gain. Exploitation of the natural world could not be culturally or societally acceptable without first changing the image most connected to the powers and abilities of the natural world in human society: women, and more specifically women healers. This perfectly orchestrated transition in the understanding of women healers is exemplified by the breakdown of women healers and midwives, as it mirrors the transition of the earth from a powerful, yet generous and kind mother to an unruly spirit containing secrets meant to be discovered. In early-modern and Industrial England, it will come to be shown, that it was not possible to sanction the environmental degradation and exploitation necessary for capitalist and commercial development without first changing the understanding of

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[153] Ibid., 38.

womanhood. Once it was acceptable to view women as evil, dangerous to society or at least backwards and blindly adhering to old ways, it also became possible to create the same view of nature, where it could only be tamed and used for good by the intervention of men. New thought labeled as empirical, and the proliferation of masculine practices and male practitioners themselves resulted in the societal shift of the role of women healers from powerful assets to society, to marginalized groups blanketed with suspicion of their inexplicable connection to the supernatural and to nature.

Chapter 2:
Francis Bacon and Earth as Object: Sexual Violence and Industrial Vigor

The orchard's open now, and free;
Bacon has broke that scarecrow deity;
Come, enter, all that will,
Behold the ripened fruit, come gather now your fill…
Bacon, like Moses, led us forth at last;
The barren wilderness he past;
Did on the very border stand
Of the blest promised land,
And from the mountain's top of his exalted wit
Saw it himself, and shew'd us it.[154]

Francis Bacon is one of the most influential figures in scientific philosophy. A prolific writer, Bacon authored texts ranging from experimental philosophy, to utopian fantasy. For this project, Francis Bacon serves a dual purpose. Not only is he a revolutionary figure in early-modern scientific thought, but he also demonstrates the influence that gender, and specifically gendered understanding of the earth had on the development of environmental science, and man's understanding of nature. Francis Bacon played a pivotal role in the development of modern experimental thought. His philosophy can be understood as the mechanism through which the transformed understanding of womanhood was transferred on to the earth. The new vision of womanhood, created by the witch craze, as suspect and secretive was placed onto the larger feminine body of the earth by Bacon, making the earth ripe for penetration and violation. Yet there is another level to Bacon's influence, which must be noted if one is to understand the full extent of the Baconian impact. The influence of the witch-hunts on

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[154] Abraham Crowley, "To the Royal Society," in *Verses Written on Several Occasions*, ed. A. R. Waller (n.p.: Cambridge University Press, 1905), 448-451, Hathitrust Digital Library. First published in 1668.

Bacon's natural philosophy is not merely speculative or theoretical. Although he is most remembered for his contribution to early-modern scientific theory, as the father of the scientific method, Bacon lived a political and public life as well. Notably, he served as the Attorney General to King James I during the witch-hunts in England.[155] Bacon's use of gender is therefore not limited to its metaphorical employment in his writing; he had explicit political connections to the early-modern witch craze, as will be explored in full forthcoming.

Bacon's contribution to environmental sciences cannot be understood fully if we only examine his life as a natural philosopher, for his reliance on a sexist and gendered worldview worked in tandem with his public and political life. In his adulthood, Bacon would embark on a political career, acting as a member of parliament for thirty-seven years, where he tried, without much success under Queen Elizabeth to combine his political ambitions with his revision of natural philosophy.[156] After falling out of favor with the Queen, he focused much of his attention to natural philosophy and away from his political career. It was not until the reign of James I that Bacon reemerged as a prominent statesman and philosopher, and came to achieve his highest political positions. He was knighted in 1603, became Attorney General in 1613 and rose to the status of Lord Chancellor in 1618.[157] To construct a complete understanding of Francis Bacon's true complexity, this chapter will examine not only the employment of violent gendered metaphor, but also his relationship to Greek philosophy, his political involvements, his

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[155] A. Wigfall Green, *Sir Francis Bacon*, ed. Sylvia E. Bowman, Twayne's English Authors Series (New York: Twayne Publishers, 1966), 39.
[156] Jürgen Klein, "Francis Bacon," in *Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta (Metaphysics Research Lab, Stanford University, 2016).
[157] Klein, "Francis Bacon," Biography.

influence on the foundation of the Royal Society, and his industrial tone.[158] Bacon's industrial tone should be understood as his specific use of language, syntax and metaphor to develop a natural philosophy well suited to the materializing of large-scale industry in England. This includes drawing inspiration from colonization to encourage industrial growth, as well as a focus on creating product and utility. Bacon's philosophies take on a pointedly different tone from his predecessors in many ways, but one of the more important ones is that Bacon is one of the first environmental philosophers to write a theory of nature that can be useful to environmentally harmful industry, as a way to legitimate their use of the environment for capital gain. This chapter will include not only Bacon's most famous works of natural philosophy, but will also incorporate his utopian writing, his sparse autobiographical work, and his ethical and political writings, in an effort to provide a new look into Francis Bacon as more than a natural philosopher.

Early Life and Inspiration for the Development of a New Philosophy

Francis Bacon was born on January 22nd, 1561 to Sir Nicholas Bacon and Lady Anne Cooke Bacon, into a rapidly changing England. Land, as well as state authority was undergoing transfer from the clergy to the laity, while England was quickly becoming a nation-state with an independent national church under Henry VIII.[159] Bacon's entrance into the world at a time of great political upheaval is significant, as Bacon's philosophical writings were also of great departure from the traditions before him.[160] His early years were colored by a familial commitment to education; both formal and informal, as both

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[158] Known in full as the "The Royal Society of London for Improving Natural Knowledge" The motto of the Royal Society is "Nullius in verba" meaning "Take nobody's word for it" and is credited as the first 'learned society.' See, The Royal Society, "History," The Royal Society, https://royalsociety.org/about-us/history/.
[159] Benjamin Farrington, *Francis Bacon Philosopher of Industrial Science*, The Life of Science (New York: Henry Schuman, 1951), 19.
[160] Klein, "Francis Bacon," Biography.

of his parents were highly learned people, and focused intensely on the education of Francis and his older brother, Anthony. They both continued on to Cambridge, where Francis had his first major realization, at approximately age 16. After being presented with academic training centered almost exclusively on classical texts, he determined that the philosophy of the ancients, specifically Aristotle was "only strong for disputations and contentions, but barren of the production of works for the benefit of the life of man."[161] Although much will be discussed later concerning Bacon's relationship to Aristotle and Greek philosophy, this single idea epitomizes Bacon's discontent with the traditions of scientific philosophy, and thus his determination to upend it. What is most important is not that he developed an early dislike for Aristotle, but instead that he did so because he viewed Aristotelian philosophy as "barren," demonstrating that his conception of what was productive thought was entangled with the ability to create a material product from of the site of contemplation, the earth, thereby "increasing man's mastery over nature."[162] From this point onward, it is clear how Bacon's philosophy will come to benefit developing industries, as he understood "improvement" to be interlaced with material production, whereas Aristotle did not.[163] The quest that would come to inspire most of Bacon's writings for the rest of his life rests upon his yearning to break the

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[161] William Rawley, "The Right Honourable Francis Bacon, Baron of Verulam, Viscount St. Alban. by William Rawley, D.D. His Lordship's First and Last Chaplain and of Late His Majesties Chaplain in Ordinary," in *Resuscitatio, Or, Bringing into Publick Light Severall Pieces of the Works, Civil, Historical, Philosophical, & Theological, hitherto sleeping, Of the Right Honourable Francis Bacon, Baron of Verulam, Viscount Saint Alban* (London: William Lee, 1657), 2.

[162] Farrington, *Francis Bacon*, 24.

[163] James Spedding, perhaps the most prolific biographer and editor of Bacon's works, said of the inspiration to increase man's mastery over nature due to discontent with the barren philosophies of the Greeks, "I believe it ought to be regarded as the most important event of his life; the event which had a greater influence than any other upon his character and future course." In, James Spedding, comp., *The Letters and the Life of Francis Bacon Including All of His Occasional Works* (London: Longman, Green, Longman and Roberts, 1861), 4, digital file.

symbiotic mind-nature relationship of Platonic and Aristotelian philosophy in favor of one that is necessarily hierarchical and in service of human advancement.

The increasing of men's riches is a central point of inspiration for Bacon's natural philosophy, as well as one of his primary goals. As Bacon himself wrote in the *New Organon*, "It is impossible to advance properly in the course [of the sciences] when the goal is not properly fixed. But the real and legitimate goal of the sciences, is the endowment of human life with new inventions and riches."[164] Bacon believed, that prior to his philosophy, science had not advanced because scientific practice did not contain a clear goal. That is, knowledge for the sake of knowledge was not sufficient to Bacon, and did not constitute an improvement in the human condition. What did qualify as an improvement was the creation of "new inventions and riches."[165] The combination of his early life influences, his distaste for Aristotelian philosophy, and the changing political and cultural landscape of England lead Bacon to reimagine an environmentally based science which would result in the tangible goals of man's dominion over nature, and capital riches. These goals shed considerable light on Bacon's understanding of nature: as ideally in willful service of men.

The admiration with which Bacon viewed his own goal is reflected in his sparse autobiographical writing. His only piece of autobiographical writing is in the preface of a never-finished work titled *On the Interpretation of Nature*.[166] He wrote this preface, most likely to ingratiate himself to James I.[167] In James, Bacon saw the possibility of

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[164] Francis Bacon, "Novum Organum," in *The Great Books: Advancement of Learning, Novum Organum, New Atlantis*, The Great Books of the Western World (n.p.: Encyclopaedia Britannica, 1952), 252.
[165] Ibid, 252.
[166] Farrington, *Francis Bacon,* 53.
[167] Sarah Moir, "King James VI of Scotland," The Age of The Witch Hunts, http://witchhunts.academic.wlu.edu/king-james-vi-and-witchcraft-in-scotland/.

convincing a royal ear of the importance of his inquiry, most likely in hopes of securing funding for continuing his philosophical quest.[168] When explaining why he devoted so much time and energy to reimagining the power of environmentally-based empirical science, Bacon provides us with an illuminating look into his character, and into what he thought was important. He wrote,

> But above all, if a man could succeed, not in striking out some particular invention, however useful, but in kindling a light in nature – a light which should in its very rising touch and illuminate all the border-regions that confine upon the circle of our present knowledge; and so spreading further and further should presently disclose and bring into sight all that is most hidden and secret in the world, -- that man (I thought) would be the benefactor indeed of the human race,-- the propagator of man's empire over the universe, the champion of liberty, the conqueror and subduer of necessities.[169]

Bacon's philosophy is often characterized as being concerned primarily with utility. Although this is true, Bacon was not simply concerned with industry and the advancement of tools. Notably Bacon seems most enthralled with the prospect of increasing man's power; by knowing all there is to possibly know about nature. To Bacon, the mystery and spirituality of nature, a concept once celebrated and understood as an inherent fact, is seen as a barricade blocking the advancement of man's power. To achieve full power over nature, we must spread further and further the reach of humans, and eliminate the ability for nature to hold any secret. Bacon's focus on conquering and controlling nature demonstrates that his ideal vision of nature exists in the service of men, without motivations or autonomy, so man may make use of natural material in the production of knowledge and riches. He understood the need to strip nature of her secrets

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[168] Farrington, *Francis Bacon,* 53.
[169] Francis Bacon, "On the Interpretation of Nature," in *Philosophical Works*, ed. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath, vol. 3, *The Works of Francis Bacon* (London: Spottiswoode & Co., 1857), 518; James Spedding, "Life and Letters of Bacon" *The Eclectic Magazine of Foreign Literature Science and Art,* 10 (1869): 406.

in the quest to reinstate man's dominion over her as the most important benefit "that could be conferred upon mankind" and as his personal life goal.[170]

Bacon's personal, political, and philosophical pursuits are colored by his quest to restore what he believed to be man's rightful dominion over nature. Now, we may move on to looking closely at his works, and how they make use of gender, industrial tonality, and disavowals of Aristotelian thinking to accomplish his life's goal.

Recreation of the Earth in the Image of the Secretive Woman

The linguistic tools employed by Bacon throughout his writing served to legitimate systems of natural exploitation that work by aligning the feminine body with the earth. Before Bacon's reconceptualization of environmental sciences, those who spent considerable time in nature were looked down upon as passive, feminized men, and it was believed that their intellectual faculty was impaired.[171] For Bacon to switch this connotation, it was necessary to create a hierarchical relationship between man and nature, wherein the minds of men were no longer degraded by association with nature, and instead nature could come to be understood as existing in the service of men. Bacon explains,

> Man, if we look to final causes, may be regarded as the center of the world… for the whole world works together in the service of man…Plants and animals of all kinds are made to furnish him…insomuch that all things seem to be going about man's business and not their own.[172]

The step to place man at the center of the natural world is highly significant, especially when considering how clearly Bacon gendered nature, demonstrating that when he refers

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[170] Bacon, "On the Interpretation," 518.
[171] Farrington, *Francis Bacon,* 107.
[172] Francis Bacon, "The Wisdom of the Ancients," in *Literary and Professional Works I*, ed. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath, vol. 6, *The Works of Francis Bacon* (London: Spottiswoode and Co., 1857), 747.

to men being regarded as the "center of the world" he is not referring to the entire human race. Although Bacon states that nature is "made" to furnish him, he employs a violent tone when describing nature, which highlights the disconnection between the willful servitude he imagined, in comparison to the control he advocated men to execute, because in reality nature was not this subservient or willing. He wrote, "The secrets of nature betray themselves more readily when tormented..."[173] If the whole world was in service of men, why is it necessary to torment nature to make it do what he wanted? Bacon's forceful tone, employment of feminine pronouns, and reliance on the active/passive, male/female dichotomy when referring to nature cements a gendered hierarchy between men, the experimenter, and nature, the object. Bacon was not the first to formally refer to nature using female pronouns. But, because he was the first to advocate the entrance into nature by means of violent, and often sexual force, and the first to advocate for empiricism in the natural sciences, his employment of female pronouns becomes far more significant.[174]

The goal of learning how to control nature for productive gain, and the employment of tool, technology and force to achieve it sets Bacon apart from many earlier philosophers. To Bacon, one of the reasons sciences up until this point had failed in continuing to make major tangible gains in the lives of men was because man refused to interfere directly in nature's way, and previously had only sought to learn from her. In

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[173] Bacon, "Novum Organum," 268.

[174] For specific examples of the use of female pronouns in reference to nature see axioms 63, 74, 82 and 89 of the first book of the Novum Organum. Bacon, "Novum Organum," 239, 248, 254, 262. ; Feminist historian of science, Carolyn Merchant argues that new translations of Bacon's work often take out the female pronouns when referring to nature and instead refer to nature as "it" in an effort to modernize the language. These newer translations are not true to Bacon's beliefs, she argues, because his understanding of nature was decidedly feminine. Thus to read more accurate translations of Bacon, she recommends 19th century translations of his works, which do not remove "natura" in favor of "nature." See, Carolyn Merchant, ""The Violence of Impediments": Francis Bacon and the Origins of Experimentation," *Isis* 99, no. 4 (December 2008): 738-739, JSTOR.

