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MARGARET CAVENDISH AND SCIENTIFIC DISCOURSE
IN SEVENTEENTH-CENTURY ENGLAND

by

Alisa Curtis Bolander

A thesis submitted to the faculty of

Brigham Young University

in partial fulfillment of the requirements for the degree of

Master of Arts

Department of English

Brigham Young University

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BRIGHAM YOUNG UNIVERSITY

GRADUATE COMMITTEE APPROVAL

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This thesis has been read by each member of the following graduate committee and by majority vote has been found to be satisfactory.

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ABSTRACT

MARGARET CAVENDISH AND SCIENTIFIC DISCOURSE IN SEVENTEENTH-CENTURY ENGLAND

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Although the natural philosophy of Margaret Cavendish is eclectic and uncustomary, it offers an important critique of contemporary scientific methods, especially mechanism and experimentalism. As presented in *Observations upon Experimental Philosophy* and *Blazing World*, Cavendish's natural philosophy incorporates rationalistic and subjective elements, urging contemporary natural philosophers to recognize that pure objectivity is unattainable through any method of inquiry and that reason is essential in making sense and use of scientific observation.

In addition to its scientific implications, Cavendish's three-tiered model of matter presents interesting sociopolitical associations. Through her own use of metaphor and her theoretical fusion of matter and motion, Cavendish confronts the masculinist metaphors and implications of mechanism. Through the dramatization of her model of matter in the narrative *Blazing World*, Cavendish exposes the theoretical failings of

contemporary methods and legitimizes her alternative to pure experimentalism. By envisioning a new planet to place the utopia of *Blazing World*, Cavendish actively uses the rational functions of the mind, showing that reason and rational matter are above all else in natural philosophy.

Although Cavendish's scientific theory in some ways promotes the participation of women in natural philosophy, it becomes complicated as she simultaneously reinforces her social biases and urges a traditional class system with a monarchical government. Cavendish actively separates the gender constraints in philosophical inquiry from the social limitations placed on the lower classes to promote herself and other aristocratic women in the pursuit of natural philosophy, urging that the rational realm, where all sexes are equal, should govern scientific investigation.

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IN SEVENTEENTH-CENTURY ENGLAND

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CHAPTER ONE

Conceptual Framework of Seventeenth-Century Natural Philosophy

and the Role of Margaret Cavendish

“Cavendish’s writing is not only copious and unusually secular, it is also overtly polemical and formally experimental [...]. An interrogation of systems of knowledge and modes of description, as well as the fluid relations between gender and genre, informs all of Cavendish’s writing, and marks it as generically self-conscious and ambitious.”

—Kate Lilley, Introduction, *The Blazing World and Other Writings*

Kate Lilley’s description, intended to depict Margaret Cavendish’s general writing, epitomizes *Blazing World*. The writing in this scientific narrative is surely experimental, and even until recently the text confused critics who read it alongside other early-modern utopias.¹ But through a detailed examination of how exactly Cavendish sees nature, how she constructs her theory of matter, how she implies this structure through figures and metaphor, and what social and political implications Cavendish draws from this theory of matter, we come to a far greater appreciation for the philosophy of *Blazing World*.

This thesis focuses on Cavendish’s scientific narrative, *Blazing World*, and the adjoining scientific treatise, *Observations upon Experimental Philosophy*, showing how both texts reveal Cavendish’s idiosyncratic and eclectic theory of matter, a model incorporating mainstream philosophies of rationalism, empiricism, and mechanism, but

¹ Marina Leslie, in *Renaissance Utopias and the Problem of History* (Ithaca, NY: Cornell UP, 1998) records that Frank and Fritzie Manuel refused to include *Blazing World* in their utopian encyclopedia due to what they believed to be an apparent “schizophrenia” on the part of Cavendish (128). In 1918 Henry Ten Eyck Perry wrote in his study, *The Duchess of Newcastle and her Husband as Figures in Literary History*, that the creator of the *Blazing World* “was, on one occasion at least, dangerously far from sanity” (qtd. in Whitaker, *Mad Madge: The Extraordinary Life of Margaret Cavendish, Duchess of Newcastle, the First Woman to Live by Her Pen*. New York: Basic Books, 2002, 356).

adding to these the elements of fancy, freedom of access regardless of sex, and subjectivity of human scales and purposes. In this discussion, we will assert four main points. The first point is that Cavendish's theory of matter, previously laid out in her scientific treatises (especially *Observations upon Experimental Philosophy*), is also evident in *Blazing World*. Second, Cavendish's theory of matter within *Blazing World* is a force of philosophical critique, sometimes countering and sometimes modifying and incorporating the scientific ideas of her mechanist and experimentalist contemporaries. Third, Cavendish's theory favors women's participation in natural philosophy in its implications, metaphors, and explanations of natural phenomena more than the popular trends of mechanism and experimentalism in England. Although Cavendish's support for women's participation in science is often critiqued as undemocratic, an exploration of how Cavendish links natural philosophy to the sociopolitical realm allows us to see why it is not contradictory that she wants a space for women to take part in philosophical discussions while she enforces the norms of traditional social class. Fourth, as Cavendish refines her theory in the course of her writing, the narrative genre allows her to dramatize her theory and scientific observations. Within the context of seventeenth-century scientific debate, the genre of fictional narrative provides Cavendish a place to express her ideas and bring them into the sociopolitical realm.

In her interlude between *Observations upon Experimental Philosophy* and *A Description of a New World, Called the Blazing World*, Cavendish says that she "add[s] this piece of fancy to [her] philosophical observations, and join[s] them as two worlds at

the ends of their poles” (*Blazing* 124).² This metaphor suggests that the connection between the Blazing World (ruled by fancy) and the “real” world of the Duchess of Newcastle (governed by sense and reason) is a direct parallel between the two texts *Observations* and *Blazing World*. Just as the Blazing World is marveled at for its differences to our world while still teaching us about the nature of our world through parallels, so the text of *Blazing World* compares and contrasts to *Observations* in ways that supplement our understanding of Cavendish’s philosophy.

In her time, Cavendish faced a large amount of opposition against her writing, not only for publishing so prolifically and emphatically under her own name but also for her bold assertion of her own social, political, and scientific opinions. After reading one of Cavendish’s early publications, Dorothy Osborne remarked in a letter to a friend that there were “many soberer people in Bedlam; I’ll swear her friends are much to blame for letting her go abroad” (qtd. in Lilley xiii). Despite the move in the last couple of decades to read and understand more fully early modern women’s writing, Cavendish’s writing and scientific theories have not been without modern-day critics. Lisa Sarasohn describes Cavendish’s writings as “a curious combination of scientific explanation and fantasy, largely uncritical and hopelessly repetitive” (290). Carolyn Merchant reports that Cavendish’s theories “are often inconsistent, contradictory, and eclectic.” Some recent critics, such as Laura Carraro and Antonella Rigamonti, assess Cavendish’s contemporary significance as nil:

[N]otwithstanding the undeniable privileges of her rank, Cavendish found no audience, she never became part of a circle, she was not recognized as

² The editions used here are *The Blazing World and Other Writings*. Ed. Kate Lilley. New York: Penguin, 1992; and *Observations upon Experimental Philosophy*. Ed. Eileen O’Neill. Cambridge: Cambridge UP, 2001.

a natural philosopher. When people looked at her they did not see a learned lady but simply the Duke of Newcastle's wife or the *notorious 'Mad Madge.'* When she discoursed on science what people actually heard were, in the words of Mary Evelyn, '*rambling*' words which, like her books, aimed '*at science, difficulties, high notions, terminating commonly in nonsense, oaths and obscenity.*' (139)

Yet as scholarship on Cavendish blossoms, more critics have found reason to defend Cavendish's writings despite the sporadic contradictions that surface as Cavendish revises her theories. Although her voice wasn't often taken seriously (though more seriously than Carraro and Rigamonti suggest), her voice is valuable to us for many reasons. One is that it is very rare. It was rare in the seventeenth century for an aristocrat to publish so prolifically in a variety of genres without omitting one's true name from the publication. The fact that Cavendish, as a *female* aristocrat did so vouches for her singularity.³ Second, it was rare for a woman, though not formally educated, to have been blessed with a small circle of scholars, including not only her husband and brother-in-law but also the distinguished physician Walter Charleton, who, biographer Katie Whitaker records, was "surprisingly honest" in "daring" to give Cavendish "not uncritical feedback on her philosophical work" (138). These men praised her work and sometimes offered revisions to her writings, thus enabling Cavendish to pursue topics often considered masculine. Cavendish's writing affords us a female perspective on issues that most of her female contemporaries wouldn't ever dream of exploring.

³ Kate Lilley states, "If it was rare for a woman to seek publication, it was still more rare for a woman to provide an unambiguous authorial signature," and suggests that this epitomizes Cavendish's drive for singularity (*The Blazing World and Other Writings*. Introduction. New York: Penguin, 1992, x).

Sarasohn is right in that Cavendish combines fantasy and science, and nowhere does she do this more than in *Blazing World*, where she uses fancy to create a work “agreeable to the subject treated of in the former parts,” that is, in her scientific treatise *Observations upon Experimental Philosophy* (*Blazing* 124). In her scientific narrative Cavendish relishes the blending of fancy and reason, asserting that they both originate from the same place, which is the “rational parts” of her mind (*Blazing* 224). Through combining fancy (in this case synonymous with imagination, see *OED* def 4.a) with the reason of her serious philosophical study, Cavendish is able to play out the results of her theory of matter, show its benefits and limits, and dramatize her theory as she figuratively represents it in a variety of hierarchical structures. Where Sarasohn is chiefly incorrect is in asserting that Cavendish’s writings are “uncritical.” As we will examine, even the fictional narrative *Blazing World* serves as a mode of critique against the emerging philosophies of mechanism and experimentalism in Cavendish’s day.

As Cavendish recognizes her partial exclusion from a male-dominated scientific community, she uses the venue of fictional narrative alongside her scientific treatises to promote herself as a rational and contemplative natural philosopher. Yet Cavendish’s scientific utopia differs greatly from other utopias written by her male contemporaries, such as Bacon’s. Instead of discovering an already existing country, island, or continent, Cavendish creates a new planet, and adds to it several mental or “philosophical” worlds. As we will discuss in later chapters, Cavendish does so for several reasons. The first is to claim the rational and subjective realm as her own, in direct contrast to the experimentalists’ drive for objectivity. By illustrating her newly created mental world, Cavendish attempts to gain critical immunity by using the elements of fantasy and reason,

both rational powers, that are more subjective, thereby showing that rational and fanciful people, regardless of sex, can participate in the discourses of natural philosophy, for it is reason and the mind where all experience must be filtered and all knowledge must originate. Placing her utopia on another planet affords her other opportunities as well, allowing her to circumvent traditional patriarchal reproductive economies and make sex irrelevant in not only the ability to reason, but also with regard to reproduction. Through creating a new world and reconstructing the biblical paradise, Cavendish is able to use her own ingenuity and natural philosophy to reverse the fall of humankind and remove the blame placed upon Eve.

There are several reasons why Cavendish was not regarded as an equal among her male contemporaries in England, including differing levels of credibility among English social classes and a certain rhetoric used by male natural philosophers that excluded women. A review of recent revisionist scholarship pertaining to what we have traditionally called the Scientific Revolution suggests why women, including Cavendish, were excluded from scientific circles that purported to discover and reveal natural truths. Next, a focus on the problem of rhetoric as seen by the Royal Society and its frequent use of two metaphors, that of the mechanical universe and that of a female natural world that awaits discovery, reveals one way in which science was linked to the sociopolitical realm and in some ways excluded women. In addition, an exploration of the methods of experimentalism and rationalism will introduce us to the theoretical framework necessary to understand Cavendish's model of matter. Finally, we will examine Margaret Cavendish's place within this conceptual framework and the issues she faced in attempting to create a space for her within seventeenth-century scientific discourse.

We cannot explain why Cavendish's natural philosophy was often ridiculed by her contemporaries without discussing the role that her gender played in the reception of her ideas. In *A Social History of Truth*, Steven Shapin argues that gentry and nobility were considered to be more reliable conveyers of knowledge than members of lower classes who might be in compromising positions because of their dependency; therefore, men were seen as more reliable than their wives (86).⁴ Determining who had the social or political right to dispense knowledge in seventeenth-century England is important for the purposes of this discussion because it explains in part why Cavendish and other women were excluded (at least partially) from the scientific scene (Shapin *Truth* 370). Shapin shows that during the seventeenth century, women were seen as a dependant group of people:

But *just because* the characteristic view was that women took their social standing from men, that their identity was subsumed in that of their father or husband, and that they worked their will through men, the relevant category of analysis was not the natural one of *biological endowment* and its expression but the situated cultural one of *dependence*. And dependence was a circumstance that was understood to affect biological males in much the same way it worked on biological females. (*Truth* 87)

Distinguishing between social and biological reasons for disregarding the testimony of women is important to understanding Cavendish's reasoning as she desired to make a place for herself and other aristocratic women to participate in scientific discourse but

⁴ "Those whose placement in society rendered them dependant upon others, whose actions were at others' bidding, or who were so placed as to need relative advantage were *for these reasons* deemed liable to misrepresent real states of affair—what they were actually thinking, what their intentions were with respect to future action, how matters stood in the world." (Shapin, *Truth* 86)

refused to make a place for *all* women. It doesn't vindicate Cavendish from the feminist critique of being anti-democratic or refusing solidarity with all her female "sisters," but helps us understand why to Cavendish it seemed logical to privilege her social class above her sex when it came to apparent potential for education or philosophy; to Cavendish women of the gentry were just as reliable as their male social counterparts.

Not only was it important *who* presented scientific knowledge, there was also a drive to find methods of inquiry that would involve the least possible interpretation on the part of the natural philosopher so that knowledge could come more directly from nature itself, avoiding the speculative filtering process. In challenging traditional forms of obtaining truth, seventeenth-century natural philosophers set about finding different ways to find out about their universe. This was seen in challenging truth based solely on authority or deduction from general principles, methods previously applied in scholasticism or rationalism. In England, this change was specifically evident in the new faith placed in experimental philosophy, a mechanistic view of the world, and inductive reasoning. However, Shapin shows that seventeenth-century England did not actually see an *introduction* of completely new scientific principles (despite those natural philosophers who saw themselves as revolutionists), but that these methods were more of a reformed knowledge from faded theories.⁵ This resulted in the inclusion of technology, previously left to the artisan guilds, to help the philosopher learn about nature and master it.⁶

⁵ *The Scientific Revolution*. Chicago: Chicago UP, 1996.

⁶ In *Solomon's Child*, William Lynch explains that Francis Bacon saw technology as more useful than simple observation because technology was handed down from artisans and men of trade who were accustomed to encountering nature in its most crude form and bending it to their will (22). "Nature is only truly understood when we operate upon the world and learn to produce a variety of effects at will rather than relying upon the accidental arrangement of qualities existing in unaltered nature. Like the artisan, the

The use of technology carried with it collaborative and democratic implications, elements that concerned a social conservative like Cavendish. The use of instruments was carried into the class-conscious Royal Society where it was largely accepted. William Lynch accounts that the Royal Society, which contained “Royalist, Anglican, and distinctly class-conscious” gentlemen such as John Evelyn who shunned “engaging ‘mechanical, capricious persons,’” still maintained a Baconian interest in the ‘history of trades’ and “welcomed the interest in questions of trade and technology of Royal Society Fellows like William Petty and Robert Hooke, both humble in origins” (4). But once the Royal Society had accepted and trained its members in this technology derived from artisans in lower classes, its goal was to make the use of this technology a strictly gentlemanly pursuit.⁷

The use of artisan’s instruments across classes shows that seventeenth-century England was a place of collaboration and conversation. Experimental philosophers found out from tradesmen how to use tools to manipulate and observe nature, and because the various fields of artisan experience were too vast, natural philosophers listened and learned from each other. There was also a need for conversation in order to concur on observations. Shapin explains this need:

If A says that a cell is elongated, and B describes it as circular, their subsequent conversation may, for instance, stabilize upon reference to a

experimentalist operates upon the world; and does not merely observe it” (Lynch 22). The issue with using technology derived from the lower classes was again one of reliability and resulted in a dichotomy. The use of artisan’s instruments was seen as a new way of examining nature, but to some philosophers, including Cavendish, it weakened the reliability of the experimentalists’ findings because the technology arose from lower, more-dependant, and therefore less-reliable classes.