De Augmentis Scientarium, he explained that, "the premature despair in human enterprises,"[175] that is, the lack of huge advances in technology, came from the error of supposing that art is "merely an assistance to nature, having only the power to finish what nature has begun, to correct her when lapsing into error, or to set her free when in bondage" while failing to realize that art can actually "change, transmute and fundamentally alter nature."[176] The movement of man's role from interpreter of and witness to nature to one who has the power to control and fundamentally alter nature, by way of tormenting her and making her do what he wants and not what she wants demonstrates that Bacon's ideology strips nature of not only her autonomy, but also the spirituality, independence and mysticism that nature had previously been regarded with.

Bacon changes the spirituality previously granted to nature into secrecy, which technology alone can root out, as when he advocates for the discovery of nature's secrets by tormenting via the arts. The tormenting of nature for her secrets is reminiscent of the courtroom tactics of the witch-hunt, specifically the tactic commonly used in Scotland under James VI, later James I of England, of "pricking."[177] During the height of the craze, witches were thought to contain "Satan's mark," and to prove a woman was a witch, she was stripped down and poked with needles until an insensitive part of her body was found, this area with a lack of sensation was proof of "Satan's mark."[178] Soon after this tactic began, men became employed as "professional prickers" and women increasingly had their "Satan's marks" discovered in their "privy parts."[179] The fact that

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[175] Francis Bacon, "De Augmentis Scientiarum," in *The Philosophical Works of Francis Bacon: Reprinted from the Texts and Translations with the Notes and Prefaces of Ellis and Spedding* (Routledge, 1905), 427, Pdf e-book.
[176] Ibid, 427.
[177] Goodare, "Women and the Witch-Hunt," 301.
[178] King James I of England, *Daemonologie,* 22; Goodare, "Women and the Witch-Hunt," 302.
[179] Goodare, "Women and the Witch-Hunt," 302.

men found gainful employment in the carrying out of orders to torment women's bodies in the name of truth itself is astounding, but this too will come to be reflected in Bacon's conceptualization of how average men can contribute to the advancement of the sciences, which will be discussed forthcoming. This tangible tormenting of women's bodies was excusable because it was done to discover their secrets, in the name of truth. Likewise, by casting nature as secretive she becomes far easier to demonize, penetrate and torment.

Bacon is persistent in his belief that nature finds her usefulness only when she "takes orders from man." In the first aphorism of *Parasceve ad Historiam Naturalem et Experimentalem* Bacon explains the three states of nature and their usefulness. He dictates that nature, in her first state is free and unfolds herself on her own terms, in her second state she is forced to show herself because of extreme natural circumstances, and in her third state she is manipulated and changed by man. Bacon wrote that the most useful and productive state of nature was her third state as, "In things artificial nature takes orders from man. Without man such things would never have been made. By the agency of man a new aspect of things, a new universe, comes into view."[180] It is clear that he believed nature needed man to be successful. But successful, we may now ask, in what respect? Successful for capitalism, successful for the advancement of new science that has deep roots in exploitation and exclusion?

A preeminent biographer of Francis Bacon, Benjamin Farrington, described the theme of the first four aphorisms of the *Novum Organum* as "Man the Helper and Interpreter of Nature," and states that the overarching idea was that man has the ability to

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[180] Francis Bacon, "Parasceve," in *Philosophical Works, Part I Continued*, ed. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath, vol. 2, *The Works of Francis Bacon* (Boston: Houghton, Mifflin and Company, 1905), 51, digital file.

understand nature and make her do "better than she does without his aid."[181] So again, we may ask: better for whom? Better for what, and at what expense? For Bacon sees the possibility of nature only insofar as human's can intervene, and seems to ignore what comes of nature without exploitative intervention, in fact the old knowledge, that is knowledge that came without intervention into nature was characterized by Bacon as impotent and sterile as he believed that science must be judged by its fruits.[182] And so, words like "better" point us in the direction of product, of capital accumulation. This preoccupation with the obtainment of product, and knowledge, that is to Bacon, *power*, from a feminine and passive, yet simultaneously dangerous nature, shines a telling light on Bacon's philosophy and his employment of hierarchical categorization between man, the masculine producer, and nature, the feminine material.

The quest to form a field of scientific inquiry that is based around the attainment of power is demonstrative of a base hierarchical assumption that nature exists, in her best form, to be used to achieve the goals of men. And that, if we could reach the end of understanding of nature, that is, understand all there was to find out, "men would quickly come to such a deep understanding of nature's secrets that their power over her would be practically unlimited."[183] That the goal of Baconian science is to have unlimited power over nature is not only personally frightening, but the strategic employment of the feminine elucidates Baconian views of women as well. Should the goal of science really be to have complete power over nature so that man can force her to create all that he may want? Why is an egalitarian goal inconceivable to Bacon, and furthermore, why does he

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[181] Farrington, *Francis Bacon,* 99.
[182] Bacon, "Novum Organum," 203-209.
[183] Farrington, *Francis Bacon*, 122.

never seem to consider the possibility that nature may have agency of her own? What about the culture and transitions taking place in early-modern England led Bacon to believe that the best way to gain information from nature was with an iron fist, instead of ever considering an approach which may have created a symbiotic relationship with nature, one that respected the autonomy of ecosystems outside of men? In Bacon's theories of environmental science, does man ever give back to nature? And, once we come to consolidate all of Bacon's theories of science, we must not ignore his political life. How can we come to reconcile Bacon's advocacy for violent intervention into nature, as a means to secure information, control and power with what we understand about his involvement with the witch trials under James I? Can we understand his conscious effort to preserve the femininity of nature, while stripping her of power and independence as a reflection on his political life outside of his philosophical writing?

Methodology and the Power of the Average Man

The methodology for obtaining information from Nature, both in Bacon's fiction and philosophical writing is deeply gendered, albeit more implicitly than his language. Bacon's concern with the mechanism of obtaining knowledge reflects upon the implicit understanding of masculinity as active. This is demonstrated most fully when examining the contrast between Bacon's relationship to intellect and his relationship to methods of attainment. He advocated for an approach to experimentation that "leaves but little to the acuteness and strength of wits, and places all wits and understandings nearly on a level."[184] Bacon does not want scientific progress to rely on men of great intellect, but instead to rely on all men, so long as they can follow the precise directions of the

[184] Bacon, "Novum Organum," 252.

experiment. That is to say, Bacon thought men of average ability were important to the cataloguing of science. This assertion is not immediately troubling, for a contemporary audience may agree that all people can contribute to the advancement of knowledge. Yet, the implications of this statement become clear when taken in the context of Bacon's famous work of utopian fantasy, *New Atlantis.*

Utopian writing has the immense power of imagination and gives the author full ability to reimagine an ideal world. Firstly, it should be noted that The *New Atlantis,* dissimilarly to other early-modern utopian works is deeply hierarchical and patriarchal.[185] Not only is patriarchy the structuring force of families, as we can see in the scene of the feast, where the mother is never allowed to be seen and is entirely disconnected to the reproductive power of the family, but patriarchy also colors methodology in this utopia based on the quest for scientific information.[186] The role of scientist is not reserved for the brightest member of the community. In fact, the quest for natural information is anatomized and divided amongst men, based on their proficiency. There are men devoted only to sailing to other lands, men devoted to collecting experiments and recording them, men that put findings into tables and charts, men who are specifically dedicated to drawing out "things of use and practice for man's life" from the experiments done by others. There are men who simply execute the experiments designed by others, called "Inoculators," and a whole different group of men, called the "Interpreters of Nature" who are devoted to taking the results of others' experiments and raising them "into

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[185] For a comparison of *New Atlantis* to other early-modern works of utopian fiction see, Carolyn Merchant, "Organic Society and Utopia," in *The Death of Nature, Women Ecology and the Scientific Revolution* (San Francisco: Harper and Row, 1980), 69-98.

[186] Francis Bacon, "New Atlantis," in *Three Early Modern Utopias*, ed. Susan Bruce, Oxford World's Classicis (Oxford: Oxford University Press, 1999), 169-171; For a more detailed analysis of gender in *New Atlantis* see Kate Aughterson, "'Strange things so probably told': Gender, Sexual Difference and Knowledge in Bacon's New Atlantis," in *Francis Bacon's New Atlantis, New Interdisciplinary Essays*, ed. Brownen Price, Texts in Culture (Manchester: Manchester University Press, 2002), 164-170.

greater observations, axioms and aphorisms."[187] This organization of research is not only reflective of the early-modern obsession with anatomization of information, but also separates the Thinker from the Actor, as there are men who design experiments, and others who carry them out. This approach allows for men of all intellectual capability to find a place in scientific research, as long as they can follow the directions of experimentation.

Furthermore, it is reminiscent of the activity prescribed to masculinity dictated by Aristotle, which colors even Bacon's methodological approach. Despite the multitude of roles men can inhabit regardless of their intellect, there remains no role for women in scientific venture, regardless of her intellect. Even in Bacon's perfect utopia, the gains of science rest primarily on men who need not be scientifically minded, but only need be willing to invade nature. As aforementioned, perhaps this would not be as striking if Bacon himself was not a dedicated intellectual and, more so, if he did not adhere so closely to the feminine characterization of the nature that was to be invaded.

The rich feminist criticism of Bacon focuses largely on his use of rape metaphor and violent sexual language while referring to the earth.[188] Yet, the opposing side, those

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[187] Bacon, "New Atlantis," 183-184.

[188] Feminist critique of Bacon rose to prominence in the 1980s and 1990s, due primarily to work in the history of science done by physicist and philosopher, Evelyn Fox Keller, feminist and postcolonial philosopher, Sandra Harding, and, historian of science, Carolyn Merchant. Most feminist criticism focuses on the violent and sexual metaphors used to portray feminine nature, as well as Bacon's sexually penetrative methodology. Sandra Harding extends her critique further, to the epistemology of science in general, although I have not read enough of her writing to provide a complete review of her work. The most famous book that came out of this age of criticism was Carolyn Merchant's *The Death of Nature, Women, Ecology, and the Scientific Revolution* (San Francisco: Harper and Row, 1980). This book, although containing information on Bacon's theories, views the Scientific Revolution in its totality, as the site of the death of Nature. Many feminist critiques give due attention to the witch-hunts as a source of inspiration from Bacon as well. I have not found feminist critique of Bacon that extends to the way his theory may have influenced the development of an environmentally dependent industry, such as mining. For more information, see, Evelyn Fox Keller, "Baconian Science: The Arts of Mastery and Obedience," in *Reflections of Gender and Science* (New Haven: Yale University Press, 1985). Although the entire book is worth reading for a varied review of gender in science, for the purpose of this project, Keller's chapter on Bacon is especially elucidating. In addition to *The Death of Nature,* see also, Carolyn Merchant, "'The Violence of Impediments": Francis Bacon and the Origins of Experimentation," *Isis* 99, no. 4 (December 2008) and Sandra Harding, *Whose Science? Whose Knowledge? Thinking from Women's Lives* (Ithaca:

who defend Bacon and his philosophy often make the case that feminist critiques pay too close attention relatively few instances of sexual language. An ardent defender of Bacon, Alan Soble, gives an example, "penetrating need not be taken as having any sexual implications. And even if penetration is sexual, penetration does not entail or suggest rape."[189] Although, of course Soble is correct in his assessment of the word "penetration" he is also serving to undermine Bacon's relationship to, and care for language. If defense of Bacon is structured around dissuading people from examining the particular historical connotations of choice words, this is not a proper defense, as Bacon himself, in his last published work argued that men should be taught philosophical grammar, a field that would later come to be known as linguistics.[190] In *De Augmentis Scientiarum,* Bacon maintained that men should learn philosophical grammar so that they would be able to investigate the traces of customs and beliefs that different cultures left behind in their tongue.[191] The feminist critic of Bacon does precisely this when she argues that we must pay attention to Bacon's word choice, as it demonstrates the culture and beliefs of his time. To defend Bacon's use of gendered language by postulating that he did not focus on the specifics of exactly what his language implied is to do a disservice to Bacon himself, who clearly cared about the study and precision of language.

Cornell University Press, 1991). Another work that is less of a direct critique of Bacon but is useful to the feminist historian of science is Slyvia Bowerbank's *Speaking for Nature, Women and Ecologies of Early Modern England* (Baltimore: The John Hopkins University Press, 2004). This work is dedicated to working women's history back into the ecological history of early-modern England.

[189] Alan Soble, "In Defense of Bacon," in *A House Built on Sand, Exposing Post Modernist Myths About Science*, ed. Noretta Koertge (Oxford: Oxford University Press, 1998), 200, digital file.

[190] Lia Formigari, "Francis Bacon," in *Lexicon Grammaticorum: A Bio-Bibliographical Companion to the History of Linguistics*, ed. Harro Stammerjohan, Lois Grossman, and Mark DeVoto, 2nd ed. (Tübingen, Germany: Max Niemeyer Verlag, 2009), 92, digital file.

[191] Lia Formigari, "Francis Bacon and the Renaissance Linguistic Tradition," introduction to *Language and Experience in 17th Century British Philosophy* (Philadelphia: John Benjamins Publishing Company, 1988), 12, digital file.

Penetrative Logic and A Philosophy Built for Industry

Francis Bacon's concerns with utility, the advancement of material gains and dominion over nature through scientific progress makes his natural philosophy useful to the formation of industry. His use of industrial rhetoric, in combination with his reliance on gendered conceptions of the earth highlights his position not only at the forefront of scientific, but also political and industrial advancements in early-modern England. An analysis of how he makes use of the language and themes of industry will shed light on not only the effort to shape environmental science into an aid of emerging capitalism, but will also serve to remind us of the connection between gendered understandings of the earth, and the subsequent ease by which the earth is exploited for capital gain.

Bacon was inspired by voyages of discovery and colonization, and the increasing rate of technological invention in Western Europe, as evidenced by his description of the galleries for placement of "rare and excellent inventions" and "statues of all principal inventors" in the *New Atlantis*.[192] In these galleries, Bacon imagines statues of "your Columbus, that discovered the West Indies," as well as the inventor of ships, the inventor of gunpowder, and the inventor of the observations of astronomy.[193] Given Bacon's admiration for the technology that enabled men's global exploration, as well as modernized warfare, it is not surprising that Bacon wanted to craft a new scientific approach that could aid industry, while retaining the penetrating spirit of the voyages of discovery.

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[192] Farrington, *Francis Bacon,* 144-145; Bacon, "New Atlantis," 184.
[193] Bacon, "New Atlantis," 184.

Although under-explored by many biographers of Bacon, his admiration for the voyages of discovery is reflected in his use of language which explicitly calls for the unapologetic intrusion into nature, to learn her secret. The relentless pursuit of nature advocated for in The *Advancement of Learning* demonstrates a clear colonial and sexual connotation, rich in language of exploration, brute determination, and superstition of the other, seen in both the literature of colonization as well as the witch hunts, and again, reworked by Bacon. He writes,

> …for it is no more by following, and as it were *hounding* nature in her wanderings, to be able to lead her afterwards to the same place again. Neither am I of opinion, in this history of marvels, that superstitious narrations of sorceries, witchcrafts, dreams, divinations, and the like, where there is an assurance and clear evidence of the fact, be altogether excluded… *Neither ought man to make scruple of entering into these things for inquisition of truth*, as your Majesty hath showed in your own example; who with the two clear eyes of religion and natural philosophy have looked deeply and wisely into these shadows, and yet proved yourself to be of the nature of the sun, which passeth through pollutions and itself remains pure as before.[194]

Bacon reveals his industrial tone and explorative rhetoric. Additionally, this also reminds the reader of his belief in witchcraft, and the alignment of women and earth, not only through their shared characteristics of being either malevolent or passive and inert, but also by aligning the methodology by which information can be obtained from both bodies. Firstly, he advocates for nature to be followed and hounded, so that she may produce the same results multiple times. The relentless pursuit of nature, in an effort to create replicable production patterns is necessary for the establishment of a reliable industry, yet also implies nature's unwillingness to shape easily to the constrictions put in place by men. Additionally, the mechanism by which the repeatable effect is made, that is

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[194] Francis Bacon, "Advancement of Learning," in *The Great Books: Advancement of Learning, Novum Organum, New Atlantis*, The Great Books of the Western World (n.p.: Encyclopædia Britannica, 1980), 72-73. Emphasis added.

by “hounding” nature, so she may end up in “the same place again” evokes colonial explorations, entry into “virgin” lands, and subsequent anatomization of said lands for their industrial capability, as is seen replicated in mining ventures into South and Central America during the Industrial Revolution.

His ability to hold a relatively modern understanding of the potential relationship between environmental science and colonial enterprise while simultaneously demonstrating his belief in the real powers of witchcraft remind us that Bacon, despite being heralded as a thinker far ahead of his time, is subject to many of the same beliefs of early-modern men, witchcraft being one of them. It also reminds one of the ever-present influences of his political life in his philosophical writing. It is significant that the witches are the example Bacon chooses when making the comparison of entering into nature in search of truth, thereby placing nature and witches on a similar level, and understanding both as objects that can be justifiably penetrated when truth is the subject of inquiry. This explicit comparison sheds new light on Bacon’s reliance on female pronouns when describing nature throughout his other works, for instance when he describes the relationship between natural philosophy and nature, by saying,

> Some in their simplicity are apprehensive that a too deep inquiry into nature may penetrate beyond the proper bounds of decorum, transferring and absurdly applying what is said of sacred mysteries in Holy Writ against those who pry into divine secrets, to the mysteries of nature, which are not forbidden by any prohibition… She [nature] is, therefore, rightly bestowed upon religion as a most faithful attendant…[195]

One may see this quote in a new light when it is understood that he believes man should not hesitate to actually penetrate into nature or women on a quest for what

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[195] Bacon, "Novum Organum," 262-263.

he calls "truth."[196] In Bacon's eyes, evidenced both by the *Novum Organum* and *The Advancement of Learning,* religion should not be a deterrent of the penetration into real women, in the form of witches, or the womanized earth, but religion instead, should be understood as the force that grants permission. For the case of women, religion allows us to penetrate her for truth, and in the case of natural philosophy, nature is religions "most faithful attendant."

In the direct comparison between witches and nature, he also makes a direct appeal to James I, saying that James has shown in his own example how much truth can be elucidated when one combines natural philosophy and religion. We can assume that when Bacon says, "as Your Majesty has showed in your own example" he means James' heading of the witch-hunts throughout Scotland, and England, which were, like Bacon's philosophy, dependent on penetrative logic and modes of inquiry.

This passage, perhaps more than any other instance of the employment of themes of witchcraft, gendered suspicion and exploration by Bacon, demonstrates the sheer strength of the connection he drew between witches and nature, how the tactics used to discover the truth of the witches could be used to discover the truth of nature, and importantly how they are both "discovered" for the sake of man's power, utility and profit.

Although Bacon wrote before the height of the Industrial Revolution, he undoubtedly understood how useful environmental science could be to the advancement of industry. As Farrington wrote, Bacon is "easily recognizable as the herald of the Industrial Revolution, who foresaw the possibility and the consequences of the

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[196] Bacon, "The Advancement," 72-73.

application of science to industry."[197] This judgment of Bacon is important to our understanding for two main reasons. First, Bacon's anticipation of the Industrial Revolution, and his effort to cleave natural philosophy to fit it demonstrates an utterly commendable effort to formulate a useful natural philosophy, albeit for an end later proven to be destructive to the natural environment. Secondly, Farrington says Bacon foresaw not only the possibility, but also the consequences of the application of science to industry. This assessment of Bacon is either false on the part of Farrington, or demonstrates the full extent to which Bacon thought only of man, and not of nature, despite saying himself that "nature is only to be commanded by obeying her."[198] Bacon did not warn of potential damage to the environment that could come at the hand of industrialization. While he did advocate for the systematic cataloguing and anatomization of nature, he did not write about maintaining natural resources, or other measures that could guard against depletion or degradation of natural resources. Thus, he didn't understand the consequences of applying science to industry, unless that is, as aforementioned, these "consequences" that Farrington alludes to only pertain to the consequences potentially faced by men. Consequences, which in the eyes of Bacon are largely positive, and may improve the lot of humanity. The lack of intellectual attention given to the possibility of negative environmental impacts does not seem to support Bacon's claim that nature must be obeyed. Instead, it more readily demonstrates the industrial fortitude with which Bacon understands nature as mere material, useful only as raw matter to feed into an industrial machine.

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[197] Farrington, *Francis Bacon,* 176.
[198] Bacon, "Novum Organum," 287.

Bacon understood his new philosophy as a machine, and nature as the material needed for production. In the introduction to *The Great Instaturation*, of which *The New Organum* is the most well known section, Bacon writes an "Epistle Dedicatory" to James I, a dedication that was written in hope of securing funding for his works, which he had not been able to do under other rulers. He explains, "I have provided the machine, but the stuff must be gathered from the facts of nature."[199] Nature as mere "stuff" reminds us of nature's lack of autonomy, the lack of consideration given to her by man, and the lens through which she is deemed useful.

In the same dedication, Bacon argues that he does not want to create the foundation for any "sect or doctrine" but instead create a foundation for "human utility and power."[200] Yet, Bacon's written disavowal of any political or religious motivation for his philosophy seems to only be true in his eyes. Environmental exploitation in the name of industry, or "human utility and power" is an inherently political act, as it encourages a way of thinking that advances capitalism and establishes a decided hierarchy between man and nature. Bacon's gendered understanding of the earth and legitimization of its penetration is hidden by claims that his philosophy is apolitical empiricism concerned with improving the conditions of humankind. The repudiation of political or religious motive contradicts the very facts of Bacon's life outside of his philosophical writing, that is, that he was not only the attorney general but also a highly religious man. His political involvement deserves special scrutiny, as he was appointed to the attorney generalship in 1613, and the *Great Instauration* was published in 1620.[201] Granted, the *Great*

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[199] Franics Bacon, "The Great Instauration," in *Francis Bacon, A Selection of His Works*, ed. Sidney Warhaft (New York: The Odyssey Press, 1965), 301.
[200] Ibid., 300
[201] Green, "Chronology," *Sir Francis*.

Instauration was not written entirely after his appointment to a highly political public post, but it was published while he was a public figure, therefore, lack of political coloring in his natural philosophy simply cannot be true. The aforementioned alignment between methodology used to gain information from the witches, and methodology used to gain information from nature already eliminated the possibility for an apolitical Francis Bacon.[202]

Bacon's relationship to emerging industry is reminiscent of the positive feed back loops common in contemporary discussion of environmental science. That is, he was influenced by the prospect of industrialization, thus wrote his philosophies based off of industrial potential and these writings served to advance the idea that industrialism could work in tandem with natural philosophy. The more Bacon was influenced by explorations and technology that would benefit industrial growth, the more he wrote, and the more he aided in the proliferation of pro-industrial thought.

Bacon's involvement in the proliferation of the idea that environmental science, or natural philosophy could be used for the advancement of capital is acknowledged not

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[202] There is a lack of serious attention paid to Bacon's political life, and how it may have influenced his scientific understanding of the Earth. In the Benjamin Farrington's biography of Bacon, which is most heavily drawn upon in this chapter, Farrington says of the period beginning with Bacon's appointment to the attorney generalship in 1613, "Of his conduct in these offices we cannot write. It would be to stray from the biography of the writer to the history of his country." Farrington, *Francis Bacon,* 82. In my eyes, the biography of Bacon has a lot to do with the political history of the country, especially considering Bacon was a highly appointed public and political figure. This omission does not preserve historical accuracy of who Bacon was, and in fact actually limits the scope of understanding offered to the reader to establish a holistic understanding of Francis Bacon as a philosopher. It should also be noted that the witch-hunts of England and Scotland are mentioned only once in this entire biography, when Farrington says, "There were still burnings at the stake for religion in the England of Bacon." Farrington, *Francis Bacon*, 80. Not only does this not explicitly mention witchcraft, though through the phrase "burnings at the stake," the image is clear, but more importantly it designates Bacon to a passive role. By positioning Bacon at the end of the sentence, and using him mostly as a reference to the temporal time frame, we are not afforded the opportunity to explore Bacon's active role in the witch-hunts. A similar lack of attention is paid to James I more infamous writings. See, Jane P. Davidson, review of *Witchcraft in Early Modern Scotland: James VI's Demonology and the North Berwick Witches by Lawrence Normand and Gareth Roberts*, by Lawrence Normand and Gareth Roberts, *The Sixteenth Century Journal* 33, no. 3 (Fall 2002): 907-908. For a concrete example of this method of writing witches out of the history of James I see, James Doelman, "Beginnings: The Roots of James' Role in Religious Culture," in *King James I and the Religious Culture of England* (n.p.: D. S. Brewer, Boydell & Brewer, 2000), which does not include any mention of the witch hunts, or the *Daemonologie.*

only by his biographers and admirers, but also by those critical of the system of capitalism, most notably, Karl Marx. In a footnote in *Capital*, Marx refers to Bacon's reshaping of man's relationship with the environment and contends "They [Bacon and Descartes] anticipated an alteration in the form of production, and the practical subjugation of nature by man, as a result of the altered mode of thought."[203] With this, Marx reminds us that the success of industry is dependent on the subjugation of nature by man, pushing a feminist analyst to question how the feminization of nature is a useful tool in this "practical subjugation."[204] He also reminds us that Bacon, as characterized by Farrington, is most definitely the "herald of the industrial revolution" whether that is for better or worse.[205]

Aristotelian Influences, and The Royal Society

Bacon's admiration for industrialism, and his ability to shape his scientific theory to support industrial growth could not have been done without specific ideas about matter first written of by Aristotle. Although, for his entire intellectual career, Bacon staunchly disavowed Aristotle and all philosophy of the ancients, much of the foundation of Bacon's conception of exactly what nature *is* can be traced back to Greek philosophy. Bacon first faults the Greek philosophers, because he believes they are unconcerned with observation, and only occupy their time with internal thought, through which man can never find truth.[206] Their intellectual pride caused man to lose his dominion over nature, because he did not continue to take stock in nature. Bacon went so far as to compare

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[203] Karl Marx and Friedrich Engels, "Machinery and Modern Industry," in *The Process of Production of Capital*, vol. 1, *Capital, A Critique of Political Economy* (Moscow: Progress Publishers, 1887), 334, PDF.
[204] Marx and Engels, "Machinery and Modern," 334.
[205] Farrington, *Francis Bacon,* 175.
[206] Peter Urbach, *Francis Bacon's Philosophy of Science An Account and a Reappraisal* (La Salle: Open Court, 1987), 2.

Aristotle to a dictator and the Anti-Christ.[207] Yet, what Bacon retained from Aristotelian philosophy was the idea of the four causes, the two most important being the material cause and the efficient cause. The material and efficient causes, as written about in the first chapter of this project, have been used as a mechanism for which man is to understand the differences between man and woman. She is the material, he is the efficient. She may contain, and hold, but he is active, a builder and shaper. Bacon understands this Aristotelian binary, but applies it to nature. Yet, its application to nature does not mean the division of causes sheds its gendered implications, and when Bacon writes that nature is the "stuff" and his philosophy the "machine," not only is he saying that nature cannot *do* anything, in the capitalist sense, but that man needs to act upon *her* for anything to get made. When Bacon reinforces Aristotle's binary, he is inherently making nature passive, but also making her feminine. We must not forget the original connotation of these terms, as they were certainly not lost on Bacon.

Aristotle's philosophy of nature examined her uninterrupted, and therefore could not help the project of restoring man's dominion over nature. To restore the dominion, man must abandon a moralistic and theoretical approach to thinking about nature, and instead concern himself with "the description and analysis of nature as she has been vexed, imprisoned, bullied, forced, violently interfered with…by the activity of man."[208] Examining nature on her own could not help in the pursuit of new invention, or if we use

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[207] Francis Bacon, "The Advancement of Learning," in *Philosophical Works Part II*, ed. James Spedding, Robert Leslie Ellis, and Douglas Denon Heath, vol. III, *The Works of Francis Bacon* (London: Spottiswoode & Co., 1857), 285; Craig Martin, "The New Sciences, Religion and The Struggle Over Aristotle," in *Subverting Aristotle: Religion, History, and Philosophy in Early Modern Science* (Baltimore: John Hopkins University Press, 2014), 149, digital file.
[208] Farrington, *Francis Bacon,* 94.

the distinction Bacon uses, we must create "natura vexata" instead of merely observing "natura libera"[209]

Bacon believed that to create a natural philosophy that was useful, Aristotelian thinking must be abandoned, as "the philosophical tradition is but a succession of masters and scholars, not of inventors and improvers of inventions" as it should be.[210] Yet despite his constant repudiation of Aristotelian thought, because of its supposed impotency, Bacon made great use of one of the most important tenets of Aristotelian natural philosophy, that is the four causes necessary for true understanding.[211] Of these four causes, Bacon developed the material and efficient causes most thoroughly for his natural philosophy. Thus, Bacon took the causes that were first used to describe the hierarchy of the sexes, and explicitly transferred them from Woman to Earth.

It is widely believed that the scientific utopia dreamt by Bacon in The *New Atlantis* was the inspiration for the creation of the Royal Society in 1660, founded by some of his first followers.[212] Henry Oldenburg, Secretary of the society went so far as to say that the complete intention of the society was "to raise a Masculine Philosophy."[213] The establishment of the Royal Society demonstrates a full acceptance of Baconian principles, and a wish to disseminate them. Its very existence is proof that the project of gendering the earth and natural sciences was furthered.

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[209] Merchant, ""The Violence," 741.
[210] Bacon, "The Great," 302.
[211] S. Marc Cohen, "The Four Causes" (lecture, The University of Washington, Seattle, WA, September 23, 2016).
[212] Urbach, *Francis Bacon's*, 10; Bronwen Price, introduction to *Francis Bacon's New Atlantis New Interdisciplinary Essays* (Manchester: Manchester University Press, 2002), 15; Tina Skouen, "Science versus Rhetoric? Sprat's History of the Royal Society Reconsidered," *Rhetorica: A Journal of the History of Rhetoric,* 29, no. 1 (Winter 2011): 26-27, JSTOR; Evelyn Fox Keller, "Spirit and Reason at the Birth of Modern Science," in *Reflections on Gender and Science* (New Haven: Yale University Press, 1985), 46.
[213] Vandana Shiva, "Nature: Philosophy and Spirituality," in *Routledge International Encyclopedia of Women, Global Women's Issues and Knowledge*, ed. Cheris Kramarae and Dale Spender (New York: Routledge, 2000), 1443, digital file.