⁷ For instance, Lynch shows that in *Sylva*, a book containing instructions to gentlemen on how to best landscape their orchards, Evelyn suggests that the gentry not rely on servants for advice on planting, showing that once gentlemen learned the tricks of a trade, that they maintain class-based control (*Solomon's Child: Method in the Early Royal Society of London*. Stanford, CA: Stanford UP, 2001, 49).

cell that is, and always was, oval. The conversation need not, though it may, invoke perspectival differences or distinctions of instrumental access or skill. Knowledge of the world is given its shape as conversation proceeds. (*Truth* 33)

Shapin shows that this collaboration was especially revered in England and that it stemmed from Bacon's methodology, which differed from Descartes' because it emphasized collective labor rather than individual reason (Shapin *Revolution* 130). In *Exiles of the Mind*, Anna Battigelli shows how Hooke's experimental philosophy, which he believed to be a fulfillment of Baconian natural philosophy, was *largely democratic* in that it made the scientific experience available to everyone and placed, as Hooke says, 'all wits and understandings nearly on a level' (92). This is made possible because interpreting science through technology (once accessible to everyone) and the senses makes all observers equal as long as their bodies are equally adapted to observe and receive information. Again, we can see that to a traditionalist like Cavendish, this challenged the idea that truth was best understood by and revealed through the gentry, whose breeding, social status, and education made their minds more suitable to philosophical pursuits. Experimentalism had the potential to make common people equal to the gentry as authorities in natural philosophy.

The use of artisan's technology bridged a gap where knowledge of commoners could be accepted by the gentry and used in their own pursuit of truth, but some contemporaries, Cavendish included, saw the experimental philosophy and its collaboration, along with the idea that nearly anyone was capable of making scientific observations, as too democratic. Cavendish thought that multiple interpretations of

differing observations, though sometimes helpful to revealing truth, would often lead to picking sides and disputes among gentlemen philosophers.⁸ Like her husband, William, and Thomas Hobbes, Cavendish believed that the best scientific inquiry didn't rely in collective labor but in unadulterated reason.⁹ Shapin argues why this was such a politically and socially charged issue: "Knowledge of nature was considered deeply relevant to problems of order, not least because nature was widely understood to be a divinely authored book whose proper reading and proper interpretation had the potential to secure right belief and thus to guarantee right conduct" (*Revolution* 125). Anna Battigelli shows that the Royal Society was not in agreement on whether or not their approach to experimental philosophy would cause disruptions. It seemed probable that through objective experiment and observation all men who had access to the experiments and evidence were likely to agree. Thomas Hobbes, who was not part of the Society, opposed this idea, saying that these "procedures could never yield the degree of certainty requisite in any enterprise worthy of being called philosophical" (Battigelli 90). But considering these valid arguments, Shapin contends there was even more reason to accept the work of gentlemen scientists. "A society dominated by gentlemen could more effectively draw on codes of genteel civility and decorum in conducting philosophical debate and evaluating testimony" (*Revolution* 134). Indeed, the men of the Royal Society thought that their manners as gentlemen would provide a "powerful alternative to

⁸ In *Blazing World*, Cavendish's Empress refuses to allow her philosophers to argue in her court and commands them to "confine [their] disputations to [their] schools," and later orders that the schools be disbanded altogether because varying opinions and degrees of knowledge "must needs breed factions in their schools, which at last break out into open wars, and draw sometimes an utter ruin upon a state or government" (*Blazing* 162, 202). During Cavendish's time, arguments at the Royal Society, who swore by their objectivity, sometimes did lead to factions and side-taking.

⁹ This will later be explored at length, especially in chapters three and four. Cavendish' preference for reason is made clear on many occasions: "Reason must judge, sense execute" (*Observations* 210).

scholarly disputatiousness” (*Revolution* 134). Striving for social decorum and theoretical consensus then became an important goal of experimentalists and mechanists, for through it they could suggest that these philosophies removed the very human tendency to bring emotion into natural philosophy and present the simple facts.

The issue of social decorum gave rise to a distinct rhetoric among some experimentalists and mechanists, but their language style still retained some metaphors that excluded women from participation in natural discovery. Royal Society Fellow Thomas Sprat thought that the Royal Society could avoid disagreements through using plain language that refrained from the rhetorical games so often employed in verbal disputes (Lynch 167). Sprat claimed that the Royal Society was focused on *things* rather than verbal disagreements (167). The attention to how language should and should not be used in scientific discourse became an important issue in the Royal Society that stemmed back to Bacon’s “non-alphabetic signs that [...] represent[ed] ‘things and notions’ directly without the mediation of words” (119). Focusing on things instead of words was to end miscommunication and aid understanding. But despite several types of languages proposed by Royal Society Fellows, it remained needful to communicate to the outside world in a common language, in which case the Royal Society urged communication with simple speech. This included an attempt to strip language of all of its tropes and metaphors, which easily confused readers. Yet despite this attempt, several metaphors remained. One important metaphor was extremely valuable to mechanist philosophers, which consisted of describing various traits of nature in mechanical ways or in terms of force. Another consisted of framing the male scientist in pursuit of female nature.

Shapin explicates these metaphors and shows that both were used to promote the mechanist cause, which is why they were permitted in the program intended for plain speech (*Revolution* 95). Although this program was meant to avoid differing opinions, these metaphors were socially charged. In *The Matter of Revolution*, John Rogers contends that Hobbes' belief in brute force leading to social privilege was incorporated into the mechanical philosophy and that "mechanism provided masculine dominance with a powerful organizational sanction" (188). He explains that this may be why Cavendish launches a critique, beginning in the year 1663, against mechanism and embraces "animist materialism," already outdated in the world of natural philosophy.

Rogers, along with Carolyn Merchant and Eve Keller, shows that to the seventeenth-century scientist, "change in the world was often little more than the effect of an implicitly masculine force of motion on the passive, even lifeless, elements of an implicitly feminine matter" (186). So it becomes interesting that as Shapin explains that Boyle's mechanical philosophy had only 'two grand principles,' which were "matter and motion," we see that down at the very core of mechanical philosophy there is a gendering of nature (Shapin *Revolution* 46).

Although the method to receive scientific knowledge in the Royal Society was experimentalism, mechanical philosophy ruled in the interpretation of these observations. William Lynch specifically shows that Digby had adapted alchemy to mechanical principles, and "Evelyn's reflections upon the 'vegetative motions of plants' took place in the speculative mechanical philosophy that was intended by Boyle and the Royal Society to encompass, rather than merely to replace, chemical explanations, by subordinating them to the mechanical philosophy" (66). Through this translation of observations into

the mechanical philosophy, we see that the experimentalists' claim to complete objectivity was beginning to crumble.

Lisa Anscomb emphasizes the Royal Society's distrust of traditional rhetoric because it relied on language for its own sake rather than logical judgment. Anscomb describes at length the Royal Society's use of metaphor, explaining that the Royal Society did not disregard metaphor and other tropes for the 'mathematical plainness' of speech that Thomas Sprat championed in his history of the Royal Society. Instead, Anscomb shows, they engaged in a particular speech regarding the male scientist in pursuit and mastery over female nature and that these metaphors, by their gendering, excluded the female enquirer from scientific discourse (161). She shows, "the 'new scientist' is presented as a virile suitor engaged in the pursuit and seduction of Nature figured as a Woman" (168). Anscomb fairly balances her argument, addressing the possibility that since the Royal Society's gendered metaphors were "so prolific and universal" that they were not seen as "excessive or indulgent, since they referred to fundamental human and cosmic categories" (168). Anscomb argues that the metaphors used by the Royal Society became part of propaganda that promoted the experimental, and may we add mechanical, method.

The Royal Society quite frequently used the metaphor of the male scientist pursuing female nature. Robert Hooke used it in his preface to *Micrographia*, in saying, "the footsteps of Nature are to be trac'd, not only in her ordinary course, but when she seems to be put to her shifts, to make many doublings and turnings, and to use some kind of art in indeavouring [sic] to avoid our discovery" (n. pag.). Here we notice how nature seems to possess a flirtatious art, being compared to a coy woman barely escaping

entrapment by her lover. This metaphor remains intriguing for several reasons. It is socially charged because it excludes women as the “hunters” of nature by turning the relationship into a romantic chase with a male pursuer and female object. It also shows a mechanist tendency to use force and technology to “trace” and entrap nature, dominating it as a lover would entrap a coy temptress. At last it maintains an interesting irony in suggesting that it is nature that is artificial in “using some kind of art,” instead of the natural philosophers who employ technology to discover the true nature of the world.¹⁰

With its restraints on rhetoric, its use of technology, and the socially challenging idea of trusting in personal experience, how was the experimental approach beneficial to seventeenth-century natural philosophers? According to Shapin, “Reformed knowledge, especially in its mechanical modes, was to be as technologically fertile as the Scholastic alternative was evidently barren. Use was to be a reliable test of truth” (*Revolution* 140). When Cavendish critiques the Royal Society and other mechanical philosophers for merely dabbling in tricks and not producing anything useful (“to what purpose should a man beat his brains, and weary his body with labours about that wherein he shall lose more time, than gain knowledge?”), she may very well be critiquing the time spent on

¹⁰ Shapin shows that the idea of nature as artificer wasn’t new to seventeenth century mechanical philosophers but originated as far back as Aristotle. He also explains that the artifice of nature, devised and carried out in her plans, was seen as far superior to the artifice of humans. “It was impossible that humans should compete with nature” (*Revolution* 31). What was different about the view in the seventeenth century was that nature began to be subordinated to the level of humans. “Bacon made that rejection [of the ancient distinction between the artifice of nature and the artifice of man] the basis for both a reformed natural history—now to include the products of human artifice—and a more optimistic attitude toward the potential of human artifice: ‘the artificial does not differ from the natural in form or essence... nor matters it, provided things are put in the way to produce an effect, whether it be done by humans or otherwise’” (Shapin *Revolution* 31).

The idea that the “art” of nature was equal to man-made creation is understandable in a certain light. As Shapin explains, “The heat of the sun can be legitimately compared to terrestrial fire; the gold said to be produced by the alchemist is the same as that found naturally in the earth; the physics appropriate to understanding machines made by humans may be the same as that required for understanding celestial motions...” (*Revolution* 32). As scientists viewed the creations of nature and the creations of humans, it became apparent that even the greatest expanse of nature could be explained according to terrestrial and man-made “micromachines.”

such a debate against the ancients, as well as their method of merely gathering facts (*Observations* 105). As we will explore further, Cavendish felt that experimentalism and mechanism went too far in neglecting the essential role of reason, as well as the knowledge passed down since ancient times. She compares her English contemporaries to “[...] boys that play with water bubbles or fling dust into each other’s eyes [...] for wasting time with foolish sports; so those that addict themselves to unprofitable arts spend more time than they reap benefit thereby” (*Observations* 52). Cavendish questions what good experimental or mechanical observations are when they are mindlessly recorded and left unfiltered by the rational mind, never creating meaning on a larger sociopolitical scale.¹¹ As we later examine Cavendish’s own natural philosophy, we will

¹¹ Although in Cavendish’s writings it seems as if there is a constant battle between the proponents of rational inquiry versus the proponents of experiment and observation, revisionist scholars show that experimental philosophers actually attempted a synthesis of these two principles. Shapin explains that Bacon rejected the ancients’ deductive tendency to use particulars only to draw sweeping generalizations about nature and instead instituted induction, which sometimes lead to the “mindless gathering of facts” (*Revolution* 92). Although this method was criticized, it was deemed as a break from the Scholastics and previously popular methods of obtaining truth. William Lynch contends, “Historians often link the early Society’s virtuosic pursuit of idle curiosities and its aversion to hypothesis and theory to a simplistic Baconianism focusing entirely on the collection of facts. The effect of method, according to this interpretation, is taken to preclude pursuit of a recognizably modern science” (Lynch 26). Of course method was used in the process, as well as collaboration and reliance on testimony, as we have already discussed. According to Lynch, “The ability to reproduce natural effects through disciplined art is the ultimate test of the validity of knowledge for Bacon” (23). The key word here is *disciplined*.

Natural philosophers in the seventeenth century launched what they thought was a revolutionary approach to science by using the instruments that artisans, members of the lower class, had been using and perfecting for years. Learning to use this art to discover natural truths also took training and adherence to method. “To the untutored sense, the moon looked no bigger than an apple pie and the sun appeared to go around the earth. It was educated reason, not simple sense, that allowed moderns to ‘see’ the moon as very big and the sun as still” (Shapin *Revolution* 93). It wasn’t just the “mindless gathering of facts” that these scientists were after, and they realized the errors that could result from relying on the senses and experience without contemplative thought. “Bacon also agreed with many other seventeenth-century natural philosophers that the uninstructed senses were apt to *deceive* and that the senses needed to be methodically disciplined if they were to yield that authentic factual stuff philosophical reason could work on” (Shapin *Revolution* 93). Although this presents a more moderate view of experimental philosophy, it still has one major flaw. The whole of nature is simply too vast to question, observe, and deduce knowledge from without extensive training and discipline. Astronomy is quite a different discipline from botany and it would take several lifetimes to master both, but reason is a more universal method (Lynch 60). This is why many in the seventeenth century still preferred rationalism as a method of scientific inquiry. The mind, without being tied down to the senses and extensive experiments, was freer to move quickly in examining nature in various forms.

see how Cavendish favors the subjectivity of her model and vouches for its utility in not only the scientific but the sociopolitical realm.

Because the exclusion of women from the scientific community was not necessarily biologically based but socially based, and because the language and metaphors used by male natural philosophers were sometimes socially or politically charged, it is evident that there was more at stake to a method of scientific inquiry than outwardly claimed. After examining how existing epistemological theories relate to the sociopolitical realm we begin to comprehend the important social, scientific, and political framework within which Cavendish wrote *Blazing World* and *Observations upon Experimental Philosophy*. We see that the newly prevailing methods of experimentalism and mechanism, although attempting to fix some flaws in previous epistemological methods, also disregarded beneficial elements of equally valid methods of inquiry, especially with regard to reason. In addition, they set up a scientific scheme that carried with it democratic implications, which were politically subversive and threatening to Cavendish's status as an aristocrat. These social and political implications were ones that could not be ignored by the either "new" scientists or traditionalists, and as we explore Cavendish's theory in detail, we see further that natural philosophy cannot be left in an isolated realm.