Henry More, a fellow of the Royal Society, in his attack on alchemy and Thomas Vaughn, critiqued Vaughn by saying, "Thou has not laid Madam Nature so naked as though supposest, only thou hast, I am afraid, dream't uncleanly, and so hast polluted so many sheets of paper with thy Nocturnall Canundrums.[214] The implications of this quote are quite shocking in a contemporary context. More criticizes Vaughn for not actually laying "Madam Nature" naked and ostensibly having sex with her, as a respectable scientist (that is, not an alchemist) would do. Instead More claims, Vaughn is merely masturbating at the thought of Nature, and in turn creating a philosophy that is a pollution of paper, with "Nocturnall Canundrums." That is to say, More is accusing Vaughn of merely contemplating, thereby creating a product (philosophy, ejaculate) only out of the workings of his own mind (or hand), and not out of the material of nature in combination with the tools and technology of man. To More, what Vaughn, or any scientist *should* do, is create a product that is borne out of the penetration of man into nature, when she is laid naked, and exposed. It is evident that not only has Bacon's call for the complete anatomization of nature been carried through, but also the sexual nature of such quests did not lessened within the writings of his followers. The members of the Royal Society were deeply concerned with how to practically raise a "Masculine Philosophy" leading them, in my opinion, to be equally as concerned with the womanhood of nature as an object for penetration.

Joseph Glanvill, although not a scientist, is often regarded as the chief propogandist for the natural philosophers of the late 17th century.[215] Notably, Glanvill is

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[214] Evelyn Fox Keller, "Spirit and Reason at the Birth of Modern Science," in *Reflections on Gender and Science* (New Haven: Yale University Press, 1985), 52.

[215] Robert Pasnau, *Metaphysical Themes 1274-1671* (Oxford: Oxford University Press, 2011), 179, PDF.

most famous for his treatise on witchcraft, *A Philosophical Endeavor towards the Defence of the Being of Witches and Apparations,* published in 1666 in London, wherein he stood by his ardent belief in the existence of witches, which some historians claimed contrasts with his great works of "new science."[216] Perhaps his belief in witchcraft is less surprising when noting that Glanvill set femininity as the chief opposition to truth, by arguing that the woman within us is the reason for deceit, and that truth will never have a chance when "the Affections wear the breeches and the Female rules."[217] Glanvill continues that the true goal of science is to discover "the ways of captivating Nature, and making her subserve our purposes."[218] This understanding of the goals of science is Baconian. The Royal Society was founded in 1660, thirty-four years after Bacon's death. Yet, his natural philosophy was pervasive and influential, not only for the ideas disseminated by the Royal Society, but also for the ways in which the men of the Society reified nature and the earth as a feminine object.

Conclusion

Bacon's influence over the development of environmental science and natural philosophy cannot be underestimated. His influence did not stop with The Royal Society, as it persists still today. Would we retain our use of gendered language while referring to nature, use which is so commonplace it is often ignored, if it were not for the strict enforcement of this in the foundation of early-modern environmental thought? Francis Bacon employed not only gender, but a violent and hierarchical interpretation of gender,

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[216] Moody E. Prior, "Joseph Glanvill, Witchcraft, and Seventeenth-Century Science," *Modern Philology* 30, no. 2 (November 1932): 167, JSTOR.
[217] Joseph Glanvill, *Scepsis Scientifica: Or, Confest Ignorance, the Way to Science; An Essay of the Vanity of Dogmatizing and Confident Opinion with a Reply to the Exceptions of the Learned Thomas Albius* (London: Henry Eversden, 1665), 100, digital file.
[218] Ibid, 100.

which made use of tactics developed in the witch trials, now simply translated onto another feminized body. Bacon's tactics institutionalized the notion of a sexualized earth, and legitimated her exploitation.

Would Bacon have been so successful in his violent methodology if enacting violence onto women's bodies in the name of truth were not already widely accepted? Were women's bodies the testing ground for Bacon's later scientific theories, or were his scientific theories an extension of his hypothesis, a further study of the effect of violent exploitation on feminine bodies in search of material product? There is no way to concretely answer these questions, but knowing what we do about Bacon, it becomes imperative to explore the deeply patriarchal roots of nature-based sciences. When the intersecting histories of witches and environmental theory are understood, one loses the ability to claim that environmental science is, at its core, objective. It is time to think about what we see when we look at nature.

Some feminist historians argue that leaving women out of science may have been a blessing.[219] Women did not have to choose whether or not they would act against something so integral to their beings, in an effort to be permitted into the male dominated sciences, or chose not to go against nature, and thus be further marginalized.[220] Although this opinion has merit, to accept this view is to concede to Aristotelian binaries. And even so, a larger problem remains above the fact that women themselves did not have the

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[219] Bowerbank, *Speaking for Nature*, 2.

[220] There is a troubling tendency in eco-feminism and feminist histories of science to accept the assertion that women are inherently closer to nature than men. I do not feel as though it is necessary, nor helpful to explain my personal opinion on this debate. It must be noted however, that even if women aren't inherently closer to nature, the defining of women into nature, as is discussed in chapter one, has served to align women so completely with nature, that I do not think the legitimacy of eco-feminist theory, and analysis of the history of science is lessened by stating that that conceptions of nature, or "the natural" are integral to women's beings.

option to be actors.[221] This larger problem is that the alignment of the female body with the earth is so deeply established within historical scientific thought that this alignment was never questioned until recently, and was historically used to exploit both women and the earth. To undue this is a monumental task, and many would argue that we should not. That the connection between women and nature is inherent, true, and even beneficial. I do not attempt to present an argument about whether or not women should be aligned with nature, but I do attempt to bring to the attention of environmental scientists, that our discipline is gendered at its core, with its forefather, Francis Bacon, being the chief employer of violent gendered language, encouraged by experience with the witch hunts to shape an exploitative and industrially useful theory of nature.

[221] I do not wish to imply that the absence of opportunity for women in early-modern science is unimportant. I believe that the issue of the lack of tangible representation and roles for women in early-modern scientific development is important, especially considering the question of how women would have had to balance their roles as actors with their existence as women, making them simultaneously actors on to nature, while also being part of nature. Yet, I believe that the problem of the lack of women historically in the field of sciences is born out of the larger problem, that is, that the female body is completely aligned with nature, and thus, women could not act on themselves.

Chapter Three

Mining and the Feminine Earth Metaphor: Where do the Women Go?

> For most traditional cultures, minerals and metals ripened in the uterus of the Earth Mother, mines were compared to her vagina, and metallurgy was the human hastening of the birth of the living metal in the artificial womb of the furnace--an abortion of the metal's natural growth cycle before its time.[222]

> Employment of female children…has the effect of preventing them from acquiring the most ordinary and necessary knowledge of domestic management and family economy… that when they come to marry, the wife possesses not the knowledge to enable her to give her husband the common comforts of a home.[223]

The expansion of British industry and technological power cannot be fully understood without examining the history of the mines and underground riches of England.[224] As all industries, mining reflected cultural changes; but mining also inspired technological advancements throughout England to a scale largely unseen in other industries. The ingenuity of miners and engineers faced with problems of transporting ore, and the need for drainage of coal pits in the Industrial Revolution led to the development of railways, and the steam engine, respectively.[225] Mining, as an industry, and the material riches borne from the enterprise are responsible for industrial as well as intellectual development in England.[226] Mining for iron provided medieval people with the material necessary for periods of gothic construction from the twelfth until the fourteenth century, increased wealth allowed for leisure, and the philosophical

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[222] Carolyn Merchant, *Radical Ecology the Search for a Livable World* (New York, U.S.A: Routledge, 1992), 43.
[223] W. R. Wood, *Conclusion of The First Report of Commissioners for Enquiring into the Employment and Conditions of Children in Mines and Manufactories 1842*, 5.
[224] John U. Nef, "Mining and Metallurgy in Medieval Civilisation," in *Trade and Industry in the Middle Ages*, ed. M. M. Postan and Edward Miller, 2nd ed., vol. II, *The Cambridge Economic History of Europe* (London, Great Britain: Cambridge University Press, 1987), 691.
[225] Ibid.
[226] Ibid., 692

achievements of medieval universities.[227] Mining in England, specifically, was steady but slow, until about 1620, when an unprecedented growth in iron mining occurred, due primarily to the blast furnace, and for the first time both coal and iron were being used for more common place building purposes and energy production.[228] The blast furnace is a vertical furnace used to produce liquid metals.[229] The blast furnace introduced an entirely new product, cast iron, to the mining industry, where previously, the less easily melted wrought iron had been used.[230] In the early modern era, mining provided natural philosophers with a tangible field of expression for their theories of nature bound exploration and penetration, and without the material riches borne of the mine, the industrial paradise imagined by Bacon could never have been realized.[231]

Mining, in its clearest definition, is the process by which useful minerals are extracted from the earth. Considering the natural philosophy of the early modern era that cast the earth in a definitively feminine way, mining can be understood as the entrance into the feminine body of the earth for useful materials. Additionally, mining history should be examined for more than its economic, ecological and technological factors. The history of mining is rich with gendered metaphor. Mining is perhaps the industry that necessitates the most complete human entrance into the earth, both on the surface and in the substrata of the biosphere, which may explain why this industry has been traditionally understood in such intimate and gendered ways, as will be presented shortly. The common metaphor seen throughout mining history reflects upon the understood

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[227] Ibid., 699, 703.
[228] Ibid., 704-705
[229] "Blast Furnace," in *Encyclopedia Britannica* (Encyclopedia Britannica, 2008).
[230] W. K.V. Gale, "Ferrous Metals," in *An Encyclopaedia of the History of Technology*, ed. Ian McNeil (London: Routledge, 1990), 149-150, ProQuest Ebook Central.
[231] Nef, "Mining and Metallurgy," 704-705.

macrocosmic and microcosmic relationship between the body of man and the body of earth. For the purposes of this chapter, I use macrocosmic to signify the understanding of a woman's body at "Earth-Magnitude," that is, to refer to the way in which the earth, as a singular yet complex system is understood through the symbol of a woman's body.[232] I make use of the term microcosmic to refer to the tangible and individual women's bodies as well as the symbolic and political weight of these tangible bodies and the gendered ideals attached to them. I employ microcosmic both as a contrast to the larger symbol at work in the macrocosmic feminine vision of the earth, as well as to draw a comparison between what is happening to womanhood, on a world-wide ecologic scale, and as it pertains to the actions and constraints of actual women.[233]

To begin, this chapter maps out the use of gendered metaphors throughout the history of mining, as they pertain to the understanding of the earth and the process of the "growth" of metals, taking into consideration spatial and temporal differences when discussing cross-cultural trends. Secondly, early-modern mining works will be examined for their particular employment of the feminine earth metaphor, and how it later fell out of favor in the Industrial Revolution. Finally, this chapter will discuss the tangible role of women, and the myriad employments of the concept of womanhood in the mining industry of 18th and 19th century England, as the macrocosmic vision of the woman-earth

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[232] For a further explanation of the idea of seeing at "Earth Magnitude" refer to Timothy Morton, *Dark Ecology For a Logic of Future Coexistence* (New York: Columbia University Press, 2016), pages 20-24.

[233] Microcosmic and Macrocosmic should not be confused for their employment in the early-modern era, as they pertain to the revolution in macrocosmic tools, such as the telescope, or microscopic developments, such as the microscope, although the scale of these innovations applies to my usage as well.

faded, and practical concerns with womanhood arose, due largely to rise of protective labor reform, intimately tied to the conception of the proper Victorian woman.[234]

Women have historically been written out of mining history, both practically and symbolically, despite the fact that mining has had an intimate relationship with the female body, and that women themselves worked in mines until the 19th century.[235] This chapter will attempt to write women back into some aspects of the history of English mining, and also to reconcile the conflict between early accounts of mining as deeply spiritual and almost obstetric in nature, and the contrasting accounts of women mine workers in industrial times, whose testimonies demonstrate deplorable conditions tainted further by gendered violence. By bringing gender as a category for historical analysis to the field of mining, it is possible to lessen the distance between technical analysis of the history of mining and the historical analysis of the social, gendered phenomenon surrounding the industry.[236]

Before commencing research for this chapter, I had expected to find a clear transformation in mining metaphors, reflecting changed understandings of the earth as a feminine body, in tandem with the role of women in society. As earlier chapters show, gendered metaphors abounded in early-modern natural philosophy, and mining practices in the Industrial Revolution seem undoubtedly Baconian. Yet, the feminine understanding of the earth, crucial to natural philosophies that would come to influence the development

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[234] Rosemary Feuer, "The Meaning of 'Sisterhood': The British Women's Movement and Protective Labor Legislation 1870-1900," *Victorian Studies* 31, no. 2 (Winter 1988): 233, JSTOR.
[235] Luis Arboledas Martínez and Eva Alarcón García, "Infantile Individuals: The Great Forgotten of Ancient Mining and Metallurgical Production," in *Children, Spaces and Identity*, ed. Margarita Sánchez Romero, Eva Alarcón García, and Gonzalo Aranda Jiménez (n.p.: Oxford Books, 2015), 105, http://www.jstor.org/stable/j.ctt198943h.12.
[236] Martínez and García, "Infantile Individuals," 107.

of the mining industry, is absent from both the writing and practices of miners themselves. I had expected to find tenets of gendered natural philosophy displayed in the way miners understood their practice, but mention of the feminine as a lens through which to understand the penetration of the earth is nonexistent in the mining works of the Industrial Revolution. Still, it is important to incorporate gender into the history of mining, even if miners of the Industrial Revolution were not as explicit in their use of the woman-earth metaphor as their philosophical predecessors. For the miners of the Industrial Revolution, gender in general, and women specifically were important to the field in a more tangible way. Women were employed within or around the mines, either as underground or surface workers, later, they were the wives and mothers that cared for the family members who still worked within the mines.

In the popular imagination, the availability of coal and a boom in mining activity plays an enormous role in the British Industrial Revolution.[237] This paper does not seek to object to the importance of coal and mining in industrial development, but to point out that mining activity and metallurgy was a formative aspect of culture, long before 19th century England, and that mining histories lend themselves to a far wider scope of study than solely the processes of industrialization. As discussed in chapter one, the early-modern transformation of womanhood, catalyzed by the push of midwives out of the field of science by use of the witch hunt as a dual mechanism for religious and empirical authority, can be seen as predicating the rise of Baconian natural philosophy that made use of a deep superstition towards the feminine earth to sanction unabashed environmental entrance and exploitation. As the witch craze influenced popular

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[237] Gregory Clark and David Jacks, "Coal and the Industrial Revolution, 1700-1869," *European Review of Economic History* 11, no. 1 (April 2007): 39, JSTOR.

understandings of womanhood, and early-modern natural philosophy transmuted these newfound understandings onto the earth, mining history too must be examined for how it deals with, and relates to the gendered understanding of the earth. Before examining the symbolic and practical role of women and womanhood in mining of the Industrial Revolution, it is useful to examine early histories of mining, and the rich influence womanhood, and the spiritual connotations of reproduction had on ancient mining practices.

Gynecological Miners and the Earth-Mother

The history of ancient mining practices is difficult to trace, due the lack of extant records or writing. Because of this difficulty, it is necessary to rely on archaeological records, surviving traces of ancient cultures, linguistic history and the theory of religion to shape a picture of how ancient people engaged in mining and metallurgic practices. Mircea Eliade, one of the most influential scholars of religion in the 20th century devoted enormous academic attention to the interpretation of ancient myth.[238] Eliade was a Romanian born philosopher and historian of religion, and his work *The Forge and the Crucible: The Origins and Structures of Alchemy is* a cross-cultural comparison of the myth and religious belief surrounding the development of mining and metallurgic rituals and practices in the ancient world.[239] As a scholar, Eliade does not exist without personal and political or methodological critique, yet *The Forge and the Crucible* remains integral to building an understanding of the sacredness of ancient mining rituals.[240] Eliade argues

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[238] Douglas Allen, "Mircea Eliade, Romanian Religious Historian and Author," in *Encyclopedia Britannica*, ed. Matt Stefon (Encyclopedia Britannica), last modified 2008.
[239] Bryan Stephenson Rennie, "Eliade, Mircea (1907-86)," in *Routledge Encyclopedia of Philosophy*, ed. Edward Craig (London: Routledge, 1998), 3: 260.
[240] Personally, Eliade has a troubling history of being involved with and supportive of the Iron Guard, a right wing, fascist and anti-Semitic political group in Romania between 1927 and 1941. After the Second World War, he was

that across cultures, mineral substances and the practice of their excavation are sacred, as they are attached the body of the "Earth-Mother."[241] Ores are understood to "grow" in the belly of the earth just like human embryos, leading the metallurgist and the miner to see themselves in the role of the obstetrician, which in turn colors his relationship to the earth.[242] It is fruitful to see the relationship between miner and earth in comparison with the active/passive divide relied upon by Aristotle in his theory of generation. Both the ancient miner and Aristotle's man understood the body of woman as the provider of material, yet, the ancient miners did not confer passivity onto the mine, and understood the mine as an active partner in the production of material, albeit with time scales influenced by man's involvement.[243]

Before progressing further with the analysis of the ancient understanding of the inherently gendered and sexualized mining experience, it is necessary to note a potential site of criticism. One could sensibly infer that this world view came readily to ancient miners, as they existed within systems of polytheism, wherein they were already familiar with the concept of a "mother-goddess" connected intimately to the life giving powers of the body of the earth and women's procreative abilities. The evidence of fertility goddesses across the cultures of early people abounds. Fertility goddesses, like the early-modern healers, were often held responsible for the health of the earth as well as

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unable to return to Romania because of his ties to the right wing Nae Ionescu. I do not wish to downplay the significance of his anti-Semitism, but I do believe that the information collected and analyzed in the "Forge and The Crucible" is crucial, and should not be ignored because of the deeply disturbing history of its author. For more information about Eliade political views and both sides of the argument, see, Bryan S. Rennie, *Reconstructing Eliade, Making Sense of Religion* (Albany: State University of New York Press, 1996), specifically sections on scholarly and other criticism of Eliade. See also, Nancy A. Harrowitz, ed., *Tainted Greatness: Antisemitism and Cultural Heroes*, Themes in the History of Philosophy (Temple University Press, 1994), specifically Adriana Berger's *Mircea Eliade: Romanian Facism and the History of Religions in the United States.*

[241] Mircea Eliade, *The Forge and The Crucible The Origins and Structures of Alchemy* (New York, United States: Harper & Row, 1962), 8.

[242] Ibid.,

[243] Ibid., 34-43

members of the community, and were looked to in times of drought, or as aids in conception.[244] Thus, this line of thinking could logically continue to argue that the obstetric nature of mining and metallurgy is less a result of the ecological understanding of the earth as a woman's body, and more a result of a polytheistic religious system. This argument is convincing, yet one must remember that the understanding of the earth, or nature, as inherently and uncompromisingly female does not end with the fall of polytheism. As the previous chapter demonstrated, Francis Bacon, the most famous figure in early-modern natural philosophy, made use of the inherent femininity he saw in the earth, and was a devout Christian. In fact, he relied upon the image of the earth as a woman to substantiate his claims about nature and his theories of experimentation. Thus, we cannot explain away the alignment between the female body and the earth simply as a facet of polytheism, for this alignment long outlasts polytheism, and is even aligned with the Colonial and Christian missions of restoring man's dominion over nature.

By examining the languages and myths of early societies, Eliade makes the case for the ancient belief in the "gynecomorphic birth of ores and, hence, the comparison of caves and mines to the womb of the Earth-Mother."[245] Throughout Mesopotamia the sources of rivers were believed to exist in the "generative organ of the Great Goddess…the vagina of the earth."[246] The parallel between women's generative organs and the sight of production of the earth is also demonstrated in Egypt, as the ancient Egyptian word "bi" meant both "uterus and gallery of a mine."[247] Linguistic patterns not only draw comparisons, but also demonstrate how myth and religious belief about "Great

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[244] Gerda Lerner, "The Goddesses," in *The Creation of Patriarchy* (New York: Oxford University Press, 1986), 142-145.
[245] Eliade, *The Forge*, 41.
[246] Ibid.,
[247] Ibid.,

Goddesses" or the "Earth Mother" were transmuted onto the tangible earth; as to make religious belief a reality of the interaction of human's with their environment.[248] It is of no coincidence that the site of the generative organ of the earth was the mine, where ores were brought into light by human hand.

The fact that ancient people across the world engaged in mining activity demonstrates that dismantling the sacredness of the earth is not a necessary precondition for the interference of natural processes. This interference with the natural workings of the earth aligns magnificently with early modern philosophy, even though it happened centuries before Francis Bacon wrote *The Masculine Birth of Time,* a book which, amongst many other points, discusses, mirroring the actions of ancient peoples described by Eliade, natural time scales and technological intervention into them.[249] Yet these ancient miners did not justify their entry into the earth, or their disruption of geologic gestation by stripping the earth of her identity as a mother of all things. Instead, they relied upon this sacred alignment, which posited that ores came from the uterus of the earth, and in turn understood themselves as gynecological aids to nature, with the project of "assisting Nature to her final goal, to attain her 'ideal,' which is the perfection of its progeny – be it mineral, animal or human – to its supreme ripening…"[250] Nature, or the earth, was always left as the subject, the being in control, even when man was benefiting from metallurgic exploration. It is of significance that the miner worked to help nature obtain *her* goal. The discordance between this and early-modern philosophies of the earth is the switch of nature into the role of the object, allowing man to become the empowered

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[248] Ibid.,
[249] Rob Iliffe, "The Masculine Birth of Time: Temporal Frameworks of Early Modern Natural Philosophy," *The British Journal for the History of Science* 33, no. 4 (December 2000): 427.
[250] Eliade, *The Forge*, 52.

subject. Bacon gives a perfect example of how nature has become the object within man's quest for knowledge and riches in the *Masculine Birth of Time,* when he writes "I am come in very truth leading to you Nature with all her children to bind her to your service and make her your slave."[251] Not only is nature the object of man's quest for dominion, but the gravity of the image of nature as a *slave* to man is astounding.

The reverence with which early miners and metal workers treated the earth is displayed outside of their language as well. During periods of mining, instead of traveling back and forth between the mine and the home, miners set up camp near the mine, where they lived for the duration of the mining period.[252] Many different groups of these miners practiced chastity, or purifying rituals before entering into the earth.[253] Campsites like these were also found in close proximity to Bronze Age mining sites on Alderley Edge, in Cheshire, England, where it is understood by archaeologists that miners lived and worshipped at the mines they entered.[254] Further, until the end of the middle ages in Europe, the sinking of mines was accompanied by a religious ceremony.[255] By maintaining a close and sacred relationship to the mine, and in many cases engaging in ritualistic acts designed to create or maintain purity, early miners displayed respect and reverence for the mine, as they understood it to be the literal birthplace of ore.

Much of the richness of Eliade's argument exists in evidence of ancient people throughout the Middle East, and Asia, but he also presents evidence that the people of Europe and England shared in the belief systems that encouraged miners to understand

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[251] Benjamin Farrington, "Temporis Partus Masculus An Untranslated Writing of Francis Bacon," *Centaurus* 1, no. 3 (March 1951): 197.
[252] Eliade, *The Forge,* 57.
[253] Ibid.,
[254] Simon Timberlake, copper mining and metal production at the beginning of the british bronze age to *Bronze Age Connections, Cultural Contact in Prehistoric Europe*, ed. Peter Clark (n.p.: Oxboq Books, 2009), 94.
[255] Merchant, *Radical Ecology*, 44.

the earth as not only a living system, but a feminine living system, and thus act with reverence and respect for her. One can see the connection between pre-industrial English mining and the feminine earth by examining the mining language of the Germans.

The standard economic and technological history of mining credits the first large growth of the industry, in the 16th century, to the entrance of German engineers into England. Germans had previously established "significant world leadership in mining" in the medieval era.[256] German engineers and technology were wanted by "monarchs who were desperate to secure supplies of strategic metals and improve their fiscal base, or by the owners of large mining estates… who were anxious to maximize their monetary income."[257] Because the first large-scale growth of the British mining sector occurred under German influence, German customs and language provide a valuable source of information when trying to elucidate the how early English miners may have understood the earth. German language aligns the site of the mine with the womb. The kiln, or site of metal smelting "was designated by the name of matrix or maternal bosom (*Mutterschoss*)."[258] Understanding the kiln as the womb or bosom fixes the imagery of mining with reproduction and nurturance of young. Additionally, some traces of the connection between the use of fire for creation of metal products and gestation remain in contemporary German. The German word for placenta is *Mutterkuchen*, "Mutter" meaning mother and "Kuchen" meaning cake.[259] The alignment of the placenta with the products of an oven, or the period of gestation with the necessary 'cooking' period in a

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[256] Roger Burt, "The International Diffusion of Technology in the Early Modern Period: The Case of the British Non-Ferrous Mining Industry," *The Economic History Review* 44, no. 2 (May 1991): 250, http://www.jstor.org/stable/2598296.
[257] Burt, "The International," 250.
[258] Eliade, *The Forge*, 38.
[259] "English Translation of 'Mutterkuchen,'" in *Collins German to English Dictionary* (2017), [Page #], accessed March 2017.

kiln, still linguistically aligns women's bodies with products formed through smelting, cooking or metallurgic practices.

Mines and Regeneration in the Early Modern Era

Belief in the regenerative powers of the mine existed well into the 17th century. Alvaro Alonso Barba, a Spanish priest, a viceroy for the Spanish crown in Peru and a metallurgist, supported this belief in his widely read 1640 book, *The Art of Metals: In Which is Declared the Manner of Their Generation and The Concomitants of Them*, of which two editions were published and widely disseminated in London in 1669 and 1670.[260] Throughout the treatise it is claimed numerous times that mines will regenerate their metals if allowed proper time to rest, because metals were not created, but grow within mines.[261] Barba posited that all people who interacted with the mines understood their reproductive nature, leading the modern reader to infer that beliefs about reproductive abilities of the earth were popularly accepted. The Frenchman Bernard Palissy, an artist and natural scientist, regarded as having scientific views far more advanced than his contemporaries shared in this belief as well.[262] He believed nothing was idle within the earth because, "what is naturally consumed within her, she renews and refashions forthwith…Everything, including the exterior of the Earth, exerts itself to bring something forth; likewise the interior and matrix strains itself in order to reproduce."[263] The European understanding of the earth as a reproductive being, and the

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[260] Joaquín Pérez Melero, "From Alchemy to Science: The Scientific Revolution and Enlightenment in Spanish American Mining and Metallurgy," in *The Revolution in Geology from the Renaissance to the Enlightenment*, ed. Gary D. Rosenburg (Boulder, CO: The Geological Society of America, 2009), 55, digital file.
[261] Alvaro Alonso Barba, *The Art of Metals in which is Declared the Manner of Their Generation and The Concomitants of Them* (n.p., 1640), 48-49, Early English Books Online.
[262] "Bernard Palissy French Potter and Scientist," in *Encyclopædia Britannica* (Encyclopædia Britannica), last modified 2010.
[263] Bernard Palissy, *Recepte Veritable*, ed. Keith Cameron (Geneva, Switzerland: Libraire Droz, 1988), 91, digital file.

mine as the birthplace of her creation extends even to writing of Francis Bacon himself, in a slight variation, when he relays the belief that metal brought from the earth retains the reproductive power of the body from whence it came. In his work of natural history, *Sylva Sylvarum,* he explains the beliefs of some "ancients" of Cyprus. He writes, "It is reported by some of the Ancients, that in Cyprus there is a kind of iron which, having been cut into little pieces, and put into the ground, if it be well watered, will increase into greater pieces."[264] Bacon gives himself an opportunity to make use of his rationality and empiricism to refute the beliefs of these "ancients" from Cyprus. Instead, he immediately follows this sentence by saying, "This is certain, and known of old, that lead will multiply and increase…"[265] Bacon supports the claims by assuring that the regenerative properties of metals within soil is widely accepted knowledge. In his better-known works Bacon again supports this idea. In his *Novum Organum*, when discussing how to ask questions and form axioms from nature he gives a telling example and says, "For instance, suppose the inquiry to be, from what beginnings, in what manner, and by what process gold or any metal or stone is generated from the original *menstruum*…"[266] The remainder of his sentence instructs the reader how to gain information from nature, and does not concern our immediate purpose. Important is his use of the word "menstruum" meaning menses, related to menstruation, to refer to the processes inside the earth that generates metals. Whether it is the direct reproductive capacity of the mine, or the belief that metals themselves hold regenerative properties when placed back into the earth from where they

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[264] Francis Bacon, "Century VIII," in *Sylva Sylvarum ; or, A Natural History in Ten Centuries* (London: William Lee, 1670), 168.
[265] Ibid.,
[266] Bacon, "Novum Organum," 292.

came, the understanding of the earth as a procreative body, and the mine as the birthing site of material is present in the theories of even the most advanced early-modern thinkers. Even without the forthright comparison between the mine and women's bodies held by ancient metallurgists, the implied image of a feminine earth remains clear.

The belief of the reproductive power of the earth, and the implied image of the earth as a fertile woman was not simply a belief held by ancient pagans. Although the belief grew and changed with time and location, a hyper-gendered understanding of mining and metallurgy, born out of the understanding of the earth as a female body, was shared by Germans, who were the main catalysts for mining development in England, and prominent early-modern thinkers, such as Bacon and Palissy who prided themselves on nature based experimentation as well. The development of mining, as it relates to the gendered metaphor of the earth will continue to be explored in this chapter, specifically how it was reformed in the Industrial Revolution of England, but first, we will briefly visit the writing and thoughts of Georgius Agricola, an important writer of the 16th century whose works are often believed to have set the foundation for the industrial European mining industry.