CHAPTER TWO

Matter, Mechanism, and Metaphor

“I cannot believe that God should be the prime actual movement of all natural creatures, and put all things into local motion, like as one wheel in a clock turns all the rest: for God’s power is sufficient enough to rule and govern all things by an absolute will and command [...] and to impart self-motion to nature, to move according to his order and decree, though in a natural way.” —Cavendish, *Observations*

Although she knew several mechanist philosophers personally and was tutored in contemporary scientific theory, Margaret Cavendish could never bring herself to accept the whole of mechanist and atomist thought. She disagreed with the philosophical underpinnings of mechanism’s emphasis on physical strength and force.¹ She came to oppose atomism as a scientific premise, claiming that atoms could not be indivisible nor could countless independent atoms “agree” with each other long enough to constitute natural elements. Instead she created her own theory, suggesting that nature is composed of matter, continuous and in constant motion. This chapter summarizes the role of rational, sensitive, and inanimate matter as the main parts of her theory of matter and discusses the significance of her theory in opposition to Cavendish’s contemporaries on not only scientific, but also metaphorical justifications. We will first examine her theory of matter and contrast it with rising mechanist philosophy. We will then examine Cavendish’s opposition to mechanism (as well as experimentalism) on metaphorical and sociopolitical grounds.

Beginning with her *Philosophical Fancies* in 1653, Cavendish began to frame a theory of matter later developed in *Observations upon Experimental Philosophy* and

¹ As we will discuss with mechanist philosopher Thomas Hobbes.

Blazing World. This theory of matter has been labeled as monist (meaning that nature consists of one type of matter) and vitalist (meaning that matter has innate life and self-motion).² In her theory, the structure of matter is continuous, not atomic or particular. It is animate and self-moving. It is sensitive and knowing, meaning that it has the ability to perceive the movements of nature as a whole but ultimately controls its own movements. Unlike the vitalism of some early modern philosophers, such as Henry Moore, it contains no incorporeal qualities. She divides single matter into two degrees: animate and inanimate matter, which coexist together. Animate matter consists of two sub-degrees that work closely together: rational and sensitive. The matter is hierarchically organized, with rational being the supreme sub-degree, followed by the sensitive sub-degree, and at last the inanimate degree.

Cavendish's later work, including *Observations* and *Blazing World*, moves away from her earlier leanings toward atomism. She asserts that everything is made of one kind of matter and that this matter is continuous and divisible. "There can be no atom, that is, an indivisible body in nature" (*Observations* 125).³ Instead, each unit in nature can be divided smaller and smaller, and even the least part would be a blending of the animate and inanimate degrees of matter.

Cavendish employs several ways to illustrate how matter works in her theory. One way is through metaphor. A figurative representation of a hierarchy of workers

² Many critics have discussed Cavendish's vitalism including Anna Battigelli, *Margaret Cavendish and the Exiles of the Mind* (Lexington, KY: Kentucky UP, 1998) 49 and Lisa Sarasohn, "A Science Turned Upside Down: Feminism and the Natural Philosophy of Margaret Cavendish." *Huntington Library Quarterly* 17 (1984): 297. For Cavendish's monism, see John Rogers, *The Matter of Revolution: Science, Poetry, and Politics in the Age of Milton*. (Ithaca, NY: Cornell UP, 1996).

³ This builds upon the a tradition in natural philosophy beginning with Aristotle.

building a house is the most pervasive metaphor Cavendish uses to explain the degrees and sub-degrees of matter in *Observations*.

For as in the exstruction of a house there is first required an architect or surveyor, who orders and designs the buildings, and puts the labourers to work; next the labourers or workmen themselves; and lastly the materials of which the house is built: so the rational part, said they, in the framing of natural effects, is as it were, surveyor or architect; the sensitive, the labouring or working part; and the inanimate, the materials: and all these degrees are necessarily required in every composed action of nature. (24)

The metaphor is a tidy way to explain the roles of the degrees and sub-degrees of matter, which is why Cavendish uses the conceit frequently in her work.⁴ But if taken too literally, the metaphor may confuse rather than clarify because it appears to suggest the separation of the degrees of matter into three divergent matters. In Cavendish's theory, the parts of matter and their roles may be distinct, but the different parts of matter do not create three *different* matters. Rational, sensitive, and inanimate matter are all part of the one singular matter of nature: "I do not say that they are three distinct and several matters; for as they do make but one body of nature, so they are also but one matter [...]" (*Observations* 206). As the degrees and sub-degrees of matter intertwine together, they compose the whole of nature as their roles complement each other.

Perhaps this concept is easier to understand when we view matter as a whole body and the degrees of matter as systems that function differently within that body. Sensitive matter is compared to our senses and nervous system of receptors and executors, which receive information from inanimate matter and inform centers, or our brains (rational

⁴ In addition, see *Observations* 33 and 206.

matter). These rational centers in turn process this information schematically and order the executors (sensitive matter) to arrange, move, or otherwise direct crude body mass (inanimate matter).

The first degree of matter, the animate degree, consists of both the rational and sensitive sub-degrees of matter. Cavendish explains the animate degree as “nothing but self-motion” (*Observations* 205). Self-motion, the ability of matter to direct its own movements, is coupled with self-knowledge in animate matter, with the rational sub-degree of matter having a finer sense of self-knowledge than the sensitive sub-degree. This idea of self-motion is very important to Cavendish but was in no wise unique to her theory alone. It follows the vitalist movement in showing that matter is self-determining. It has its roots in classical philosophy and is relevant today in theoretical physics.⁵ That Cavendish held to the theory of self-motion, even though it had fallen out of vogue, attracts our attention because it was in direct conflict with the emerging mechanist philosophy, which presented matter in motion as a reaction to force. Contemporaries such as Thomas Hobbes sought to distinctly separate matter and motion from each other, arguing that nature consisted only of the two qualities. Because of its separation of matter and motion, some present-day scholars regard the mechanist philosophy as masculine because it suggests that objects move in the direction of the strongest force, privileging strength over self-direction. Cavendish makes her stance clear, “I do not mean, that all actions are made by rote, and none by imitation; but, by voluntary actions I

⁵ In his cosmological argument, Plato’s distinguished two types of motion, motion forced on an object from an external force, and motion from within an object. Aristotle believed that matter and motion were linked and that a being without matter could have no motion of its own (thus God was the Unmoved Mover). In post-Enlightenment times we began to understand motion as small particles (even mass-less particles) in rapid motion. Nineteenth-century German chemist Wilhelm Ostwald again linked matter and motion as he believed that all matter was energy, with energy being particles in motion. Albert Einstein’s equating mass with energy ($E=mc^2$) suggests that as critical matter increases, so does energy.

understand self actions; that is, such actions whose principle of motion is within themselves, and doth not proceed from such an exterior agent [...]” (*Observations* 19). According to her belief, matter moves because it wants to move, not because of an outside intrusion that forces it into action. This idea will be explored later in this chapter where we will examine Cavendish’s theory in relation to that of the mechanist philosophy.

To Cavendish, even the *smallest* part of nature⁶ is actually a system of rational, sensitive, and inanimate matter working together in a hierarchical balance. Animate matter, found integrated into all parts of nature, is what gives nature freedom to direct itself. Cavendish argues, “As infinite nature has an infinite self-motion and self-knowledge; so every part and particle has a particular and finite self-motion and self-knowledge, by which it knows itself, and its own actions, and perceives also other parts and actions [...]” (*Observations* 138). In Cavendish’s theory, nature orders itself through the self-knowledge of each of its elements, and they in turn influence and interact with each of the other parts based on knowledge, perception, and choice.

There are two sub-degrees of animate matter in this system, the higher and purer being rational matter. These two sub-degrees work like systems of the body, with rational matter functioning like the brain in the human body and the sensitive sub-degree functioning as the rest of the nervous system. Cavendish clarifies this distinction, “As the several degrees of matter are not several kinds of matter; so neither are rational and sensitive knowledge, several kinds of self-knowledges, but only different degrees of one self-knowledge,” suggesting that rational matter (the governing brain of Cavendish’s

⁶ The word *smallest* is used to here to refer to a very small sampling of nature. In Cavendish’s philosophy, there cannot actually be an amount of nature that constitutes the *smallest* part because matter is continuous and not particulate.

material hierarchy) has simply a higher degree of knowledge than sensitive matter (the rest of the nervous system) (*Observations* 161). Rational matter, as its name suggests, is the reasoning sector of matter. It receives information from sensitive matter, and directs sensitive matter to control the inanimate degree of matter. Cavendish explains,

[...T]he rational being so pure, fine and subtle, that it gave only directions to the sensitive, and made figures in its own degree, left the working with and upon the inanimate part, to the sensitive degree of matter, whose office was to execute both the rational part's design and to work those various figures that are perceived in nature; and those three degrees were so inseparably commixt in the body of nature, that none could be without the other in any part or creature in nature [...]. (*Observations* 24)

Rational matter is the head of the hierarchy in matter, and is left to think freely, unencumbered by inanimate matter.

The sensitive sub-degree of matter is the cause of perceptions. It receives information based on its experience with parts of nature to the extent that it interacts with other elements. As with rational matter, it also has self-knowledge, but not to the same degree. Cavendish asserts that sensitive matter gains self-knowledge as it remembers perceptions through repetition and experience (*Observations* 149). The senses, Cavendish asserts, are knowledgeable themselves. "Some learned conceive, that all knowledge is in the mind, and none in the senses: For the senses, say they, present only exterior objects to the mind; which sits as a judge in the kernel, or fourth ventricle of the brain [...] and judges them [...] which shows, they are very dull servants; and I wonder how they can inform the mind of what they do not know themselves" (*Observations* 153).

Through this explanation, Cavendish shows that the mind can only gain its vast knowledge through a system of senses or knowledgeable informers. Because of this perception in sensitive matter, all degrees of matter are able to coordinate their actions together just as the nervous system coordinates the commands of the brain with the mass of the body (*Observations* 143).

The inanimate degree of matter is crude and unrefined, and for our purposes can be compared to the critical mass of the body—the internal organs, bones, muscles, and skin. Although animate matter has only two sub-degrees, rational and sensitive, Cavendish argues inanimate matter has many sub-degrees such as “density, rarity, softness, hardness, etc.,” essentially the physical qualities we normally ascribe to objects in nature (*Observations* 30). Like the animate degree of matter, inanimate matter is self-knowing, but unlike animate matter it is not self-moving because it lacks perception. “The rational parts are more agile, active, pure and subtle than the sensitive; but the inanimate have no activity, subtlety and agility at all, by reason they want self-motion; nor no perception, for self-motion is the cause of all perception” (*Observations* 25). Since inanimate matter has no perception or self-motion, it requires the rational sub-degree of matter to direct it and the sensitive sub-degree to move it.

Cavendish’s theory is not entirely new to seventeenth-century natural philosophy, but does work against the some of the most popular theories of her day, including mechanism. One area where Cavendish’s theory of matter contrasts sharply with her mechanist contemporaries is with regard to motion and matter. According to Cavendish, “Motion, being material and inseparable from matter, cannot be imparted without matter”

(*Observations* 75). But even as she accepts some of her contemporary mechanists' ideas, she will not relent on this one.

I am of Descartes' opinion, that the parts of matter may be made bigger or less by addition or subtraction of other parts; but I cannot yield to him when he says, that motion may be swifter and slower by addition given to the movement by other contiguous bodies more swiftly moving, or by subduction of it by bodies slower moved, and that motion may be transferred out of one body into another. (*Observations* 200)

To Cavendish, matter is inherently self-moving, and motion cannot be transferred without matter being transferred.

But Cavendish doesn't always oppose the mechanists. Through examining Cavendish's relation to mechanical thought, Sara Hutton redeems Cavendish from some negative readings of her resistance to mechanical philosophy. Hutton suggests that Cavendish's ideas on mechanical philosophy weren't pure resistance, but a synthesis of old and new ways of examining the universe. Like Hobbes, as well as other mechanical philosophers, Cavendish believes that nature is made of matter and, as her contemporaries, she describes phenomena "in terms of the size, shape, and position of matter in motion" (423). In addition, the Empress' scientists in *Blazing World* account for natural phenomena such as the formation of ice or of lightning in strictly Hobbesian terms (Hutton 425). Like Hobbes and others, Cavendish argues that experimental and mechanical philosophies are only needful as they benefit humankind. It is particularly in relation to motion that Cavendish disagrees with the mechanist mode of thought, suggesting that her opposition to the theory is at least partially social.

Eileen O' Neil shows that Cavendish opposes the causational theory underlining mechanical philosophy. Because mechanical philosophers explain natural change as corporeal bodies impacting one another, they often use terms of motion and force (*Observations* xxix). To the mechanists, motion may be transferred from one body to another. Cavendish claims that the transfer of motion through the impact of corporeal matter is an insufficient and incorrect explanation for all natural changes (xxix). O' Neil explains, "Cavendish is attempting to replace a transfer model of change, where discrete parts of nature give and receive motion, with a model of the vital agreement and harmony in a unified organism" (xxxii). To Cavendish, motion can only be transferred from one object to the next if the first object gives up some of its matter at the same time. Instead, motion is inherent in the object itself, and other objects may only "occasion" the object to move through the "perceptions" of sensitive matter.

Cavendish illustrates the principle of "occasioning" by showing a man moving a string or ball with his hand, "[...] the string or ball is no more sensible of the motion of the hand, than the hand is of the motion of the string or ball; but the hand is only an occasion that the string or ball moves thus or thus" (*Observations* 140). O' Neil clarifies, "It is the nature of the ball itself, and the force inherent in it, that is the principal and perfect cause of the ball's motion" (*Observations* xxxii). An object only moves in accordance with another through such an "occasion," giving every object its own organic self-determination. Cavendish further explains this idea of matter moving more in harmony with the rest of nature rather than being inevitably moved upon by force, "And hence I conclude, that no particular parts are bound to certain particular actions, no more

than nature herself, which is self-moving matter” (138). In contrast to motion being the result of force, to Cavendish it is the product of choice.

This self-motion and “occasioning” obviously pose some difficulties as well as some misreadings of Cavendish. John Rogers calls Cavendishian *choice* a type of *consent* because it seems to rise out of an obligation (206). This isn’t necessarily the best reading of Cavendish. Cavendish asserts that in most cases, an object will move as another “occasions” it because nature is usually very ordered and systematic. But sometimes parts of matter disagree, which cause irregularities in nature.

Thus the sensitive and rational motions do oftentimes cross and oppose each other: for, although several parts are united in one body, yet are they not always bound to agree to one action [...] for, were there no disagreement between them, there would be no irregularities, and consequently no pain or sickness, nor no dissolution of any natural figure. And such agreement and disagreement, is not only betwixt the rational and sensitive parts, but also betwixt the rational and rational, the sensitive and sensitive. (*Observations* 145)

Through this explanation, Cavendish accounts for irregularities that are much more difficult for the mechanists to elucidate. It explains anything from biological irregularities, like sickness or congenital disorders, to differences in physical properties of different materials, such as wood’s resistance to heat versus copper’s conductivity. In Cavendish’s theory, some of these unexpected results come from an instance when one of the degrees of matter fails to cooperate with the others. For example, if sensible matter, through its self-knowledge and self-motion, forgets to or decides not to inform rational

matter of its perceptions of another object, then irregularities in nature will produce unexpected results.