Agricola and the Implication of a Feminine Earth

Georgius Agricola, 1494-1555, was a doctor, labor advocate and scholar from Saxony, and is also regarded the "father of mineralogy."[267] He wrote extensively of mining, metallurgy and minerals, and is credited with writing the first mineralogical

[267] Hans Prescher, "Dr. Georgius Agricola 1494-1555: A European Scientist and Humanist from Saxony," *GeoJournal* 32, no. 2 (February 1994): 85, JSTOR.

textbook in 1546.[268] When Agricola was writing, the earth was still widely understood through the concept of womanhood, and mines through the image of the womb.[269] Agricola is regarded as a revolutionary in the development of the mining industry, in part because he broke away from the most spiritual aspects of it. Although he was a prolific writer, his most famous work is *De Re Metallica*, published in 1556. This book set out to bring as much respect and admiration to the art of mining as to agriculture.[270] What is so noteworthy about this work is that Agricola pointedly rejected much of the beliefs surrounding mining held by his contemporaries. His methodology is far more evidence based, and less speculative. Additionally, he rejects the existence of the four primary elements (earth, air, water, and fire), which had shaped most of alchemy and metallurgy up until his writing. Agricola's rejection of alchemy, may logically lead the reader to believe that Agricola also eliminated the spirituality and religious elements from the field of mining.[271] Contrarily, amongst the things Agricola writes that a miner must know of, is philosophy and religion, going as far as to say that it is "indispensable" that a miner should "worship God with reverence."[272] Furthermore, it is not only the religious practices of the miner that matter, for Agricola himself believes that riches of mines are "from heaven."[273] Agricola's devotion to a Christian god is not unique for this time period, but what is noteworthy is that he extends religious significance onto the earth itself. The way he speaks about the earth as an independent and feminine body exists

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[268] Robert W. Cahn, "Georgius Agricola, German Scholar and Scientist," in *Encyclopædia Brittanica*, last modified May 2011, accessed March 2017, https://www.britannica.com/biography/Georgius-Agricola; Kurt Biedenkopf, "In Commemoration of Georgius Agricola, 1494-1555: Introduction," *Geojournal* 32, no. 2 (February 1994): 83, JSTOR.
[269] William Newman, "From Alchemy to 'Chymistry,'" in *The Cambridge History of Science*, ed. Katherine Park and Lorraine Daston (Cambridge: Cambridge University Press, 2006), 501.
[270] Georgius Agricola, *De Re Metallica, Translated From The First Latin Edition of 1556*, trans. Herbert Clark Hoover and Lou Henry Hoover (New York, U.S.A: Dover Publications, 1950), xxv.
[271] Agricola, *De Re Metallica*, xxviii, xxix.
[272] Ibid, 25.
[273] Ibid, 22.

seemingly at odds with his devout Christianity, if we consider the ancient understanding of the sanctity of mines as an element of polytheism. Yet, he refers to the earth using feminine pronouns, calls her a "benevolent mother" and grants her a surprising level of autonomy.[274] Similarly to the ancient miners before him, Agricola reconciles the earth's protection of metals in her "bowels" with human interference. He writes,

> The earth does not conceal metals in her depths because she does not wish that men should dig them out, but because provident and sagacious Nature has appointed for each thing its place. She generates them in the veins…as though in special vessels and receptacles for such material.[275]

Although Agricola does not go so far as to say that metals reside within the womb or matrix of the earth, by saying that she "generates them" he is granting the earth considerable reproductive ability, while advocating for men's mining activity. Agricola's characterization of the earth as a woman is not unique for his time, as man's understanding of the macrocosmic vision of the earth retained a feminine identity well into the early modern period. What is notable about Agricola is that he was able to at once advocate for a new approach to mining that was grounded in mathematical logic, while also understanding the earth through motherhood, thereby granting a considerable amount of autonomy to it.

He continues to speak about the earth as a woman in the introduction of the third book. Agricola spends the majority of the second book explaining how to effectively search for veins of metals in the earth, as well as methods for washing sands and how to identify the best localities for starting mines. He begins the third book by saying,

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[274] Ibid, 7.
[275] Ibid, 12.

> The term "vein" is sometimes used to indicate *canales* in the earth, but… I now attach a second significance to these words, for by them I mean to designate any mineral substances which the earth keeps hidden within her own deep receptacles.[276]

The use of the word vein, although common in mining language is not completely separated from its anatomical definition as it pertains to the human body. Additionally, in this new meaning he is attaching to the word vein, he is giving the earth autonomy to hide things, because she *keeps* them hidden within her deep receptacles, they are not merely placed there. This, understood in tandem with his characterization of mines as "fertile" or "barren" is further reflective of the alignment between mines and the earth's feminine reproductive ability.[277] Much of Agricola's theories are highly innovative for his time, yet he does not abandon the inherent femininity of the earth, and the translation of femininity into the metaphor of the earth as a woman's body.

Agricola is an important figure in the development of the theory and practice of mining. Part of what makes Agricola's work interesting in terms of the chronology of the industry is that he straddles the beliefs of ancient philosophy while acting as a forefather of early-modern natural philosophy. He understands the earth as an autonomous and powerful, yet benevolent woman, and also believes that miners should live at their mines, similarly to the beliefs of ancient miners outlined by Eliade. Simultaneously, he was one of the first to advocate for sense based learning instead of logical deduction. In an earlier work, *De Ortu et Causis* Agricola wrote, "those things which we see with our eyes and understand by means of our senses are more clearly to be demonstrated than if learned by

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[276] Ibid, 43.
[277] Ibid. 27.

means of reasoning."[278] Agricola's sensed based methodology and dedication to empirical evidence is a predictor of what is to come with Bacon's natural philosophy. It was with this methodology that Agricola was able to break away from the traditional classification of substances, and invented a system that divided minerals based on hardness, color, solubility and other factors, a classification system which is still in use today.[279] This approach calls to mind Bacon's yearning for a great work which systematically anatomized all things in nature, yet, Agricola remains separated from Bacon in an incredibly important way; while Agricola advocated for the intrusion into nature, and believed in the inherent value of the miners exploration and art, he still looked unto nature with reverence and admiration. Agricola did not shy away from using the metaphor of a woman's body to represent the earth, and specifically, women's reproductive organs to represent the mines, but his treatise did not rely upon violent sexual metaphor, as is the case for Bacon.

Exploration and Entrance into the "Natural"

The spirit of exploration, integral to Bacon's philosophy and utopian writing, the spirit that shaped early-modern natural and industrial philosophy, encouraged men to enter into the earth, or into unknown lands in search of truth and riches. No industry is better suited for the display of this philosophy than mining, as it necessitates both the entrance into the earth, and in the case of British mining history, colonial ventures into Latin America. The early-modern preoccupation with the possibility of dominating nature can be understood as foreshadowing the extent to which the growth of mining in the 19th

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[278] Ibid, xiii.
[279] Lutz W. Weber, "Georgius Agricola (1494–1555): Scholar, Physician, Scientist, Entrepreneur, Diplomat," *Toxicological Sciences* 69, no. 2 (October 2002).

century would come to anatomize nature, and make her work on human time scales. This spirit of exploration was relied upon to legitimate the early-modern obsession of entering into nature's "hitherto unexplored lairs" in order to find out her "secrets of inestimable value."[280] Nature could be the site of exploratory missions to find veins of valuable ore within the earth, likewise, on a larger scale, it also meant the "natural" world of the uncolonized, which the early-modern man believed he could improve via intervention, just as he could improve the workings of the earth.[281]

The obsession with improving nature by controlling, exploring and transforming it is tangibly expressed in the development of industrial mining, at home and abroad. One can find connections between the practice of mining and the colonial and natural justifications for exploration. Bacon himself categorized the division of natural philosophy into "The Myne and the Fornace" meaning that he envisioned two types of natural philosophers, "some to bee Pionners and some Smythes, some to digge, and some to refine, and Hammer."[282] This dualism, although present and referenced in much of Bacon's work, exists here as a stark comparison to mining. His use of imagery would not have worked if mining and the roles of the pioneer and the smith had not been familiar to his readership. His distinction between the theoretical and practical sides of natural philosophy worked well with the physical nature of the mining industry, but also sheds new light on his practical involvement in the development of the industry in England.

In his private notes from 1608, Bacon made a list called "Sors sive fortunae Praesentes" or "lot, or present fortunes" under which he listed his share in the Company

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[280] William Leiss, *The Domination of Nature* (Québec: McGill-Queen's University Press, 1994), 73-74.
[281] Ibid, 74.
[282] Cesare Pastorino, "The Mine and the Furnace: Francis Bacon, Thomas Russell, and Early Stuart Mining Culture," *Early Science and Medicine* 14, no. 5 (2009): 637, http://www.jstor.org/stable/20617821.

of Mineral and Battery Works, a company dedicated to introducing the mining and brass related industries from Germany into England.[283] Not only did Bacon hold shares in the company, he had an active role in the patenting of mining technology.[284] Bacon's theoretical and practical involvement in the development of mining in England is reflective of the early-modern preoccupation with exploration, technology and transforming nature. Not only did Bacon involve himself with mining both metaphorically through employment of the imagery of the industry, but also practically. Additionally, exploration by the British into Latin America to find metals and establish mining businesses is also Baconian in spirit and tactic, although it might not have been contemporarily recognized as such.

In the late 1700's and early 1800's, British investment in Latin American mining endeavors was energetic and widespread. Between 1822 and 1826 alone, 64 companies were established for the working of mines and "related enterprises."[285] This boom in colonial investment was due to the fact that Britain was a country with a rich mining industry and therefore could more efficiently export their own superior technologies to the plentiful "virgin mines" of the new world.[286] Few people openly dissented from the push for exploration and colonial ventures. One who did was Henry English, a London stockbroker, who in 1825 said, "The valuable products of our native land should be made a source of profit to the capitalist full equal to what is held out by speculation carried on in so remote a part of the globe."[287] Yet, English's advice, to focus on the development of

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[283] Pastorino, "The Mine," 642-643.
[284] Ibid., 649.
[285] Alma Parra, "Mining," in *Britain and the Americas: Culture, Politics, and History*, ed. Will Kaufman and Hiedi Slettdahl Macpherson (n.p., 2005), ABC-CLIO eBook Collection.
[286] Ibid.
[287] Ibid, 2.

industry at home was not taken seriously, and despite technological challenges of working in the "New World," British companies pushed forward and established seven companies between 1820 and 1830 in Mexico alone.[288] The relentless push for the global expansion of industry and natural exploration is an important backdrop to understanding mining both in England and abroad. Additionally, the push for overseas expansion and exploration is reflective of the natural philosophy that formulated the earth as an object ripe for entering.

Woman(hood) at Work: Women Miners and Unattainable Femininity

To remain specific in our understanding of how women and womanhood played major roles in mining, we will shift our focus back to developments in English at home, at the dawn of the Industrial Revolution. The boom of industry responsible for and resulting in the Industrial Revolution spurred enormous growth in the mining industry, as mining for metals contributed to many industry's infrastructures, and the rapidly expanding demand for energy was met by coal.[289] Although major technological advances happened between the late 18th century and early 19th century, human workers in the mine remained indispensible, and thus, many smaller mine owners chose not to invest in new technology, because women, children and men could do all the work by hand or with simple tools, for a much smaller price.[290] In addition to growth of the industry and proliferation of trade, the once abounding metaphor of woman as earth disappeared almost entirely from industrial era writing about the practice of mining.

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[288] Ibid, 2.
[289] Nef, "Mining and Metallurgy," 760.
[290] Robert Lindsay Galloway, *A History of Coal Mining in Great Britain* (London: Macmillian and Co., 1882), 249, digital file.

Although this metaphor was still present within Bacon's natural philosophy, by the time mining for various metals and coal was being conducted at an industrial scale, images of woman-as-earth had nearly disappeared from popular thought. Instead, attention shifted to economically exploiting women and children as a demographic, and as an 1813 report on the mines of Whitehaven demonstrates, "…a child or woman is sacrificed, where a man is not required, as a matter of economy, that makes not the smallest account of human life in its calculations."[291] Because men were understood as more economically valuable, women and children were often left to jobs that men wouldn't, or couldn't do.[292] The jobs that women were relegated to were then deemed "insufficiently manly" as to ensure that women would continue to be used in these positions.[293] As a colliery worker testified in 1842, "Females submit to work in places where no man nor even lad could be got to labour in…and are prematurely brought to the grave, or what is worse, a lingering existence."[294] Even other coal workers understood the plight of the women forced to work in the mines to be so severe, that an early death was preferable to continued existence.

As lower class women and children were economically forced to accompany men in their mining work, Victorian ideals and constraints on appropriate expressions of womanhood were increasing for women across England.[295] It was during the 19th century that gender roles became more sharply defined than ever before in English history. This

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[291] Ivy Pinchbeck, *Women Workers and the Industrial Revolution 1750-1850*, ed. R. H. Tawney and Eileen Power (Devonshire, England: F. S. Crofts & Co., 1930), 243; Sheila Lewenhak, "The Industrial Revolution," in *Women and Work* (London: The Macmillan Press, 1980), 151-152.
[292] Pinchbeck, *Women Workers*, 242.
[293] Alice Kessler-Harris, "Gender and Work: Possibilities for a Global Historical Overview," in *Women's History In Global Perspective*, ed. Bonnie G. Smith (Chicago: University of Illionis Press, 2004), 1: 176.
[294] "Colliers and Collieries," in The London Quarterly Review, *volume LXX* (Joseph Mason, 1842), 98, digital file.
[295] Carol Zisowitz Stearns and Peter N. Stearns, "Victorian Sexuality: Can Historians Do It Better?," *Journal of Social History* 18, no. 4 (Summer 1985): 625.

time period bore the ideology of separate spheres, relegating women to the domestic sphere, which may have been a major influence on the decision to abolish women and girl mine workers in 1842. Women were encouraged to be excellent homemakers, who were educated in art, painting, sewing, singing and dancing, but not too devoted to the intellectual sphere.[296] The mining women could never fit the Victorian ideal, nor hope to raise her daughters to fit it. Victorian women were expected to focus on, and find complete fulfillment in motherhood and domesticity.[297] Above all else, they were to be respectable ladies, who provided for their husbands while at home, and raised polite children. It was absolutely impossible to be a miner and to fit the ideals of the Victorian woman, especially considering most miners were considered savages. Even those who advocated for miners understood them to be "spectacles of human misery and degradation," and the existence of women and children to be even worse, as women were treated like "beasts of burden"[298] or more generally, "they [women] nor the children were treated like human beings."[299] Although the cultural demands of Victorian womanhood were certainly not the only factor that resulted in women leaving the mines in the mid 19th century, the popular notions of respectability, and the clear ways in which mining women could not meet ideals of womanhood undoubtedly helped garner public support for their plight.[300]

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[296] Kathryn Hughes, "Gender Roles in the 19th Century," British Library, Discovering Literature, accessed March 2017, https://www.bl.uk/romantics-and-victorians/articles/gender-roles-in-the-19th-century.
[297] Lynn Abrams, "Ideals of Womanhood in Victorian Britain," History Trails Victorian Britain, last modified September 18, 2014, accessed March 2017, http://www.bbc.co.uk/history/trail/victorian_britain/women_home/ideals_womanhood_01.shtml.
[298] Harriet Martineau, "Chapter VII," in *A History of England During the 30 years Peace: 1816-1846* (London: C. Knight, 1849), 2: 555.
[299] "Colliers and Collieries," 98.
[300] Hughes, "Gender Roles," British Library, Discovering Literature.

Until The Mines and Collieries Act of 1842, commonly known as The Mining Act of 1842, the conditions of women and children mine workers was largely unknown to the populous. Most people, belonging to the class of those "who move above ground" claimed not to know the true plight of the "class moving about underground…whose condition of suffering brutalization exceeded all that had ever been known or could be believed."[301] The ignorance of the plight of the miner could have been because mining villages had a tendency to be isolated, or because the miners place as a social outcast did not warrant public attention.[302] Their workday was supposed to be between 11 and 12 hours long, but some workers, often belonging to the lowest class families desperate for money would stay in the poorly ventilated underground tunnels for up to 26 hours at a time.[303] The working conditions for all miners were atrocious. Not only were mines not lit or ventilated, but because the underground pathways for removing coal were commonly only between two and four feet high, women and children were the most logical choice to be carriers of coal, as they were commonly smaller and more flexible than men.[304] Despite the backbreaking nature of this work, the Mining Act of 1842 did not win favor by focusing on inhumane conditions, or exploited and uneducated workers alone. The Mining Act depended greatly on Victorian ideals of womanhood to be passed.[305] The deplorable working conditions faced by all those involved in the mining industry was not enough on its own to convince law makers to set standards for age or gender within the mines, and so, the report made a pointed moral argument about the

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[301] Martineau, "Chapter VII," 2: 560.
[302] Pinchbeck, *Women Workers*, 242.
[303] Nathalie Bourdenet, "The Mines Act, 1842," Université Paris Nanterre, last modified October 11, 2003, accessed March 2017, http://anglais.u-paris10.fr/spip.php?article88.
[304] National Coal Mining Museum of England, "Working Conditions in 19th Century Mines," Background and History, last modified 2017, accessed March 2017, https://www.ncm.org.uk/learning/learning-resources/history.
[305] Angela V. John, *Coalmining Women: Victorian Lives and Campaigns* (Cambridge: Cambridge University Press, 1984), 9.

destruction of the ideal Victorian woman, by relying on the tainted gender expression of the women and young girls who worked in the mines.[306] When examining the parliamentary papers from 1842 concerning the act, it becomes obvious how gender played a crucial part in the narrative that was crafted to exclude women from mining work. The intensity of the work is not denied, but in most instances the sheer horror of working conditions is morally qualified by the mentioning of a gender deviant activity that went along with labor in the mine. This activity doubtlessly served to make her engagement in the mining industry even more deplorable to those reading the report, as labor conditions alone may not have been enough, considering the labor conditions of men underground were not modified in the act. Even with the moral implications of women's gender deviancy, girls were introduced to mining labor earlier in life than boys, because, as the parliamentary papers of 1842 show, "girls are more acute and capable of making themselves useful at an earlier age than boys."[307] Despite the working conditions in the mines, girls were still held to the contemporary expectations of the female sex, one of these expectations being that young girls be more mature and useful than young boys. For example, When Sub-Commissioner J.C. Symons spoke to the parliament about the conditions at the mines he said,

> Girls regularly perform all the various offices of trapping, hurrying... just as they are performed by boys. One of the most disgusting sights I have ever seen was that of young females, dressed like boys in trousers, crawling on all fours, with belts round their waists and chains passing between their legs…[308]

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[306] Angela V. John, *By the Sweat of Their Brow: Women Workers at Victorian Coal Mines* (London: Routledge & Kegan Paul, 1984), 37, 40, 43-44.
[307] Pinchbeck, *Women Workers*, 248.
[308] *Parliamentary Papers, 1842, Vol. XVI pp. 24, 196*, [Page #], July 1998, accessed March 20, 2017, http://sourcebooks.fordham.edu/halsall/mod/1842womenminers.asp.

It is clear that Symons cared about more than the gender presentation of the girl miners, and was concerned as well with the nature of the jobs they were performing, and the fact that they were pulling, by chains passed through their legs, buckets of coals through tunnels "not above two feet."[309] but he also finds their manner of dress important enough to highlight in the beginning of the sentence when he sets out to explain "one of the most disgusting sights" he had ever witnessed. The sexual deviancy of the women and girls employed in the mines continues to be a central focus of the parliamentary papers on what was supposed to be a discussion of working conditions. Not only do the papers constantly bring up the fact that the women are dressed in the same way as men, but they are affected by the lack of distinction between sexes, and speak on several occasions about the trouble of not being able to tell girls and boys apart.[310] It seems to have been deeply troubling that it often wasn't clear which children were boys and which were girls, despite the fact that they were performing the same labour, and thus were facing the same occupational hazards, negative health effects, and exclusion from educational opportunities. Thus, most young girls were encouraged to wear necklaces and earrings during their work, so they could be identified as women.[311] The papers continue,

> In many of the collieries in this distrcict, as far as relates to the underground employment, there is no distinction of sex, but the labour is distributed indifferently among both sexes…in this district the men work in a state of perfect nakedness, and are in this state assisted in their labour by females of all ages…these females being themselves quite naked down to the waist.[312]

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[309] Ibid.,
[310] Ibid.,
[311] Deborah Simonton, *A History of European Women's Work 1700 to the Present* (London, England: Routledge, 1998), 154.
[312] *Parliamentary Papers.*

Again, in this passage, it is implied that the problem is less about the type of work done, on a basis of how dangerous and inhumane it is, and more concerned with the nature of the work as it pertains to the ideals of womanhood, and the proper ways for women to act and exist, in relation to the men in the mines. In contrast to early mining ventures, where femininity and specifically, abundant fertility were celebrated, the extent of the constriction applied to women's bodies is clear. Prior to industrialization, the site of the mine was understood as the bosom or birth canal of the earth. It was a sacred, and sexual space. Now, women themselves are culturally policed for indecent exposure. Furthermore, the naked state of men was never brought up, other than to explain its necessity because of the extreme heat in the mines. Yet, the nakedness of the women was brought up countless times, most notably, when young girls were nearly naked around their male co-laborers. In one last instance, the fear of sexual deviancy and a lack of adherence to Victorian ideals of womanhood is explicitly stated in the parliamentary papers. The record states,

> …The chain, passing high up between the legs of these girls, had worn large holes in their trousers; and any sight more disgustingly indecent or revolting can scarcely be imagined than these girls at work-*no brothel can beat it*…when it is remembered that these girls hurry chiefly for men who are not their parents, that they go from 15 to 20 times a day into a dark chamber… to a man working naked, or next to naked, it is not to be supposed but that where opportunity thus prevails sexual vices are of common occurrence. Add to this the free intercourse…and consider the language to which the young ear is habituated, the absence of religious instruction, and the early age at which contamination begins, and you will have before you, in the coal-pits where females are employed, the picture of a nursery for juvenile vice…[313]

From the beginning, the commissioner is not concerned with the quality of the working uniform, or the damage that might be done to the skin of a young girl when it is

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[313] *Parliamentary Papers,* (emphasis added).

constantly rubbed by thick chain. Instead, he is occupied with the sexual indecency of this image, explicitly comparing the image of these girls to what one could find at a brothel. A brothel, of course, being a place where men can achieve sexual gratification, begging the question of exactly what the commissioner sees when he looks at the suffering of these young women. Instead of commenting on the threat to health or safety that these working conditions pose, he instead categorizes it as "disgustingly indecent."[314]

Secondly, the commissioner focuses on the fact that girls are hurrying for men who are not there parents, implying the immorality of the proximity between unrelated girls and men, yet no concern is paid to the men who may be sexually targeting these young girls. Instead, by saying that sexual vices are of "common occurrence" he implies that "sexual vices" are an unavoidable fact of positioning young women next to naked men.[315] By including the fact of "free intercourse" the commissioner is also decontextualizing the scene where these sexual acts are taking place. Use of the adjective "free" implies that this "intercourse" is consensual. Although the intercourse may have been consensual in some instances, we should not assume, especially in this context, that it is.[316] Instead of making any policy to change the heating in the mines, in an effort to avoid nudity, or provide lighting so the girls would not be venturing into "dark chambers," or even to change the behavior of men, the conclusion is to remove the girls from the mines, because men's sexual advances and actions are unavoidable in the situation.[317]

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[314] *Parliamentary Papers.*
[315] *Parliamentary Papers.*
[316] *Parliamentary Papers.*
[317] *Parliamentary Papers.*

Thirdly, the commissioner cites lack of religious education and exposure to indecent language as primary concerns. But he does so while ignoring the inhumane physical nature of the work, and does not cite the physical burden as a reason to take children and girls out of the mines, and instead only sees it as evidence of overall sexual indecency. Although the nature of the work is not completely ignored, gender, and specifically womanhood is mobilized to elicit an emotional response that will result in the removal of women and children from the mines. I am not attempting to argue that women and children should have been kept at work in the mines, but only that it is significant that the way the public opinion was swayed was not by appealing to the atrocity of mine work, but by appealing to the rigidity of proper womanhood, and how girls and women in the mines could simply not adhere to this image.

First hand accounts provided by the women, which were included in the parliamentary papers do not suggest any higher standard of living than what is described by the commissioners. One of the more shocking is testimony provided by Isabel Wilson, a 38-year-old mother of seven. She spoke about pregnancy and motherhood as it pertained to the mining women, and said,

> When women have children thick [fast] they are compelled to take them down early. I have been married 19 years and have had 10 bairns; seven are in life. When on Sir John's work was a carrier of coals, which caused me to miscarry five times from the strains… [my] last child was born on Saturday morning, and I was at work on the Friday night…None of the children read, as the work is no regular. I did read once, but no able to attend to it now; when I go below lassie 10 years of age keeps house and makes the broth or stir-about.[318]

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[318] "The First Report of Commissioners for Enquiring into the Employment and Conditions of Children in Mines and Maufactories 1842," in *The University of British Columbia History Department* (Parliamentary Papers, 1842), 2. Accessed March 2017, http://www.ubc.ca.

Understanding this quote in reference to the power of the imagery of fertility and maternity for early mining communities is astounding. Not only does it seem that the sanctity of the mine is removed, but any respect for the child-bearing abilities of the women workers are also non-existent. In fact, the women are understood mainly as economic contributors, not as humans. Any acceptable quality of life is taken from the mineworkers, especially considering the extra responsibilities of the women, who were workers and mothers, responsible for bringing in income for their families and the moral guidance of their children. This quote reflects how the conditions in the mines were not only physically harmful for women, resulting in five miscarriages for Isabel, and demanding that she be in the mines one day before giving birth, but also how the conditions robbed all workers of educational opportunities that may have given them an opportunity to find a better source of income.

From other testimonies, it is obvious that the physical nature of mining work alone could and should have been enough to stop the employment of girls in the mine, or ideally reform mining practices for all workers. As Patience Kershaw, a 17-year-old mine worker with nine siblings testified,

> …I go to pit at five o'clock in the morning and come out at five in the evening; I get my breakfast of porridge and milk first; I take my dinner with me, a cake, and eat it as I go; I do not stop or rest any time for the purpose…I hurry in the clothes I have now got on, trousers and ragged jacket; the bald place upon my head is made by thrusting the corves…I hurry the corves a mile and more under ground and back; they weigh 300 cwt.; I hurry 11 a-day; I wear a belt and chain at the workings, to get the corves out; the getters that I work for are naked except their caps; they pull off all their clothes; I see them at work when I go up; sometimes they beat me if I am not quick enough, with their hands; they strike me upon my back; the boys take liberties with me sometimes they pull me about; I am

> the only girl in the pit; there are about 20 boys and 15 men; all the men are naked…[319]

To a contemporary audience, a 17 year old engaging in a 12-hour workday, six days a week would be enough to warrant serious reform of the industry. Especially considering that from her own testimony, she pulls buckets of coal on chains over a mile each way, each bucket weighing 300 centrum weight, a unit of measurement used for certain commodities in the United Kingdom, estimated today to equal approximately 100 pounds a unit. Although it is impossible to verify the accuracy of this mineworker's claims, the sheer strain of this level of physical labor is extraordinary. The conditions of labor, in consideration with her proximity to men who "strike her" and "take liberties with her" highlight the deplorable nature of this work.

Although it has been demonstrated that the push to exclude women from mines was largely because of the contrast between socially acceptable forms of womanhood, and the identities of the women in mines, gender based superstition was not entirely absent from industrial mining culture. Although miners in this time period are not documented to have engaged in superstitious practices regarding the feminine macrocosmic body of the mine itself, the miners were a largely superstitious group of people in other regards. Miners commonly believed in the existence of spirits or "knockers" in the mines that either warned them of danger, or led them to rich streams of metal or coal.[320] Notably, miners also believed that the appearance of women on the way to work was a bad omen. As Valerie G. Hall notes in her book, *Women at Work: 1860-1939,* after the Mining and Collieries Act, "In Northumberland and Durham, such was the

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[319] Ibid, 4.
[320] William Jones, *The Treasures of the Earth Or, Mines, Minerals and Metals With Anecdotes of Men Who Have Been Connected with Mining*, 2nd ed. (London: Frederick Warne and Co., 1869), 111, digital file.

bias against women working in the mines in any capacity that men would turn back home if they met a woman on their way to work, considering the sight of a woman a bad omen."[321] The disappearance of the feminine earth metaphor does not mean that miners suddenly ceased to be superstitious. Superstition surrounding ideas of the feminine remained, however, the focus of superstition shifted from a focus on the feminine body of the earth to a preoccupation with individual women's bodies. The superstition also shifted in tone, from being primarily concerned with honoring the reproductive capacity of the earth to one fearful of the presence of women's bodies near to working zones.

The condition of women in the mines of the Industrial Revolution was enough to inspire dialogue outside of England as well. Specifically, the working condition of these women was used to compare against the working conditions under which American women complained. In *The Ladies Repository*, a monthly periodical devoted to keeping women up to date with literature, art, religion and current events, the condition of British mine workers was mentioned for how harsh it was, even after the passage of the 1842 Act. In July 1854, the periodical published an article called "Women in the British Mines." By taking the form of an imaginary dialog with the reader of the magazine, the writers succeed in comparing the plight of British and American workers, while pointing out the delicate dispositions of the American women who dare to complain about their lot. It reads,

> 'But surely females don't go away down those deep shafts and work in those horrid dirty pits, among coals and rocks, and standing in water?'
> 'Why, yes, you delicate, nervous creature, they do. They dig coal; they draw cars or tubs of coal to which they are harnessed.'
> 'Work in the mines?'

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[321] Valerie G. Hall, *Women at Work, 1860-1939: How Different Industries Shaped Women's Experiences* (Woodbridge, Great Britain: The Boydell Press, 2013), 20, digital file.

> 'Ay, indeed, the mother and her daughters-they work among men rough as Hottentots, and almost, sometimes quite, as naked. Yes, woman, burying every feeling of refinement, of delicacy, of womanhood, clad often in but a single ragged garment, toils there for bread.'[322]

The significance of this passage is the symbolic weight that the plight of English women held for their American counterparts. Not only is the reader supposed to have pity for the miserable existence of the woman unfortunate enough to work in the mines, but her lot is also used to ensure that American women feel lucky. This use of womanhood is another specific and distinct aspect of the role of the feminine in the British mining industry. As we have seen thus far, these women were used symbolically, to represent the schism between the proletariat and the Victorian ideal, they were used metaphorically, as a container for the superstitions of men, and in an American context, they were used comparatively to remind American women that they could have it worse.