Many scholars have pointed to Cavendish's tendency to view scientific theory as a type of political or gendered metaphor, and suggest that Cavendish's material theory, including the self-motion of matter, favors her political and gendered predispositions. This is not too surprising, as her contemporaries often did the same. Rogers accuses the mechanist philosophers, such as Hobbes, of loading their theory with gendered and political implications. He explains,

It is difficult to imagine anything but the most patriarchal conclusion derivable from Hobbes' ruthless, scientific view of the priority of physical strength. Mechanism provided masculine dominance with a powerful organizational sanction, and [...] it was precisely the untenable nature of such conclusions that impelled Cavendish to distance herself from the mechanical explanation of natural change. (188)

Indeed, Hobbes' prioritizing of brute force in nature is interpreted by Cavendish to have masculine implications, and she implies that it reveals men's ambition and pride,

But I perceive man has a great spleen against self-moving corporeal nature, although himself is a part of her, and the reason is his ambition; for he would fain be supreme, and above all other creatures, as more towards a divine nature: he would be a God, if arguments could make him such, at least God-like, as is evident by his fall, which came merely from an ambitious mind of being like God. (*Observations* 209)

Cavendish's resistance to the idea of masculine force and domination shows that in seventeenth-century England natural philosophy was socially charged. The rising philosophies of mechanism and experimentalism changed the way that people were accustomed to viewing not only nature, but each other and society as well. And as for the philosophers themselves, their beliefs and ability (or lack thereof) to convince others to stand beside them in promoting their chosen theory had sometimes strong social implications and consequences.

One implication of the mechanical and experimental philosophies was religious in nature. The belief circulated through experimentalist circles and the Royal Society that through dominating nature, scientists could redeem mankind from its current state of misery. Cavendish refused to believe this promise and rejected Robert Hooke's claim

[T]hat experiments were the only true foundation for a philosophy of nature, that the society's experimental results were certain, incontrovertible truth, and that their discoveries would bring practical benefits as great as the inventions of printing and gunpowder, producing revolutions in the arts of navigation and agriculture, and restoring mankind to its pristine knowledge and happiness before the fall. (Whitaker 280)

Cavendish believes it is precisely this ambitious drive which demonstrates the sinful nature of humans that *led* to the fall. This anxiety over the issue of the fall and human redemption directly relates to the political turmoil in the seventeenth century with the rise of Puritan and parliamentary millennial philosophy, a philosophy that worried royalists such as Cavendish. Katie Whitaker shows that the experimenters' philosophy in several

ways put the old royalists on their guard, including its “grandiose utopian promises of almost limitless human improvement—which smacked of the Interregnum parliamentary reformers who had indeed inspired many of them” and that the royalists “were angered by the Royal Society’s success in gaining royal patronage, and the rapid career advancement” of its members in the church and government (281). From this we see that one’s allegiance to certain scientific theories sometimes led to the making or breaking of social and political alliances. For some royalists, this meant that in order to reject political alliance with the parliamentary and Puritan force, they had to reject the more popular theories of experimentalism and mechanism (along with their metaphors for society and their millennial promises) espoused by those who sought for a more democratic England. Scientific theory was not always solely based on what seemed the most rational and correct way to understand and discover nature, but became a factor of social and political association.

The link between each scientific theory’s governing metaphors and the sociopolitical realm, suggested in the last chapter, is worth examining in further detail as it relates to Cavendish. Even though the Royal Society sought to eliminate rhetorical tricks that would complicate language, they still used metaphors that promoted their theories (Harvey’s describing the *heart* as a *pump* helps promote the mechanist philosophy and Hooke’s description of nature as a coy lady compares the scientists pursuit of nature as a man pursuing a female love interest).⁷ Despite the seventeenth-century shift in England to present scientific ideas more clearly, Cavendish’s writings are

⁷ Stephen Shapin, in *The Scientific Revolution* and John Rogers in *The Matter of Revolution* both show how the use of metaphor by mechanist and experimental philosophers promoted their theories and were often politically or socially charged.

no stranger to metaphor, which she often uses to show the link between nature (as she sees it) and society and politics.

Cavendish first began using scientific theories as metaphors for the sociopolitical realm when she was an atomist. Battigelli dates Cavendish's atomist roots to 1645, when Cavendish and her husband were at the center of a scientific salon in Paris where leading thinkers, including Gassendi and Descartes, discussed and reviewed their ideas on natural philosophy (45).⁸ It was from socializing in this circle that Cavendish was introduced to mechanism and atomism, philosophies that were associated with each other on microscopic and macroscopic levels, which Cavendish at first accepted and later rejected for her monistic and vitalistic theory of matter. Her interest in atomism led to her "fascination with a metaphor that served to explain political and psychological conflict; by questioning the validity of sensory perception, atomism helped caution against the kind of dogmatic certainty that to Cavendish's mind had fueled the English civil wars" (Battigelli 49). Lisa Sarasohn also shows that Cavendish likely made the switch from atomism to her vitalist theory of matter for political reasons. Cavendish saw each atom having a free will with no controlling force as politically disastrous (297). Battigelli agrees, "She turned to studies of natural philosophy because, like many seventeenth-century thinkers, she read the new scientific systems as metaphors for the political chaos of her world" (Battigelli 3). Indeed the atomism as presented in *Poems and Fancies* details how atoms form factions and have an individual will of their own. In "A War With Atoms," Cavendish writes,

Some factious *Atomes* will agree; combine
They strive some *form'd Body* to unjoyne

⁸ As does Katie Whitaker in *Mad Madge* (81-103).

The *Round* beate out the *Sharp*: the *Long*

The *Flat* do fight withal, thus all go wrong.

Here Cavendish suggests that if nature were constructed of atoms, democratic in body, they would act similar to people in combining together in warring factions, similar to the factions that exiled the Cavendish's and other royalists during the civil war. When Cavendish later begins to form her theory of matter with its strict hierarchy of three degrees, we see it is probable to also view this theory as socially charged as it mirrors both the class layers of English society and the political structure in *Blazing World*.

By the time Cavendish writes *Observations* and *Blazing World*, her new theory of matter (in place of her old atomism) resolves the problem of democratic disorder and presents nature as an orderly monarch, whose reason governs her actions and makes sense of the natural world: "though the actions of nature were different and opposite to each other, yet they did cause no disturbance in nature, but they were ruled and governed by nature's wisdom; for nature being peacable in herself, would not suffer her actions to disturb her government" (*Observations* 34). Noticing a similar trend in Cavendish's writings, Battigelli asserts that Cavendish gives up atomism in 1665 (just a year before she published *Observations* and *Blazing World*) because to Cavendish

[S]uch a system [of atoms] would result in 'an infinite and eternal disorder' [...]. The dance of atoms was unlikely, in her mind, to result in a stable universe governed by definable laws; furthermore, by positing a material system in which any given atom had power equal to that of any other atom, atomism threatened to level the hierarchical order that

Cavendish felt was necessary if anarchy was to be avoided in both material and political systems. (62)

This hierarchical structure is precisely what Cavendish develops in *Observations* and dramatizes in *Blazing World*. Battigelli reminds us that even though Cavendish finds a more ordered way of describing nature, she continued to view scientific theories as metaphors for the sociopolitical realm. “But although she rejected atomism as a theory of matter in 1665, she retained it throughout her life as a metaphor for the body politic and for the mind,” especially with regard to the dangers Cavendish saw in democracy and collaboration (Battigelli 63).

Some may question why Cavendish gives up the theory of atomism and replaces it with a theory of matter that is still, as Rogers shows, very democratic. For example, although he acknowledges that Cavendish has no sympathy, hidden or expressed, for Puritan politics, Rogers connects Cavendish’s theory of matter with the Protestant doctrine that each individual is endowed with reason and right to receive inspiration, just as each division of matter contains a part of rational matter within it that exercises free will and governs the other two kinds of matter (198). Cavendish’s theory does resemble this to a degree in saying that even the smallest part in nature is endowed with a system of matter governed by rational matter, not to mention that it also allows all degrees of matter the concept of self-knowledge and gives each a distinct dependence on each other. But even though all degrees of matter have self-knowledge and work in a mutually dependant “society,” the rational sub-degree still is the governing part of matter. Although Cavendish envisions a living matter with free will, she hierarchically structures it to mimic her ordered society.

The ambiguity regarding this system, which can be seen as both democratic and hierarchical, has confused and even disappointed some present-day critics. David Norbrook explains why this issue is more complicated.

[I]t seems so hard to categorize Cavendish in political terms, with such radical shifts between an extraordinary openness of imagination and high Toryism. As with later Nietzschean theories of social construction, the arguments can easily cut in two ways. It sometimes seems to be assumed that if it is recognized that a cultural form is constructed then the scales will fall from everyone's eyes and emancipation will follow; but then as now it is perfectly possible to see an inequality as constructed and still opt to maintain it, the more so if skepticism about universals makes it hard to formulate an alternative ground for critique. (184)

Norbrook suggests that even though Cavendish recognized that there were artificial constructions linked to the way early moderns saw science and society doesn't mean that Cavendish saw all of these constructions as necessarily bad. Recognizing that science could be used as a metaphor for society, Cavendish could choose which metaphors suited her social beliefs and use those over the ones that were not favorable. Thus, she could promote metaphors and natural philosophy that supported the idea that natural philosophers could be female as well as male while at the same time allowing her to support England's class system through a hierarchically structured theory of matter.

This issue becomes especially interesting when we look at Cavendish's theory through a feminist lens. Rogers notes that Cavendish's theory is constructed on more than philosophical and political views; it is driven by Cavendish's belief in the equality of

men's and women's minds. He explains, "In Cavendish's case, it has been argued that she turned towards a more vitalistic form of atomism because its gender connotations were less patriarchal, and this has been linked with a more general postmodern feminist critique of empirical science" (188). Rogers suggests that she does this not along political lines, but against the sexual subjection of patriarchal society and the supreme rule of brute force evident in mechanical philosophy. He argues, "The egalitarian infusion of matter with motion, or the conjecture of innumerable agents of infallible reason, may have emerged originally from a radical politics of dissent" (199). Cavendish's adoption of the old idea of motion inherent in matter is "egalitarian" because it suggests that matter is preferred in nature and that there is no such thing as "force." The mechanist belief that active force is what compels passive matter to move reinforced traditional ways of viewing the active male/passive female relationship. Because Cavendish agrees with Descartes that sex is not linked to the mind, and therefore irrelevant regarding rational powers, her theory of matter metaphorically gives women just as much power as men, while still maintaining a place in a traditional hierarchy of social class.

In her gendered metaphors we see more clearly Cavendish's view of gender relations and science as her metaphors link her natural philosophy with the social realm. Rogers explains, "Cavendish shares [...] a drive to marshal images from natural philosophy as an organizational foundation for her beliefs about human society and, more specifically, about the interaction of men and women" (Rogers 185). Eve Keller also examines Cavendish's gendered metaphor and deems it a type of feminism, though not in strictly present-day terms: "An assessment of Cavendish's science [...] allows us to

recognize in her works an unusual awareness of the constitutive role of gender relations in science. This awareness may not suffice to deem her a feminist, but it does forcefully anticipate what has become a defining feature of feminist analysis” (Keller 452). Lisa Anscomb engages in a lengthy discussion over Cavendish’s frequently used gendered metaphors, despite her attempts to be ‘plainly and vulgarly expressed,’ as was the fashion of her day. But to Anscomb the figurative language Cavendish uses “deviated from the drive for mastery” propagated by her contemporaries (162).⁹ Yet it is not the supposed lack of refinement in Cavendish’s metaphors that is the key point. Cavendish’s metaphors altered from her contemporaries, but in deliberate ways that parodied those of her contemporaries or supported her own scientific premises.

Indeed, the differences in Cavendish’s gendered metaphors are worth examining. Instead of portraying nature as a coy woman pursued by the male scientist, as Hooke’s metaphor does, Cavendish’s gendered metaphors were less promiscuous, emphasizing positive feminine traits. Cavendish records in *Observations*,

⁹ Anscomb clarifies Cavendish’s approach as one that didn’t worry so much about style as the thought process (171). This is evident in Cavendish’s confession that she preferred not to take much time in revising her works because it hinders the thought process. Of this she says in her husband’s biography, “I want also the skill of Scholarship in true writing, I did many times not peruse the Copies that were transcribed, lest they should disturb my following conceptions” (qtd. in Anscomb 174). Anscomb showed that Cavendish’s contemporaries could not accept this kind of writing. “Cavendish’s reliance on gendered metaphor and the metaphoricity of her own gender was a strategy which could not be accepted by a society which championed the masculinity of straightforward language, plain and unadulterated, even while it denied its own defining use of tropes” (164).

Richard Nate’s article, “‘Plain and Vulgarly Express’d’: Margaret Cavendish and the Discourse of New Science” begins with a brief history detailing the Royal Society’s preference of things over words and asserts that its members marked their discourse with a gender-biased rhetoric, not necessarily when discussing their observations, but more often when writing about science—when explaining its functions, advantages, or discussing general principles (408). In reviewing Sprat’s history, Nate says that he contrasts “the male scientist’s active role with the passive role of female nature, but [Sprat] also describes the ‘*Masculine Arts of Knowledge*’ as a positive alternative to the ‘*Feminine Arts of Pleasure*’” (408). He shows how Cavendish progressively attempted to make her works clearer to the fashion of the time. He gives an example from *Blazing World*, where the Empress’s orators, the parrot-men, fail from muddling their discourse. Nate shows that however subversive Cavendish is to the scientific modes of her time, she isn’t willing to question the new linguistic norms (412). While Nate is right to trace the influence of the new attitudes toward language in Cavendish’s own writing, he doesn’t examine her use of gendered metaphors as continued resistance to the Royal Society’s linguistic project.

Nature being a wise and provident lady, governs her parts very wisely, methodically, and orderly: Also, she is very industrious, and hates to be idle, which makes her employ her time as a good housewife does, in brewing, baking, churning, spinning, sowing, etc. [...]. But if anyone would take delight in such things, my opinion is, that our female sex would be fittest for it [...] they would prove good experimental philosophers and inform the world how to make artificial snow, by their creams, or possets beaten into froth [...]. (105-06)

This metaphor seems a bit overdone in its elevated appearance of a housewife's duties, and Cavendish probably did this on purpose. As Brandie Siegfried shows in "Anecdotal and Cabalistic Forms in *Observations upon Experimental Philosophy*," Cavendish often uses gendered metaphor to mimic those of her male contemporaries (such as Hooke, Digby, and Glanvill) in burlesque fashion (2, 5). But this parody writing does more than point out the humor of the overly obvious gendered writing of male scientists; at the same time it addresses the serious issue of the social and intellectual exclusion of women in natural philosophy in England. Cavendish's metaphor doesn't exclude male natural philosophers on account of their sex as Hooke's metaphor excludes females because the metaphor focuses on nature's domesticity (an artificially acquired quality) instead of nature's sexuality (an intrinsic trait). Instead it suggests that women would be more suited for experimental philosophy because their experience has already lead them to imitate nature in the kitchen, a trait that men could learn if they wished. On another level, it dismisses the "serious" experiments of the experimental philosophers as trivial actions akin to the whipping of cream by women, thus bringing both sexes to the same

plane. This metaphor shows that for Cavendish natural philosophy cannot be separated from the social realm or vice versa, for the issue of *who* is best suited to discover nature and bear testimony is inherently linked to the method of inquiry.

Cavendish is working on two different levels in constructing her theory of matter. On the one hand, she is ordering the universe with priority given to reason by placing rational matter at the top of the material hierarchy. To Cavendish's mind, this is the most logically sound theory as it allows for nature to be a constantly changing body, both self-moving and self-knowing. On the other hand, she constructs her material theory to coincide with her viewpoint regarding gender and politics. We see how Cavendish, in the style of her contemporaries, uses gendered metaphors on both a small and large scale in discussing natural philosophy to promote a position that favors her unique position as a female aristocrat. Cavendish forfeited her allegiance to atomism to form a theory which mimics the desired social structure. We are now at a point to examine specifically this hierarchical order of matter, particularly the scientific, social, and political motivations behind Cavendish's placement of reason at the head of her hierarchy. Through examining this theory on these two levels, we come to appreciate a complexity of ideas formed by an aristocratic woman seeking to enter the arena of scientific discussion, a realm previously closed to most of the female sex.