The Mines and Collieries Act of 1842 put an end to all women and girl's work in the mines, and for boys under ten years old as well.[323] From the many testimonies of mine workers, it is clear that the working conditions of all miners were deplorable, and serious reform should have been taken to improve the industry. Women and children were not alone in suffering the effects of a harmful and deprived occupation. Yet, the act only focused on the involvement of women and children, and even within this scope, was primarily concerned with the lack of proper morality in the mines, and the deviation from the Victorian norms of womanhood.[324] The economist Jane Humphries takes a controversial stance on the Mining Act, arguing that familial labor was the most

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[322] T. M. Eddy, "Women in the British Mines," *The Ladies' Repository* 14, no. 7 (July 1854): 295.
[323] United Kingdom Parliament, "Reforming Society in the 19th Century," www.parliament.uk, accessed March 2017, http://www.parliament.uk/about/living-heritage/transformingsociety/livinglearning/19thcentury/overview/coalmines/
[324] Jane Humphries, "Protective Legislation, the Capitalist State, and Working Class Men: The Case of the 1842 Mines Regulation Act," *Feminist Review*, no. 7 (Spring 1981): 13.

dependable choice, and when women and children were banned from work through the act, familial wages fell, because previously all workers earnings were paid to the father.[325] Although this may be true, I do not see it as providing a sufficient argument against the act. If anything, it highlights another inequality between the sexes in Victorian England, that is, despite their labor in the mines, women were normally not permitted to take home their own independent wages. Still, Humphries argument has merit, considering it highlights the lack of reform made to the working conditions of men, and resulted in labor shortages that women could no longer fill.[326]

The Mining and Collieries Act reflects upon images of womanhood in Victorian England, as well as standards women were expected to meet. A more convincing aspect of Humphries' argument is that not only were women barred from the mines because their labor within them was unladylike, but that the mass proletarianization of women made them unable to be subdued by the patriarchal expectations of a homemaker and wife.[327] Thus, the Mining Act can be seen to work in two ways regarding womanhood and industry: it dictated that women's physical labor within the mines was unbecoming and deviant, and it forced women back into the home, where they could fill the role of wife and mother, and thus come back under the private sphere of patriarchal control. None of this is to say whether or not the Mining and Collieries act should have been passed through Parliament. For the purpose of this project, what is important is understanding the ways which the act weaponized images of womanhood in an effort to

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[325] Ibid, 15.
[326] Ibid, 17.
[327] Ibid, 18.

shape working women into the Victorian, passive, and leisurely ideal, despite the fact that these women were of the lower classes, and thus could never fill this role.

Conclusion

Ideals of womanhood, whether metaphoric or not, have been central to the development of the mining industry, before and after the Industrial Revolution. From the religious and spiritual beliefs of the ancient, foundational miners, through the 16th century scientific and industrial legitimization of mining by Agricola, and well into the growth of mining in industrial England, gender, and specifically ideas of womanhood have been central to building and developing mining culture. The understanding of the earth as a female body, and the mine as her womb was instrumental in developing initial language, practices and rituals for miners. As the industry advanced, although the spiritual and alchemical aspect declined, reverence for, and the understanding of the earth as an inherently female body continued. It was not until the 19th century that metaphor of the feminine body at earth magnitude disappeared from popular mining culture. As the preeminence of the Earth-Mother faded in the British mining industry of the Industrial Revolution, acceptable performances of womanhood constricted due to Victorian cultural ideals. These ideals were applied to women engaged in the mining industry, and, in conjunction with horrific working conditions, resulted in the removal of women and children from mining in 1842.

Understandings of womanhood, maternity, and the female body, whether pertaining to mine workers, or the earth was instrumental in building an industry borne out of the legacy of early-modern natural philosophy. Without the spirit of intrusion necessary for the modern conception of empiricism, the mining industry in England could

not have risen to industrial heights. Without the characterization of the earth as an inherently feminine, simultaneously mischievous and even potentially evil body, perhaps mining could not have had the cultural permission to develop on an industrial scale. The disappearance of the spiritual reverence for the earth that is present in mining cultures until the Industrial Revolution, if nothing else, is an interesting historical development, as it marks a moment in environmental and technological history where human interaction with the environment was no longer predicated on the gendered interactions of man with the figure of a powerful, benevolent and providing mother. Whether it was the rise of early-modern natural philosophy that caused this change, or any myriad of historical factors, the development and subsequent disappearance of the feminine earth metaphor in time for the Industrial Revolution reframes the history of mining as a spectacular journey that sheds light on the changing perceptions of womanhood on the macro and micro scales, and how these changes relate to man's treatment of the environment and development of environmentally intrusive industry.

When tracing the history of mining using gender as category of historical analysis, one can see a transmutation and transference of the macrocosmic understanding of the earth in relation to women. The transmutation takes place when mining looses its gynecological significance, and thus the image earth as a reproductive female body fades. The transference takes place when the gendered focus is shifted from the belly of the mine to the bodies of the actual woman laborers, leaving them as the site of policy reform. The journey of the mine, in combination with the reformation of womanhood, in an attempt to create Victorian ideals, leaves the earth de-sexed, or rather evilly-sexed and thus, ripe for industrial use.

Conclusion

> Now it has become rather urgent to question this solidarity between logocentrism and phallocentrism – bringing to light the fate dealt to woman, her burial – to threaten the stability of the masculine structure that passed itself off as eternal-natural, by conjuring up from femininity the reflections and hypotheses that are necessarily ruinous for the stronghold still in possession of authority. What would happen to logocentrism, to the great philosophical systems, to the order of the world in general if the rock upon which They founded this church should crumble?[328]

The history of womanhood cannot be told only through moments of great change. The history of the earth cannot be encapsulated solely in a study of natural philosophy. The histories of feminine bodies, whether they belong to women, or the earth, are as long as the history of man. They are intersecting. Often they are the same histories, written on to different skin.

It is impossible to answer the question of whether or not women are inherently closer to nature than men. Feminists once championed for the understanding of women through her proximity to nature, claiming that women have ability for higher understanding, are naturally more peaceful, have a greater capacity to care for that which exists outside herself. Philosophers, industrials, the not-feminists, have championed for the understanding of woman through her proximity to nature as well, claiming that women are matter, are passive, are surplus. The impossibility of ever finding the truth of the women-nature question reminds us that this is not the question we should be asking. A better inquiry, the one I asked and hoped to answer through this project, is the *why* and *how* of it.

Why was it useful to align women so concretely with nature and the natural? How was it done so successfully that we may still believe there is some inherent component of

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[328] Hélène Cixous, "Sorties: Out and Out: Attacks/Ways Out/Forays," in *The Newly Born Woman*, by Hélène Cixous and Catherine Clément, trans. Betsy Wing (Minneapolis: University of Minnesota Press, 1986), 24: 65.

womanhood that makes women closer to, or even a part of the natural world? The journey that understandings of womanhood and nature underwent in the early modern era is the most concrete example of the use value of aligning women with nature, as is evidenced by the industrial boom of the mining industry. It was my hope that these three chapters, although all focusing on vastly different subjects could join together in building a narrative of how changing the perception of early-modern women healers became a tool for the construction of natural philosophy, and this natural philosophy was thereby useful to industrial endeavors which needed cultural permission to denigrate a once sacred earth.

The transformation of the natural woman healer to the dangerous witch changed cultural understandings of women from those who are still innately within nature, but useful, spiritual and helpful, to someone whose connection with nature is worthy of superstition and regulation. The transformation of womanhood, as demonstrated through the journey from midwife to witch also facilitated the rise of a masculine and intervention-based approach to medicine and the body.[329] The new image of women was then useful to the development of capitally profitable natural philosophy, as a foundation was set for the justifiable penetration into the feminine body, where one had not been before. Early-modern natural philosophy, at the hands of Francis Bacon, explicitly aligned the new devilish woman with secretive nature, and put an end to the history of the revered feminine earth. Mining in the Industrial Revolution was one of the industries to make use of the newly crafted image of the earth. This is evidenced by a transformation of the once gynecological practice of mining into a wide scale, unceremonious penetration of the earth. In this transformation, the preoccupation with the macrocosmic

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[329] Both the body of woman and the body of earth.

female body of the earth was placed on to the microcosmic female body of the miners, as exemplified through actions taken to remove women from mines, actions that were predicated on Victorian ideals of proper womanhood.

The goal of this project was to investigate deeper into the alignment of women's bodies with the earth. To see why this happened, by what mechanism it happened and for what end goal was it done. In undertaking a question of this scope, I am aware of the lacunae in my research and analysis. The lack of women's voices is disheartening, not only in terms of equality, but also as women's understandings could have provided valuable insight into these cultural movements. This project would have benefited from accounts of midwives tried as witches, or any women tried during the witch trials. Not only would this ground the analysis, but it could have helped elucidate how women themselves understood the witch craze.

Additionally, if this project were to be extended, I would like to incorporate contemporary feminist analysis. In my attempt to ground this project in English history, I sacrificed feminist philosophers, such as Judith Butler, who problematize the very concept of 'womanhood' and 'nature' through the analysis of these as constructed concepts reliant on differentiation and performance. Incorporating Butler would have deepened my analysis, and pushed me to think about the very act of constructing 'womanhood,' 'nature,' and 'earth' instead of taking these as universal and organic. Conceptions of womanhood and popular understandings of the earth have shifted innumerable times throughout history, but a mapping of these shifts would be gainfully complicated through an understanding of how constructed nature is used to formulate the concept of gender and vice versa. In the future, I would like to revisit my questions with a

more intersectional approach to the analysis. For instance, questions should be raised not only as to how the earth was gendered during the early modern era, but also to how it was racialized. How did colonial ventures, and other broad cultural movements construct a racialized understanding of the earth? How and to whom was this useful?

This project was the vehicle for my desire, as a woman deeply invested in environmentalism and feminism. If we are to realize a brighter future for women, we must understand the mechanism by which woman is defined into nature, and why this defining is the necessary foundation for her subjugation. If we are to realize a solution to climate change, or re-imagine a relationship between man and the earth that is not predicated on exploitation, we must understand the ways in which the earth has been feminized, and why this feminization is useful to the building of industrial societies. This project was an attempt to trace the intersecting histories of women and the earth, in an effort to begin imagining multidisciplinary and intersectional approaches to solving climate change and advancing women's rights. To build an understanding of women's construction into nature, or the earth's construction as a woman's body, is to see clearly that a solution to one must include the other.

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List of Illustrations

1. Allegory of Nature, print by Melchior Lorck (1565).
Personification of nature as a nude woman, feeding animals below her by squirting milk from her breasts. Female fertility is interconnected with animals and the earth. The English translation of the German poem on the bottom reads,

"The earth is fertile, full of force
Gives oil, wine, milk, cider
Domestic Animals, birds, fish, plants, fruits, and wild animals
Crawling-ones; and all meat draws nourishment from her
A mother nourishing her small children
With tender female breasts so fine
And as a woman who is pregnant
So too the earth when the time has come
Very well and fine gives birth to everything
Of her body and richly nourishes
All of nature
Makes us note God's eternal praise and honour and glory."

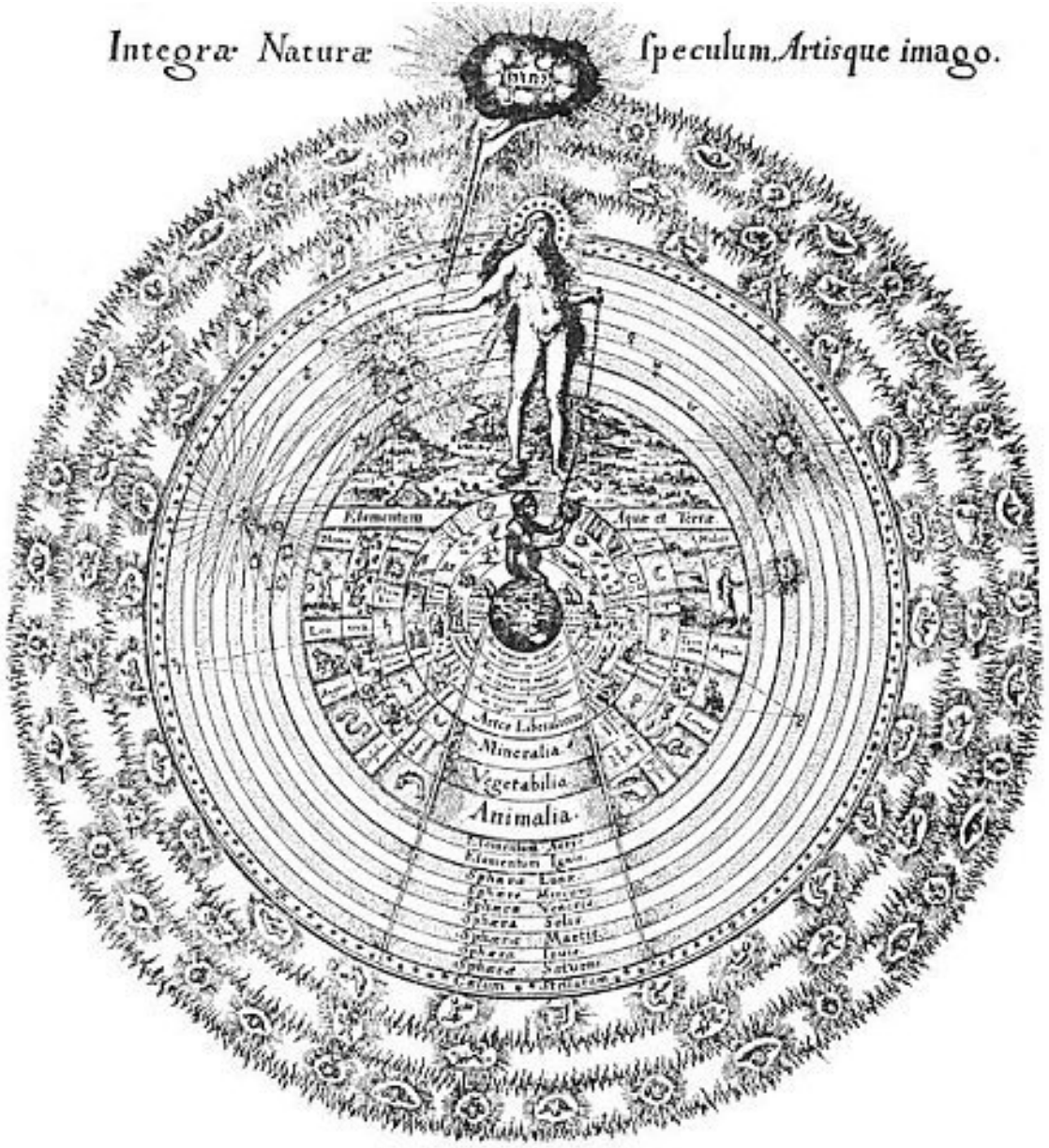
I first found this picture in Lyndal Roper, *Witch Craze, Terror and Fantasy in Baroque Germany* (pg. 149). Translation by David Kretz.

2. The Female Soul of the World, engraving by Johann Theodore de Bry in Robert Fludd, *Utriusque Cosmi Maioris Scilicet et Minoris Metaphysica* (1617-1621).
The Female Soul of the Earth is represented here chained to God above her, and the animal life of the earth below her. The right side of her body, which is chained to God, also has an image of the sun, traditionally associated with masculinity, while her left side, chained to the earth below her, contains the inferior, feminine symbol of the moon. The moon is also covering her womb.

I first found this image in Carolyn Merchant, *The Death of Nature* (pg. 12).

And dreams of filiation
that is masculine, dream
of God the father
issuing from himself
in his son – and
no mother then

— Hélène Cixous, *Sorties*



2. *See List of Illustrations.*