Through examining the fundamentals of Cavendish's theory of matter, we realize that to Cavendish (and to many of her male contemporaries) natural philosophy carries with it social and political connotations. Cavendish is placed in a unique social position as both an aristocrat and a woman, and her carefully constructed theory works metaphorically to sustain and build her position in both situations. Through arguing that

matter and motion are inseparable, Cavendish is able to provide an alternative to the mechanists' favoring of masculine strength and brute force. Her hierarchical structure in the theory of matter mimics a structured social society, suggesting that a structure of monarchy, aristocracy, and commoners is natural because even the smallest piece of nature contains a similar structure. When these two points are merged, we begin to see that Cavendish's theory, especially regarding the rational degree of matter, is key to defending not only her philosophical, but also sociopolitical stance. Because rational matter is the highest degree, and because all people, regardless of gender, have access to rational faculties, Cavendish suggests that men and women have an equal space for scientific inquiry, for even the smallest part of nature tells us this is so.

CHAPTER THREE

Reason, Fancy, and Rational Matter

“But seeing that in this age, sense is more in fashion than reason, it is no wonder there are so many irregular opinions and judgments amongst men. However, although it be the mode, yet I, for my part, shall not follow it; but leaving to our moderns, their experimental or mode philosophy, built upon deluding art, I shall addict myself to the study of contemplative philosophy, and reason shall be my guide”

—Cavendish, *Observations*

Because Cavendish places rational matter in the highest place in her model of matter, above sensitive and inanimate matter, it is evident that Cavendish prefers the rational faculties above those of the senses and highly values the functions of the mind including the abilities to reason, imagine, and contemplate. This chapter furthers the discussion of how Cavendish uses science on a sociopolitical plane by focusing on a part of her theory: rational matter and the faculties of the mind. In addition to this exploration, this chapter examines how Cavendish’s theory is evident directly and figuratively in *Blazing World*, and how in this fictional narrative Cavendish again discusses science on both philosophical and sociopolitical levels. Because rational matter is defined as the highest and most refined part of matter, Cavendish’s theory has strong social implications and creates a place for women to participate in the discourse of natural philosophy.

In *Blazing World*, Cavendish classifies reason, fancy, and imagination under rational matter. In her preface, “To the Reader,” Cavendish brings these elements together: “By *reason* I understand a rational search and enquiry into the causes of natural effects; and by *fancy* a voluntary creation and production of the mind, both being effects,

or rather actions of the rational parts of matter [...]” (*Blazing* 123-24). By observing the faculties of the mind as parts of matter, we see that to Cavendish the human body has its own hierarchy symbolizing the organization of her material theory. The functions of the mind are actions of the rational sub-degree of matter. The mind is informed by the five senses, which are part of sensitive matter, and the physical mass of the body is included in inanimate matter. According to Cavendish, the parts of the body are figuratively governed by the various degrees of matter. These parts of matter are not entirely separated out in the body, but as in all of nature, each part of the body is made of complete matter, which means that each part of the body has rational, sensitive, and inanimate matter intermixed. The body becomes another metaphor for Cavendish to explain her theory of matter.

As Cavendish shows that reason and fancy are located in the human mind above all the rest of the body and its senses, we observe the importance of these two concepts in Cavendish’s work. But first, it is important to clarify what Cavendish means exactly when using these terms.¹ To Cavendish, reason can be further defined as a serious inquiry into natural philosophy. She shows this in her preface to *Blazing World*, entitled “To the Reader,” where she clearly distinguishes her writings in *Observations on Experimental Philosophy* from those in *Blazing World*, calling the first “serious philosophical contemplations” that result from “motions of reason” and the second “a

¹ Her definitions for reason, fancy, and imagination have a slightly different spin than the closest *Oxford English Dictionary* definitions of Cavendish’s time. The *OED* explains that *reason* during the early modern period was often defined as the “intellectual power or faculty (usually regarded as characteristic of mankind, but sometimes also attributed in a certain degree to the lower animals) which is ordinarily employed in adapting thought or action to some end; the guiding principle of the human mind in the process of thinking” (“Reason,” def. III10a).

work of fancy” (*Blazing* 123). To Cavendish, these types of contemplations, like those found in *Observations*, consist of mental discourse.

When I say, that ‘discourse shall sooner find out nature’s corporeal figurative motions, than art shall inform the senses,’ by discourse I do not mean speech, but an arguing of the mind, or a rational enquiry into the causes of natural effects; *for discourse is as much as reasoning with ourselves*; which may very well be done without speech or language, as being only an effect or action of reason. (*Observations* 14, emphasis added)

Perhaps Cavendish’s belief in the merits of discussion with oneself is why we see the two characters in *Blazing World* that represent Cavendish herself, the Empress and the Duchess of Newcastle, engage in discourse and different points of view from time to time, parodying the discussions that Cavendish may have had with herself while refuting and drawing on current philosophies to form her theory of matter.

Cavendish includes such a discourse at the beginning of *Observations*, entitled “An Argumental Discourse” which is essentially an argument that Cavendish has between what she labels her “previous” and “latter” thoughts. In this discourse, Cavendish first explains the degrees of matter and then affirms that “nature was a self-moving body, and all her parts and creatures were so too” (24). In creating a conversation with these two trains of thought that assert and the object to her philosophical opinions, Cavendish uses her rational faculties not only to apprehend the objections of her contemporaries to her theory of matter, but adds something more as well. Instead of laying out experiments, results, and endless facts as the experimental

philosopher might while recording his method and keeping records, Cavendish's record of her discourse in her mind allows the reader to see first hand the process of reason at work in scientific inquiry in addition to experimentalism. Although contemporary experimentalists also recorded their thought processes, Cavendish omitting the endless facts, while leaving her method open to contemporary criticism, emphasizes reason as the most important element in the epistemological process. The written discourse is Cavendish's way of recording the rational process, akin to the reports and observations recorded according to the experimental process published so prolifically during the time, such as Hooke's *Micrographia*.

Alongside reason, fancy is likewise important in *Blazing World*. Since Cavendish distinguishes between fancy and reason, it is helpful to refer to the *Oxford English Dictionary* again in search for early modern usage of fancy. In the closest definition to Cavendish's, the *OED* defines *fancy* and compares it to *imagination*:

In early use synonymous with imagination [...]. The process, and the faculty, of forming mental representations of things not present to the senses [...]. In later use the words *fancy* and *imagination* (esp. as denoting attributes manifested in poetical or literary composition) are commonly distinguished: *fancy* being used to express aptitude for the invention of illustrative or decorative imagery, while *imagination* is the power of giving to ideal creations the inner consistency of realities.

("Fancy," def. 4a)

Fancy and imagination, as defined by the *OED*, are both clearly functions of the mind, as is reason. Together all three originate from the rational process and refer to rational

matter. Understanding how fancy differs from reason helps clarify how *Blazing World* generally differs from *Observations*. *Blazing World* is intentionally fantastical in combining both elements of fancy and imagination, and it differs drastically from its more rational companion *Observations*. It appears from the onset that fancy and imagination are incorporated far more frequently than reason in the scientific utopia. Yet this is not actually the case. Cavendish in fact incorporates fancy and imagination into her rational framework in *Blazing World*, using her newly imagined world to figuratively display her theory of matter within the bounds of fancy, and framing the philosophical discussions in the new world after discussions and opinions expressed in physical reality. The reality of the physical world is the one on which Cavendish based her writings in *Observations*, thus requiring her to call upon fancy and imagination to discuss the figurative and hypothetical in *Blazing World*.

A good place to start examining how Cavendish uses fancy and reason in *Blazing World* is to examine the text for evidence of her theory of matter. At first, Cavendish seems to tell her readers not to expect that the “serious” philosophical discussion in *Observations* (where her theory of matter is set forth) will have any heavy bearing on her fictional narrative, and we might prematurely conclude that her theory of matter ends within the genre of scientific treatise. She claims her narrative *Blazing World* is intended merely to “divert [her] studious thoughts [...] and to delight [her] reader with variety” (*Blazing* 124). She says that she chose the subject of her fiction as an appropriate companion piece to her *Observations*, to which it is attached. She explains, “the end of reason, is truth; the end of fancy, is fiction” and therefore, claims that her narrative, though philosophical in part, is not to be taken as a serious scientific discourse (123).

Further examination, however, reveals that this is not her true intention for *Blazing World*. Her joining it to her scientific treatise, combined with the lengthy discussions on natural philosophy within the narrative that mimic her writings in *Observations* (shown in detail in the following chapter), strongly hints that the discussion of her theory of matter and her critique of experimental philosophy is continued from her *Observations* into the *Blazing World*, despite the change in genre. But not only is the philosophical discussion continued into *Blazing World*, it also advances the conversation in ways that Cavendish is unable to do in *Observations*. Eve Keller supports this claim as she also feels that *Blazing World* is quite important for revealing the implications of Cavendish's natural philosophy as revealed in *Observations*:

When it is considered in light of her *Observations*, the *Blazing World* is routinely treated as Cavendish's apologetic retreat: unable to make a believable mark in the 'real' and difficult world of fact, the argument goes, Cavendish escaped into the easy world of fiction. But to my mind, the *Blazing World* actually continues the critique of experimental science begun in the *Observations*, though with some important differences: like the philosophical text, Cavendish's vision of Paradise, the capital of her utopian society, deconstructs the assumptions and claims about nature, knowledge and the self that implicitly or explicitly pervade the new science project; but the *Blazing World* also demonstrates—as the *Observations* does not—Cavendish's asymmetrical deployment of class and gender as categories of critique. (Keller 459)

Without *Blazing World*, the discussion begun in *Observations* would not be complete. Through transporting her scientific discussion into fictional narrative, Cavendish is able to discuss her theory and its implications through fictional politics and society, thus bringing her theory, through figurative representation and fiction, into the sociopolitical realm.

Cavendish's preface to *Blazing World* sets up the expected level of philosophical critique in her narrative. She explains that *Blazing World* is divided into three parts: "the first part whereof is *romancical*, the second philosophical, and the third is merely *fancy*" (124). Cavendish combines fantasy and natural philosophy (i.e. "fancy" and "reason," respectively), in *Blazing World*, and in so doing initially distracts the reader from her forwardness as an English woman publishing her philosophical observations, a privilege most often left to the men. But *Blazing World* does more than serve as a distraction to Cavendish's awkwardness in entering a realm generally reserved for men. It is much more than a diversion to her "studious thoughts" or simple "variety" to the reader. It also functions to dramatize Cavendish's natural philosophy as presented in *Observations*. It takes her theory, personifies its hierarchy in its fictional characters, and through a narrative line shows how the parts of matter function together.

Through Cavendish herself we see a direct connection between *Observations* and *Blazing World* when she explains that she publishes the two texts together "as two worlds [joined] at the ends of their poles" (*Blazing* 124). Through this image the two worlds of her narrative become metaphors for the two written works, both created out of the rational faculty: the first for philosophical contemplation and the second for its figurative implementation of the philosophies of the first. In this manner, Cavendish links her

theory of matter directly to *Blazing World*. Speaking of her new world, she explains, “This world... is composed of the most pure, that is, the rational parts of matter, which are the parts of my mind” (*Blazing* 224). Using this reference to rational matter, Cavendish shows us how *Blazing World* was created as a fictional text in accordance with her theory. Cavendish is optimistic in her ability to use her concept of rational matter and reason in order to transcend this world into higher mental worlds where utopias, such as her *Blazing* and *Philosophical* worlds (both worlds described in the text), are created. While contemporary mechanists, such as Hobbes, use natural philosophy to triumph over the fallacies of human nature, Cavendish uses her understanding of matter, especially rational matter, to apply it to the transcendence of the mind, proving not that mind is over matter, but that mind is the purest and most elevated form of matter.

The links between Cavendish’s concept of rational matter and its implementation in the text of *Blazing World* are more subtle and symbolic. One item that suggests that Cavendish’s preferential placement of rational matter is carried from *Observations* to *Blazing World* is the pattern of hierarchy that appears in her writing, especially with regard to social class. Because Cavendish’s theory of matter is presented in hierarchical form of rational, sensitive, and inanimate matter, examining other three-part hierarchies in *Blazing World* and contemplating whether or not they correlate to her theory of matter yields us a distinct figurative dramatization of Cavendish’s hierarchical system laid out in *Observations*.

We are not the first to examine three-part hierarchies in Cavendish’s writings. David Norbrook shows that Cavendish incorporates a three-part hierarchy into her writings to relate to the sociopolitical realm. Norbrook explains that in the preface of her

husband's biography, Cavendish uses a "top-down model of political power and virtue." He explains this concept of a Cavendishian hierarchy that

[D]raws a distinction between three kinds of history: a general history, which is democratic, the history of a particular nation, which is aristocratic—and also potentially subversive because it draws attention to factions and revives old quarrels—and a particular history, which is monarchical. Cavendish's history of her husband falls into the third category: her focus is entirely on his actions and character. All other characters are shadowy: this reflects [...] her belief in a world where the lower orders follow the lead from above. (195)

This observation is important to our discussion because through it we are able to recognize a similar "top-down" model ("where the lower orders follow the lead from above") in Cavendish's theory of matter. Using this metaphor, rational matter is the commanding monarch of the theory of matter, while sensitive matter is the aristocracy, needing the guidance and knowledge of the monarch to guide it. Rational matter on the other hand needs the aristocratic sensitive matter to act as liaison with the general populace, or the crude and unrefined inanimate matter.

We have seen in earlier chapters that it is common for Cavendish and her contemporaries to see nature (as viewed through a particular theory or philosophical filter) as a metaphor for contemporary society. Perhaps Cavendish employs this hierarchical model, as seen in her view of history (as seen through Norbrook in William's biography) and in her explanation of matter (as interpreted in *Observations*), as a guiding structure for *Blazing World* and the philosophical and social critique she creates therein.

The evidence in the text seems to hint that this is a valid and probable way of viewing the text and that through the characters in the Blazing World, we begin to recognize the Empress (the monarch), the counselors (the aristocracy), and the common inhabitants of the world as figures of rational, sensitive, and inanimate matter respectively. As these characters interact in the constructed sociopolitical system of the Blazing World, we see how Cavendish dramatizes her theory of matter and critiques not only natural philosophy, but also society, gender, and politics as well.

Examination of *Blazing World's* plot reveals many similar examples of social hierarchy. The story begins with a romance involving issues of class and marriage. After the young man falls in love with the Empress-to-be, he realizes that he can never have her because he is “beneath her both in birth and wealth” and therefore determines “to steal her away” (125). Immediately Cavendish shows how fortune and the gods smile upon the woman and punish the kidnapper for his violation of social code. His ship is sent up North, where he and his crew perish of the cold while the future Empress survives “by the light of her beauty, the heat of her youth, and protection of the gods” (126). The immediate issues in the text are ones of social hierarchy, and the reader is quickly acquainted with the problems that ensue when one disrupts the “natural” (to Cavendish and other aristocratic royalists) order of social class.

Just like the Empress' old world, her new Blazing World is also one of class distinctions. The Empress belongs to the highest group of people, which is the imperial family, the only people allowed to have gold or jewels (133). The imperial “race,” as Cavendish calls it, is tightly centered on the monarchy and is carefully controlled. The clergy are also part of this family, but are made eunuchs to keep the royal family small

enough so that only the Empress, her husband, and posterity intended for the throne can reproduce (133). The second group consists of the imperial counselors, who are part of the animal-men that inhabit the world and are gifted in natural philosophy, oration, mathematics, and other “intellectual” fields of study. Lower down the social ladder exist the common people, also animal-men: “Of these sorts of men, each followed such a profession as was most proper for the nature of their species, which the Empress encouraged them in” (134). Each person in the new world has a duty that is most fitting to his or her nature, and in this ideal world for Cavendish, each person has a defined place in society and doesn’t attempt to rise above or descend below it.²

Cavendish believes that these class distinctions bring order and preserve the peace of the Blazing World: “For there was but one language in all that world, no more but one Emperor, to whom they all submitted with the greatest duty and obedience, which made them live in a continued peace and happiness, not acquainted with other foreign wars, or home-bred insurrections” (130). In addition to class distinctions, Cavendish shows that ecclesiastical monarchy is best form of government at preserving peace and order.

Cavendish examines this further in the text. As the Empress makes her way to the golden city in the new Blazing World, the Cavendish records, “No sooner was the Lady brought before the Emperor, but he conceived her to be some goddess, and offered to worship her; which she refused, telling him [...] yet was she but a mortal [...]. But her subjects, who could hardly be persuaded to believe her mortal, tendered her all the veneration and worship due to a deity” (132). Through this political model, it is clear that in Cavendish’s mind, a powerful monarch rules the ideal state, regardless of sex. This is

² For a post-modern critique on Cavendish’s view of race, social class, and gender, see Sujata Iyengar “Royalist, Romancist, Racialist: Rank, Gender, and Race in the Science and Fiction of Margaret Cavendish.” *ELH* 69 (2002): 662.

in line with her political views in life as a devoted royalist, as well as her personal ambition to be “the Most Excellent Princess,” as she sometimes signed her name in publications. Cavendish gives a reason for a monarchy through “nature” and through religion and denounces the virtue of a commonwealth,

[The statesmen] answered [the Empress], that as it was natural for a politic body to have but one governor; and that a commonwealth, which had many governors was like a monster with many heads: besides, said they, a monarchy is a divine form of government, and agrees most with our religion; for as there is but one God, whom we all unanimously worship and adore with one faith, so we are resolved to have but one Emperor, to whom we all submit with one obedience. (134)

Cavendish shows that the unity brought about by this “natural” form of government not only agrees with the natural order but also brings peace upon the whole planet, and unlike other early modern utopias, such as Bacon’s utopia, the inhabitants of this new planet have no need for guns or weapons of any kind.³

The rationale given by the counselors to the Empress is similar to arguments on government made by royalists in the seventeenth century, suggesting that a monarchical system of government mirrors a perfect heavenly government, and through political alliance we may thus assume that this view represents Cavendish’s actual political opinion. This proposal of a monarchical system of government also relates to Cavendish’s natural philosophy and her shift from atomism to her hierarchical theory of

³ Contrast *Blazing World*, “And as for guns, there was no use for them, because they had no other enemies but the winds” (129) with *New Atlantis* where the residents of Bensalem produce “Ordanance [sic] and instruments of war, and engines of all kinds: and likewise new mixtures and composition of gun-powder, wildfires burning in water, and unquenchable” (321).

matter. Just as the statesmen in *Blazing World* compare the commonwealth to a “monster with many heads,” Cavendish compares atomism to a coat with many heads of insects by explaining, “[...] There cannot be atoms in nature, or else nature would be like a beggar’s coat full of lice: Neither would she be able to rule those wandering and straggling atoms, because they are not part of her body, but each is a single body by itself, having no dependence upon each other” (*Observations* 129). The political and scientific metaphors help to solidify Cavendish’s position that both political and natural systems need to have a ruling head. To Cavendish, both democracy and atomism carry a dangerous implication, and she feels that policies and theories that treat all elements of their systems equally can only result in chaos. Instead of showing nature as “democratic” and disorderly, Cavendish places a monarch (the Empress) at the head of her political model in *Blazing World* and presents nature as a fitting ruler over her elements in her theory of matter, held together through a hierarchy of matter in which the rational sub-degree rules.

Cavendish believes not only that having a hierarchical system results in political peace and avoids social disorder, but also that matter is ordered hierarchically to make sure nature functions as it ought to, preventing chaos. A year or two before she published *Observations* and *Blazing World*, Cavendish gave up atomism as a theory for explaining the composition of nature. She did so after considering that if each atom had equal sense and knowledge, there would be no way for nature to coordinate countless atoms to work and function together.⁴ Believing nature to be a “wise” and “orderly” entity, Cavendish formulates her new theory of matter from her own ideas and parts of existing

⁴ This is discussed more fully in the previous chapter. For more on Cavendish’s shift from atomism to her material theory, see Anna Battigelli, *Margaret Cavendish and the Exiles of the Mind* (Lexington, KY: Kentucky UP, 1998) 49 and Lisa Sarasohn, “A Science Turned Upside Down: Feminism and the Natural Philosophy of Margaret Cavendish.” *Huntington Library Quarterly* 17 (1984): 297.

philosophical theories, both ancient and modern (*Observations* 105).⁵ Through these ideas, she constructs her theory to ensure that it reflects and explains the order she sees in nature. Cavendish doesn't believe that nature could have order through an atomic "democracy," but instead must be constructed of a natural hierarchy, with rational matter as the ruling monarch, being the most refined and the most knowledgeable of all the degrees. To Cavendish it is the control center for all other parts of matter.

The political ideology presented in *Blazing World* by the Empress' statesmen not only mirrors Cavendish's actual political beliefs, but also figuratively represents her theory of matter. Cavendish arranges the constituents of her narrative to represent the parts of her material theory. She places the Empress at the head of the hierarchy, representing the monarchical rational matter. Next she places her animal-men counselors to represent sensitive matter with their ability to receive knowledge from their senses as is most appropriate for their species. At last the rest of the Empress' kingdom, consisting of the remaining populace and rough elements of the Blazing World, represents inanimate matter, which is acted upon by the animal-men scientists and contemplated by the Empress.

It is not too surprising that the Empress and others in the Blazing World personify Cavendish's hierarchy of matter. Cavendish has done so similarly on theological terms. She symbolically shows the order of matter through examining the order of nature:

God the author of nature, and nature the servant of God, do order all things and actions of nature, the one by his immutable will, and the all powerful-command; the other by executing this will and command [...] for God's

⁵ As discussed in the previous chapter, Cavendish builds her theory on not only those of Plato and Aristotle (regarding continuous matter, or the relation of matter to motion) as well as other classical thinkers, but also builds eclectically on the theories of her contemporaries: Descartes, Moore, Hobbes, and others.

will is obeyed in nature's self-motion; which self-motion God can as easily give an impart to corporeal nature [...] but [...] Reason must judge, sense execute [...]. (*Observations* 210)

Cavendish suggests that rational matter acts with sensitive and inanimate matter as God acts with nature and material, proving to us that there is yet another hierarchy that resembles the structure of the degrees of matter. Cavendish's illustration of nature and God working on the elements in a similar three-part hierarchy only reaffirms Cavendish's assertion that her theory of matter, with its flow of power from the top downward, is most natural. Cavendish's theological point from *Observations* is also drawn back into the metaphor of the Empress' statesmen, showing that "as there is but one God, whom [they] all unanimously worship and adore with one faith, so [they] are resolved to have but one Emperor" (*Blazing* 134).

There are other examples of Cavendish using religious ideas in conjunction with natural philosophy, although critics as well as Cavendish herself have claimed the contrary. As Cavendish uses reason and religion to support her political views, she also uses religion and scientific views to support each other.

Yet Cavendish was not a theologian, and many scholars see more secularism in Cavendish than her contemporary natural philosophers. Quoting Cavendish, in her article "Ideas in the Mind: Gender and Knowledge in the Seventeenth Century," Paula Findlen asserts that among her female contemporary philosophers, "only Margaret Cavendish seems to have actively sought to *separate* theology and philosophy. 'Neither can Theology and Natural Philosophy Agree... for Philosophy is Built all upon Human Sense, Reason, and Observation, whereas Theology is built upon an Implicit Faith'" (187,

emphasis added). An example of this separation in *Blazing World* is when the spirits tell the Empress, “you mortals are so puzzled about this divine faith, and natural reason, that you do not know well how to distinguish them, but confound them both, which is the cause you have so many divine philosophers who make a gallimaufry both of reason and faith” (167). Here Cavendish suggests that placing reason and religion in the same realm will destroy faith and at the same time unravel reason. It is probable that through the advice that reason and religion remain separate, Cavendish is attempting to avoid contemporary religious controversy, created in part by the Cambridge Platonists and Latitudinarians, rising from reading religion through the eyes of reason. Indeed the Empress, an imaginary form of Cavendish herself, will not tolerate folly of reason in her court. The irony is that the subjects that tell the Empress of the differentiation of faith and reason are spirits themselves, and are not subject to natural philosophy but religion and mysticism.

But at times Cavendish cannot entirely escape using reason to justify religion. It is evident in her explanation of the monarchical system of government as the most natural; “For as there is but one God [...] so we are resolved to have but one Emperor, to whom we all submit with one obedience” suggesting that it is reasonable to have the same form of government that God instituted (*Blazing* 134). Cavendish is no theologian, and she is not claiming any right to present new religious doctrine. But she is a philosopher of nature, and for a devoted seventeenth-century Anglican, God must be viewed as an important (or even the *most* important) part of nature.⁶ Though Cavendish

⁶ The depth of Cavendish’s religious conviction is not argued here, but many events of Cavendish’s life suggest at least a strong cultural and political devotion to Anglicanism: her marriage in Catholic France by an Anglican minister, her attendance in the Anglican congregation at Richard Browne’s chapel in Paris, and her attendance at Anglican services in Antwerp (Whitaker 80, 87, 128).

refrains from writing a theology, there are some necessary intersections between religion and natural philosophy. In a fantasy like *Blazing World*, this juncture sometimes occurs figuratively.

One example of combining reason and religion in *Blazing World* demonstrates how Cavendish uses the two together to achieve a desired rhetorical goal. The Empress (representing rational matter) uses the fact-gathering and reason of her counselors (representing sensitive matter) to control her subjects' religious views and convert them from a general monotheism to Christianity. She has her bird-men bring her a star-stone, which always shines with a "splendorous and comfortable light" (164). Likewise, she asks the worm-men how volcanoes always produce fire, and when they tell her of the fire-stone and that it burns when wet, the Empress "desired the worm-men to bring her some of that stone, but *be sure to keep it secret*" (163, emphasis added). Her counselors reveal the scientific explanation of these stones to her, though they remain a mystery to the rest of her subjects. She then uses these stones to light her chapels and to teach her subjects of Christianity.

In the chapel which was lined with the fire-stone, the Empress preached sermons of terror to the wicked, and told them of the punishments for their sins, to wit, that after this life they should be tormented in an everlasting fire. But in the other chapel lined with the star-stone, she preached sermons of comfort to those that repented of their sins, and were troubled at their own wickedness. (164)

Here the Empress uses her own power of reason (and that of a few of her counselors) to make the natural and explainable appear divine and therefore causes her subjects to

believe Christian doctrine based on faith in a mystery that has a perfectly logical explanation. “And thus the Empress, by art, and her own ingenuity, did not only convert the Blazing World to her own religion, but kept them in constant belief, without enforcement of blood-shed” (164). Although this semi-colonization of religious principles and the secrecy involved may disturb some readers today, Cavendish the narrator explains that this use of natural philosophy and cognitive reasoning on the part of the Empress achieved the important political goal of peace. In this hierarchical system, it is reasonable to assume that the head, which is in this case the Empress, would be more privy to information than the lower elements of the system, and with such information would watch over the lower elements. Indeed the Empress feels that she is doing something worthwhile for her subjects by introducing them to Christianity, even if the setting for her chapel of repentance is only powered by a special effect.

Although the Empress in fact colonizes her people with Christian religion, Cavendish calls these “gentle persuasions,” which have their roots in a reasonable belief in mystery and the convincing of the mind, similar to Plato’s “myth of hell”: “And after this manner she encouraged them [her subjects] also in all other duties and employments, for fear, though it makes people obey, yet does it not last so long, nor is it so sure a means to keep them to their duties, as love” (164). This “love” is the (white) lie that the Empress imposes on her subjects, but her aim is not only to get her subjects to love God, but also to make them good and impressionable political subjects. She uses her natural philosophy, and therefore her reason, to achieve both ends.

Cavendish has been critiqued for her commanding and vetoing Empress, but having a strong central figure of control makes sense when seen in line with her theory of

matter. The power and control of the Empress seems to look as if Cavendish agrees with Hobbes's famous "tyrannical" placement of reason. Eve Keller explains, "The utopian unity of the Blazing World arises not out of communal desire, but rather out of the autocratic control of knowledge production" (464). Despite the Empress' control over knowledge and her religious colonization, it is not necessarily accurate to label her power as solely limited to herself any more than rational matter has absolute power in the hierarchy of matter. Perhaps *monarchical* is a better adjective here. First of all, the Empress is informed of the nature of the fire-stone and other elements by her aristocratic counselors, a symbolic resemblance of sensitive matter informing rational matter of the workings of inanimate matter. The Empress makes the decision to keep the nature of the fire-stone a secret, but her own knowledge is only made possible through the worm-men. Figuratively speaking, Cavendish states the same thing in *Observations*, "the head, although it is a whole and perfect figure, yet it is a part of the body, and could not subsist without it" (126). The control of knowledge production doesn't lie solely in the Empress, but follows a necessary, and to Cavendish natural, chain of command that depends upon the cooperation of the lower elements.

Despite Cavendish's claims that her *Blazing World* was merely fantastical ("The end of Reason, is truth; the end of Fancy, is Fiction"), Keller also sees the scientific theme carried from *Observations* into *Blazing World* and suggests that in *Blazing World* Cavendish "boldly interrogates the epistemological assumptions and the social agenda that underline the mechanical philosophy and the experimental method, and, in the process, offers a critique of new science that is remarkably sensitive to its social and gendered construction" (448). Indeed, Cavendish not only uses a hierarchical model to

critique natural philosophy and politics, but she also uses this model in her theory of matter to critique the category of gender.

One gender implication results from Cavendish's natural philosophy's correlation with the philosophy of Descartes. A recorded reader of Descartes, Cavendish rejects his separation of body and soul, but maintains some tenets of his philosophy. She believes in the ability to create whole worlds in her mind through contemplation to the point where she recommends to her readers of *Blazing World* that they create a world within their own minds (Findlen 191, *Blazing* 124). This "proliferation of worlds and selves" found in *Blazing World* challenges the empiricist and mechanical view of the "discrete self and stable object," both elements necessary to the success of experimental philosophy, which Cavendish regards as only secondary (Keller 463). An advantage that comes out of Cavendish's use of reason and fancy in *Blazing World* is that she is able to demonstrate the limitless nature of rational matter through creating various planets and characters, even multiple self-representations. Cavendish creates not only the Blazing World in which her Empress lives, but allows her character within the text, the Duchess of Newcastle, to create a Philosophical world as well. In her epilogue she urges her readers to "create worlds of their own, and govern themselves as they please" (225). Because Cavendish creates several intellectual worlds and urges the creation of even more, some critics have thought her utopia is instead a form of wish fulfillment or psychosis. For this reason, Frank and Fritzie Manuel refused to include *Blazing World* in their utopian encyclopedia, thinking that Cavendish's text was a freakish result of some sort of schizophrenia (Leslie 128). In actuality, the plurality of worlds and selves more likely

comes from Cavendish's implementation of Cartesian philosophy; it allows reason to take precedence over the flesh and permits the mind to explore limitless boundaries.

Many scholars have shown the importance of Cartesian thought in allowing women to participate in natural philosophy.⁷ Ruth Perry writes, "Once mind was separated from body, and elevated, nothing could be argued from physiology; women's reproductive capacity could no longer be held against them if all minds were created equal and rationality was the cardinal virtue" (473). As Perry also shows, Descartes promoted a mind that could search out knowledge as it came to "free itself from its attachment to the senses" and "required prior learning inessential" (478). As Cavendish searches for a way to make her philosophical writings in *Observations* come to life, to show how her theory functions, she retreats into her mind, a realm where her sex is irrelevant and where the elements of her theory become figures in her fancy.

Sujata Iyengar shows a more specific example of this as she discusses the importance of the imperial family's eunuchs in the *Blazing World* (*Blazing* 133). Because the "imperial race" (who, along with the Empress, represent rational matter) "lacks the physical signs of gender difference," Iyengar argues, they cannot be "identified as separate or inferior" on basis of gender (662). It is interesting to see that because the members of this family, in the role of rational matter, do not identify themselves with sexual markers they seem to be following Descartes' often quoted assertion that "the

⁷ To read more on feminist applications and readings of Descartes, see Ruth Perry "Radical Double and the Liberation of Women" *Eighteenth-Century Studies*. 18:4: (1985). 472-493. Also Hilda Smith, *Reason's Disciples*. (Urbana, IL: Illinois UP, 1982).

mind has no sex.”⁸ This example presents more supporting evidence for Cavendish’s belief in this assertion.

Cavendish shows that rational faculties in the mind are innate in all humans regardless of sex; she defiantly asserts, “I will not say, but many of our sex may have as much wit, and be capable of learning as well as men” (*Observations* 11). Yet Cavendish laments that in her time not all scientific inquiry can be achieved through natural rational powers, but requires training and learning; “But since [women] want instructions, it is not possible they should attain to it: for learning is artificial, but wit is natural” (11). This concern may also help explain why Cavendish favors the power of reason above other epistemological methods; reason is more inherent and hails from a realm where physiology may be disregarded altogether. Plus, experimental philosophy takes years, and possibly decades, of training. But natural reason is given to all despite training or experience, just as rational matter is inherent in every part of matter. Since English women were not usually well trained in the experimental arts and had little access to instruments, Cavendish necessarily prefers easily-accessible reason. She prefers it to the mechanical philosophy, where brute masculine strength and force is favored above the more feminine self-motion and self-knowledge.⁹

Through *Blazing World*, Cavendish uses the combined powers reason, fancy, and imagination to continue the philosophical critique begun in *Observations*, while at the

⁸ In “Cartesian Women,” Erica Hearsh asserts that this phrase became “something of a feminist rallying cry” for seventeenth-century women (*Yale French Studies* 80, 1991: 146-164). This idea had enormous implications for women of the period in opening up doors to their role in philosophical discourse, and many studies have been published on the issue, among them the seventeenth-century Poullain de la Barre, *De l’Égalité des deux Sexes*. Paris: Jean Du Puis, 1673 and Londa Shiebinger, *The Mind has no Sex?*. Cambridge: Harvard UP, 1989.

⁹ For an in-depth discussion on the masculinity of mechanism and Cavendish’s resistance to it, refer to the previous two chapters and the discussion of John Rogers, Anna Battigelli, and Lisa Sarasohn.

same time she dramatizes her theory of matter in various characters and classes. Her partiality for the rational degree of matter and its metaphorical equivalent of monarchical government is clear. Favoring the rational functions of reason and fancy, Cavendish is able to emphasize a place that places both genders equally, but a place not void of social hierarchy or political and religious order. In comparison, experimentalism, as we will discuss in the next chapter, has its elements that favor women as well; however, these elements carry a democratic fundamental unsuitable to Cavendish's socially traditional outlook, demonstrating the careful balance Cavendish must walk between social inequity and gender equality.

CHAPTER FOUR

Sensitive Matter and Experimental Philosophy

“Wherefore, the best optic is the perfect natural eye, and a regular sensitive perception; and the best judge, is reason; and the best study, is rational contemplation joined with the observations of regular sense, but not deluding arts.”—Cavendish, *Observations*

Although rational matter is given preferential treatment in Cavendish’s model, sensitive matter too is very important to her theory. In fact, the sensitive sub-degree of matter is essential for matter to function in nature as it should. As the mediator between rational and inanimate matter, its role is crucial. Because rational matter does not act directly on the crude inanimate matter but employs sensitive matter to execute its will, rational matter in a sense lives through sensitive matter. Cavendish feels similarly about the role of the senses. To Cavendish, they are an important part of scientific inquiry, but are not to rule over reason. Although she values sensitive matter, she places strong boundaries on its role, and is even more limiting to the use of instruments and technology, which are used to aid the senses.¹ Cavendish believes that sensitive matter, and therefore the senses (through symbolic connection), are once-removed from rational matter and pure reason. Art, or human-crafted instruments, are man-made aids for the senses, not found in nature, and are therefore twice-removed from reason. And so we see Cavendish’s chain of epistemological practices in a hierarchical order for deriving truth: reason is the best mode, followed by our natural senses, and lastly, the senses with the aid of art.

¹ *Technology* is used here to refer to artificial means that aid in scientific discovery and observation. The use of the term in this way was probably not used until the nineteenth century and is slightly different from its seventeenth-century meaning, which refers to a study or treatise on the subject of human arts (*OED* “technology” def. 1 & 2).

For Cavendish, sensible matter possesses masculine strength and force, and yet is second in the material hierarchy.² This chapter will look more closely at *Observations* and will discuss Cavendish's own observations, her critique of experimental philosophy, and her argument that the senses are limited as a method of scientific inquiry and that instruments are often distorting to the discovery process. To further show the scientific connection between *Observations* and *Blazing World*, we will closely examine Cavendish's observations on fire, the eyes of flies, and the generation of vegetables, discussions that reappear in *Blazing World* in the presentations and explanations of the Empress' subjects. This aids our understanding of how exactly Cavendish uses her fictional narrative to further the philosophical and social critique against the emerging acceptance of experimental philosophy that she began in *Observations*.

Cavendish did not always have her intellectual cannons aimed at experimental philosophy and its professors, but her distaste for the discipline came after time. Katie Whitaker recounts how Cavendish was at first taken with the experimental philosophy of Robert Boyle and remarked, "He is a very civil, eloquent and rational writer [...] his style is a gentleman's style," but in 1665, especially after reading Hooke's *Micrographia, or Some Physiological Descriptions of Minute Bodies*, she became disenthused (279).

Cavendish rejected the experimentalists' claim that

[E]xperiments were the only true foundation for a philosophy of nature,
that the society's experimental results were certain, incontrovertible truth,

² Cavendish makes it clear that sensitive matter has self-knowledge as has rational matter. The senses, Cavendish asserts, are knowledgeable themselves. "Some learned conceive, that all knowledge is in the mind, and none in the senses: For the senses, say they, present only exterior objects to the mind; which sits as a judge in the kernel, or fourth ventricle of the brain [...] and judges them [...] which shows, they are very dull servants; and I wonder how they can inform the mind of what they do not know themselves" (*Observations* 153).

and that their discoveries would bring practical benefits as great as the inventions of printing and gunpowder, producing revolutions in the arts of navigation and agriculture, and restoring mankind to its pristine knowledge and happiness before the fall. (Whitaker 280)

As we will see in this chapter, Cavendish critiques several of the philosophical tenets of experimentalism, especially that the experimental method can bring more practical benefits than rationalism and that the philosophy was closer to arriving at objective certainty in science.

Critics have formulated several reasons for Cavendish's arguments against experimental philosophy. Many, including Anna Battigelli, have argued that the objections came from Cavendish's politics or proto-feminism. But Ruth Perry shows that the motivation may not have been feminist alone. Referring to Francois Poullain de la Barre, a seventeenth-century feminist, Perry argued

Since men and women had the same physiological equipment for receiving and registering sensations—the same bundles of nerve fibers—they therefore had the same potential for finding their way to Truth. Once put on an experiential basis, philosophy became the common intellectual ground on which men and women might meet to discuss the nature of thought and of physical matter. (Perry 476)

Perry makes a good case for showing how democratic experimental philosophy is. If every person has equal power in the senses as Perry suggests, then each person has an equal right to understanding based on observations. Along these lines, this may have been an opening for Cavendish and other women to enter the realm of natural philosophy.

Yet despite this enticement, Cavendish still rejects the theory, preferring a hierarchical one where reason and rational powers govern the senses and crude matter.

John Rogers presents an explanation to Cavendish's rejection of the experimental method by suggesting that Cavendish objects to the theory because of the patriarchal implications and the supreme rule of brute force in the mechanical philosophy, which belief came about through the paradigm shift from rationalism to experimentalism and faith in inductive logic. He argues, "[Cavendish's] egalitarian infusion of matter with motion, or the conjecture of innumerable agents of infallible reason, may have emerged originally from a radical politics of dissent" (199). As we have previously discussed, Cavendish, as well as many of her contemporaries, uses scientific theory as a metaphor for the political world that surrounds her. Why she then would reject the sometimes more democratic methods of inquiry, which favor the senses (which are generally equal among the human race) for rationalism and reason is a question worth examining in more depth.

Cavendish's theory, although rejecting democracy through its hierarchical structure, does allow Cavendish what she wants in society and in scholarship: a place as an aristocratic woman in scientific discourse. Although Cavendish envisions living matter with free will, she hierarchically structures it to mimic her ordered society. With rational parts of matter governing sensible and inanimate matter, she represents the idea of political rule by a monarch, with the aid of the aristocracy. Because Cavendish agrees with Descartes that sex was not linked to the mind, and therefore gender is irrelevant regarding rational powers, her theory of matter metaphorically gives women just as much power as men within their given social class (or metaphorical sub-degree), while still maintaining a place in a traditional hierarchy. Recognizing that Cavendish is able to

project her socially privileged place onto her theory and still argue for a place alongside her male contemporaries in philosophical discussion, we are left to consider that Cavendish's objection to experimental philosophy may not have been gender based, but class based.

With regard to the debate between rationalism and empiricism, Battigelli argues that Cavendish preferred rational deduction for the exact same reason that the Royal Society preferred induction by experiment and observation. Both believed that their method was a way of correcting human error and avoiding the madness that led to social and political unrest (such as the English civil war) (89). But Battigelli also argues that Cavendish's main concern with the experimentalists wasn't their method, "Cavendish's real criticism [...] lies in their [the experimentalists'] unwillingness to acknowledge the inevitable interference of their own subjectivity" (107). Other critics suggest the same, including Sara Hutton who sees Cavendish's views on mechanistic thought not as a critique but as a synthesis of principles of rationalism and mechanism (regarding size, shape, and motion of matter), which Cavendish incorporated into her material theory. According to Battigelli, when Cavendish critiques the Royal Society's use of lenses or gathering of facts, she is showing that there are often gaps between the empirical evidence and the observer's conclusions, where the mind must necessarily interpret information. Since the mind is not always free from subjective thoughts, or sometimes works with distorting instruments, the products can become corrupted. Battigelli contends, "Cavendish warned against making statements about the external world, fearing that claims of objective certainty might be contested in ways that subjective claims could not be. Her scientific works were the result not of experiment and

observation but of her subjective thoughts, which, by definition, could not be challenged” (Battigelli 89). As an informally educated woman in seventeenth-century England, Cavendish attempts to avoid the strict criticism of other natural philosophers by remaining in the subjective realm when critiquing their philosophical methods and while developing her own theory of matter. She makes it clear that her thoughts make sense in her mind and through her experience, without suggesting that everyone has equal experience.

Battigelli also illustrates Cavendish’s outright claim to subjectivity as an attack on the Royal Society and as a guard from claims of “objective certainty” (105). To Cavendish, everything is subjective and interpreted by the individual. Battigelli claims this is why Cavendish admits in her preface to *Blazing World* that she creates her world to become ‘Margaret the First’ and outright proclaims that it is a world merely *in her mind*. Battigelli explains that Cavendish purposely problematizes the “self” (by presenting herself as three women: Cavendish the author, the character the Empress, and the character Duchess of Newcastle) to further explore subjectivity, rather than merely using the narrative for wish fulfillment or fame. If Cavendish merely wanted to become an empress rather than a subject, she could have ended her narrative quite early, after the Empress is given power over the new world. In Battigelli’s mind, there is no question that the rest of the narrative is left to satirize Hooke and his Royal Society Fellows through a grand conflict that examines subjectivity and objectivity while discussing experimental philosophy and rationalism (107). On the other hand the Royal Society, Battigelli argues, saw their objectivity as a natural extension of mechanism, influenced by Harvey’s contention that humans, and their bodies, are very similar to machines. They

likened themselves to machines whose job it was to objectively record with their hands what the eye observed. With only mere observation, they argued, there was little room for interpretation (93). To the experimentalists, this machine-like objectivity creates a resiliency to attacks, and it is this claim to objectivity that Cavendish challenges.

To aid the experimentalists in their search for objective truth about nature, instruments gained prestige among gentlemen-philosophers in seventeenth-century England, although they had previously been used almost exclusively in lower artisan classes.³ The second section of Cavendish's *Observations* entitled "On Art, and Experimental Philosophy" introduces her stance on the use of human craft and technology in experimental philosophy. In this section, she argues that art (technology) is finite, that humans cannot control natural causes and effects, that sense "cannot be the ground of reason no more than art can be the ground of nature," and that "experimental and mechanic philosophy cannot be above the speculative part" (48-49). Cavendish holds firmly to the stance that art is usually unnecessary and often harmful in scientific inquiry. Even as Cavendish disagrees with the experimental method in part because it places the senses above reason, she shows that when sense, the informer of reason, is corrupted, the reason will likely falter as well. She later argues that "art causes gross mistakes and errors, not only in sensitive, but also in rational perceptions; for sense being deluded is apt to delude reason also, especially if reason be too indulgent to sense" (*Observations* 96). She qualifies her stance by stating, "[...] Art may help to mend some defects, errors, or irregularities in nature, but not make better that which nature has made

³ Although this technology originated from lower classes of tradesmen and artisans, Katie Whitaker shows that scientific instruments (such as the telescope) in the seventeenth century were generally very expensive and used as a symbol of social and financial status among the upper classes, including the Cavendishes themselves (98-99).

perfect already” (*Observations* 64). Cavendish hints that experimental philosophy is no more apt at discovering the nature of the world than a more rational natural philosophy and at the same time attacks the experimental method’s utility.

Indeed, Cavendish seems to hold the experimental philosophers to a high standard in expecting that the fruits of their work yield up something of use to society.

But could experimental philosophers find out more beneficial arts [...] either for the better increase of vegetables and brute animals to nourish our bodies [...] or for the advancing of trade and traffic to provide necessaries for us to live, or for the decrease of nice distinctions and sophistical disputes in churches, schools, and courts of judicature, to make men live in unity, peace and neighborly friendship; it would not only be worth their labour, but of as much praise as could be given to them. (*Observations* 52)

Cavendish proposes a wide range of possible uses for scientific discovery here, from nutrition to moral philosophy. She then furthers her statement with an analogy of the uselessness of the experimental philosophers’ work: “But as boys that play with water bubbles or fling dust into each other’s eyes [...] for wasting time with foolish sports; so those that addict themselves to unprofitable arts spend more time than they reap benefit thereby” (*Observations* 52). Because Cavendish sees most of the experimentalists’ behavior as unfruitful, and their discoveries often distorted through the use of faulty instruments, she feels that they would be much better off to use reason as the primary source of scientific truth.

Cavendish’s theory and thoughts on experimentalism are put into practice in many places in *Observations* and *Blazing World*, where she plays along (to a certain

extent) with the experimentalist's methods. It is important to view several observations, both in her fiction and her scientific treatise, to understand *how* Cavendish contributes to the discussion of natural philosophy in the two genres and to see the philosophical importance of *Blazing World* as a companion piece to *Observations*. The first phenomenon we will examine is that of the fire-stone, a stone that burns while continuously kept wet and has the capability to burn under water. This fictitious element is not unique to Cavendish. Bacon mentions such a manifestation in *New Atlantis* under the arsenal of the island. Although Solomon's House rules over a peaceful society, its science has led to the creation of "ordnance [sic] and instruments of war, and engines of all kinds: and likewise new mixtures and composition of gun-powder, *wildfires burning in water, and unquenchable*" (Bacon 321, emphasis added). There is also such an element discussed earlier in John Lyly's *Ephues*, where the narrator speaks "of a firestone in Liguria that was quenched by milk and reignited by water" (Whitaker footnote 283). Cavendish uses this fictional phenomenon to bridge the gap between her fiction and her serious philosophical study.

What is important about the fictional observations of the fire-stone as seen in *Blazing World*, as well as Cavendish's realistic observations in *Observations*, is that in both cases the discovery and use of fire occurs only through the senses, without the use of artificial means. After the initial observation has taken place, the rational faculties are exercised to explain the phenomenon and put it to use, emphasizing the principles of Cavendish's theory of matter. The fire-stone is seen as the source of volcanic eruption. It is discovered after the Empress sends her worm-men to find out the cause of volcanoes, and upon their return, they "informed her Majesty, that there was a certain sort of stone,

whose nature was such, that being wetted, it would grow excessively hot, and break forth into a flaming-fire, until it became dry, and then it ceased from burning” (163). Upon reviewing their observation, the Empress immediately conjectures a use for the fire-stone. After consulting her rational faculties, she places it in a church, keeping its nature a secret from her subjects, and uses its eerie light to remind her people of hell and call them to repentance (163-64). The Empress later uses the fire-stone to help the Duchess of Newcastle fight a war for England. Since all the ships in this world are made of wood, and the fire-stone burns as long as it is wet, the Empress sets her fish-men to set fire to the enemy’s ships (206). At last the Empress uses the fire-stone to set fire to many cities to strike fear into the hearts of kings so that she could gain control over their lands on behalf of the monarch of her native land (214). The inclusion of the fire-stone phenomenon is important to *Blazing World* because of the method of inquiry used by the worm-men. In this case, the worm-men find out the cause of volcanoes by using nothing but their natural senses. No instruments are used, yet through the natural senses of the worm-men, directed by the rational Empress, several uses are brought about including a Christian fear of God and unity in the Empress’ original world. Moreover, the worm-men themselves appear merely to be objective observers and recorders of the facts (much the way experimentalists viewed themselves). It is not until the worm-men have taken this knowledge to the Empress, metaphorically taking the knowledge gleaned from the senses to the source of rational thought, that the knowledge is put to any good use. This furthers Cavendish’s argument in *Observations* that natural sense is best and more useful when tempered by the higher powers of reason, rather than the senses aided with art alone.

In *Observations*, Cavendish includes several discussions about flame and combustions but excludes any discussion of an element with the properties of a fire-stone. However, Cavendish does take notice to the various types of flames, such as the differences between “flame of oil, the flame of wood, the flame of ‘aqua-vitæ’ [“life water,” or alcoholic liquids], the flame of gums, and the like” (*Observations* 134). She also distinguishes between liquid, fluid, and wet qualities in nature: “*Flame* is fluid, but not liquid, nor wet: *Oil* is fluid and liquid, but not wet; but *water* is both fluid, liquid and wet. *Oil* will turn into flame, and increase it, but *water* is so quite opposite to flame, that if a sufficient quantity be poured upon it, it will totally extinguish it” (*Observations* 17). While directly stating that in reality water extinguishes fire, we believe that Cavendish’s own propositions of the cause of fire is so based in reality that she will not entertain the idea of a wet burning fire unless the fire is one that sustains itself on water mixed with oil or another fuel substance. However, Cavendish’s method of observation avoids any in-depth experimentation. Her study of fire revolves around common sense, not the use of instruments or tools to help her determine its causes, consistencies, or uses. Instead, she is content to use her senses to glean information and later uses this information to support her rational thoughts regarding the nature of matter.

Although Cavendish’s *Observations* do not offer a description of a wet fire, Cavendish’s comments on ordinary combustion are helpful in determining how the fanciful fire-stone is theoretically possible in the rational realm and important to Cavendish’s natural philosophy. In consulting her rational thoughts in describing the burning of fuel, Cavendish asserts that the “fuel’s consumption or burning, is not made by the fire, but by the fuel’s own perceptive motions, imitating the motions of the fire; so

that fire doth not turn the fuel into ashes, but the fuel doth change by its own corporeal figurative motions, and the fire is only an occasion of it” (96-97). This explanation makes sense within the context of Cavendish’s theory of matter. Fire is not regarded by Cavendish to have the power to force itself on fuel and make it burst into flames (as it may possibly be described by the mechanists). Instead, it is the fuel’s own choice, an agreement between the several degrees of matter to convert into flames. With the fire-stone, we see fire “occasioning” water to become like itself, and through water’s own choice, it bursts into flame.

Cavendish’s discussion of the fire-stone, although fantastical, is an interesting one, because it follows her theory of matter. Through the governing rational realm, Cavendish is able to create an imaginary element that allows water to imitate burning flame. After its creation in the rational realm, she then narrates its discovery through the natural senses. At that point the Empress is able to find several uses for this discovery, both in religion and politics. The fiction of the *Blazing World* gives Cavendish a venue to contemplate a hypothetical type of fire that could exist because it fits within the frame of her philosophy. This conjecture also carries with it utility because if such a thing were actually found in nature, Cavendish has already shown how it could greatly benefit humankind. Without the reason and sensitive observation combined together, Cavendish seems to say, the observation of fire may be as useless to natural philosophy as it was to the worm-men before the Empress’ arrival.

The observational method shifts during Cavendish’ discussion concerning a fly’s eye, and this study provides an example where art is used in combination with sense and

reason, and in comparison to the experiments by the worm-men, this observation's results, as presented in *Blazing World*, are less desirable.

The fly's eye is an important observation because it is easy to identify this observation as a direct critique of Cavendish's contemporaries. This discussion is one in which Cavendish builds directly from Robert Hooke's *Micrographia*, referring to it in both *Observations* and *Blazing World*. This observation is important to Cavendish because through the use of a microscopic lens, common small creatures in nature, such as insects, could now be perceived as monstrous. Cavendish felt that this was a result of taking nature out of context and presenting it as something it was not. Through reviewing *Micrographia*, Cavendish gained familiarity with Hooke's recorded observations, experiments, and sketches of the phenomenon, so she could not avoid the knowledge that came through the use of the microscopic lens in her discussion. She critiques the use of lenses in general because "magnifying, multiplying, and the like optic glasses, may, and do oftentimes present falsely the picture of an exterior object" (*Observations* 50). This is part of her thesis from the beginning in *Observations*, and Cavendish uses two genres, scientific treatise and fictional narrative, to prove as much.

Cavendish's main concern is with the lenses' purpose: the lenses are meant to show things as they are not, either by bringing the cosmos very close to us on earth or by making miniscule creatures appear enormously large, thereby distorting nature and muffling common sense and reason. This seems appropriate for Cavendish, who believes that sense is inherently less-pure than reason, and that art or technology may corrupt the senses even further. She shows the destructive result of valuing an instrument that warps nature at times beyond recognition as she claims

[Y]et I doubt they will hardly find out the interior nature of our sex, by the exterior form of their faces or countenances, although very curious, and full of variety of several beauties; nay, I dare on the contrary say, had a young beautiful lady such a face as the microscope expresses, she would not only have no lovers, but be rather a monster of art, than a picture of nature [...]. (*Observations* 201)

Indeed, Cavendish argues, how can art “make better that which nature has made perfect already?” (*Observations* 64).

The argument against lenses is introduced in *Blazing World* when the bear-men, the natural philosophers in the world, try to prove the worthiness of their various lenses to the Empress. When they only anger the Empress and each other with the disagreements about what they observe through the telescopes, they instead turn to their microscopes and show the Empress “a grey [sic] drone-fly, wherein they observed that the greatest part of her face, nay of her head, consisted of two large bunched all covered over with a multitude of small pearls or hemispheres [...] the number of them was in all 14,000” (142). When the Empress asked them what they judged these hemispheres to be, the answer that “each of them was a perfect eye, by reason they perceived that each was covered with a transparent cornea, containing a liquor within them, which resembled the watery or glassy humour of the eye” (143). When the Empress argues that they may indeed be pearls and that their microscopes might delude their senses, they insist on the microscopes’ usefulness, saying, “they did never delude, but rectify and inform their senses” (143). This reasoning parodies that of the experimental philosophers, who did believe that lenses could be used to correct a faulty perception in the visual sense, but runs contrary to Cavendish’s logic of a top-down scale. To Cavendish, the senses are

naturally fitted to their uses, and cannot be made more correct through art since art cannot “make better that which nature has made perfect already.”

In *Observations*, Cavendish debates whether or not the 14,000 hemispheres (as recorded by Hooke) are in fact eyes, but arrives at no certain conclusion. She does however, divert into a discourse on utility, saying that if they are eyes, then flies must have a greater use for them and backs it with a metaphor that counters one previously mentioned by Hooke: “For though art, the emulating ape of nature, makes often vain and useless things; yet I cannot perceive that nature herself doth so” (59). To Cavendish, if what the lens presents is actually true, then there must be some inherent need or use for such a phenomenon to exist.

The question of utility is a valid one. Cavendish doesn’t only question whether or not the observation is accurate, but she questions why it is important to know that a drone fly has 14,000 eyes. In order for lenses to be proven beneficial, they must reveal some useful knowledge to humankind. Eve Keller shows how Cavendish thinks that the use of expensive telescopes and microscopes were more a show of intellectual and social distinction rather than a mark of a good natural philosopher (461). This is shown in *Blazing World*, when the Empress commands the bear-men to break their glasses (in this case telescopes) and says that the inhabitants will now “trust only to their natural eyes, and examine [...] objects of their own sense and reason,” but the bear-men proclaim that the lenses are needful because they allow “one man [to be] though wiser than another” and if they could not use their lenses “neither would one man be thought wiser than another, but all would [...] be alike” (*Blazing* 141-42). In this part of the parody, Cavendish mocks those who use their possession of telescopes and microscopes, instead

of reason and natural sense, to *appear* as great natural philosophers. This again shows that the use of art separates the philosopher from pure, natural ways of observing the world and results in pettiness and chaos.

Portraying the experimental philosophers as unable to agree on their observations also functions to question the supposedly objective ground of experimental philosophy. Eve Keller again gives further insight:

Furthermore, the episode in Cavendish's fiction functions as an epistemological critique of the new science's claim that a boundary could be marked between matters of fact, about which consensus was to be expected and therefore could be deemed certain, and explanatory causes, about which disagreement was permissible and which therefore could achieve only the status of probability. By having the experimenters disagree even on what they physically observe (that is, not only on what might cause the perceived effects), Cavendish challenges the reliability of such a boundary. (Keller 462)

As Cavendish challenges the experimental philosophers' claim to objectivity, she attacks the utility of the philosophy, its very purpose in being. Experimental philosophy was meant to curb the biases and errors of rationalism, but instead, in Cavendish's portrayal, possesses all these faults without the reason of rationalism. Through this discussion, Cavendish is able to reverse the experimentalists' critique of rationalism by accusing them of even greater errors of judgment. Here the Empress joins Cavendish as she makes several arguments against the New Science and the emerging Enlightenment. She denounces the use of microscopes and telescopes, asserting that they do not give

objective results, but distort nature and give way to false interpretations. Furthermore, the Empress finds no use for the information found through the microscope that flies have thousands of eyes, unlike the information regarding the fire-stone which proves very useful in her kingdom. She therefore refuses to allow her philosophers to argue in her court and commands them to “confine [their] disputations to [their] schools,” and later orders that the schools be disbanded altogether because varying opinions and degrees of knowledge “must needs breed factions in their schools, which at last break out into open wars, and draw sometimes an utter ruin upon a state or government” (*Blazing* 162, 202). During Cavendish’s time, arguments at the Royal Society, who swore by their objectivity, sometimes did lead to factions and side-taking. With these problems in mind, Cavendish examines and fears the implications of widespread scientific inquiry that ignores the importance of human connection and only deceives the scholars who swear by its objectivity. Without any personal interpretation, philosophers risk that the information they gleaned will have no real purpose.

The last observation we will examine does not present any immediate physical uses to mankind, but is pivotal in revealing the limits of experimentalism and the unbounded nature of rationalism. Cavendish’s observations of vegetables, and the parallel examinations in *Blazing World* conducted by the worm-men, are important in *Blazing World* as they reveal most accurately the failings of the experimental method and the superiority of the rational realm in scientific inquiry. As she is questioning her various counselors about the Blazing World’s nature, the Empress asks the worm-men if they can perceive through their senses the “interior corporeal, figurative motions both of vegetables and minerals” and the worm-men launch into a discussion of interiority and

exteriority similar to Cavendish's in *Observations*. The worm-men state matter-of-factly, "Interior, figurative motions of natural creatures are not subject of the exterior, animal, sensitive perceptions, yet by their rational perception they may judge of them, and of their productions if they be regular" (*Blazing* 150). The Empress tests the sincerity of their claim and tries to persuade the worm-men to use microscopes under the earth to make their observations, but the worm-men reply that microscopes are not designed for their optic sense and wouldn't be advantageous (*Blazing* 151). Through the voice of the worm-men, Cavendish lays forth two important ideas: first, senses aided through art are inadequate to reveal the interior workings of things and second, microscopes are limited in what exteriors they are able to observe. It is no wonder that the Empress finds the worm-men as wise as any of her council, and is "wonderfully taken with [their] discourse," takes "much satisfaction in several of their answers," and seems "well pleased" with what they have to say (*Blazing* 151, 153). The worm-men naturally inhabit a part of their world that is almost completely barred from what we consider optical perception, showing the limits of the experimentalists' instruments.

Cavendish is also making a statement here with regard to the realms of the senses and the mind. To Cavendish, the senses have their distinct realm. They are useful within the bounds of the bodily senses, but as we move further inward toward nature, we leave the sensitive and enter the realm of the rational. Indeed we see the hierarchy as outward and common moving toward the most inward and pure as the worm-men tell the Empress, "Interior, figurative motions of natural creatures are not subject of the exterior, animal, sensitive perceptions, yet by their rational perception they may judge of them

[...]” (*Blazing* 150). Cavendish uses the discussion of seeds to show the importance of weighing the inward motions of things against the outward appearance:

And since the exterior figures of creatures are not the same with the interior, but in many or most creatures quite different; it is impossible that the exterior shape and structure of bodies can afford us sure and excellent instructions to the knowledge of their natures and interior motions, as some do conceive. (*Observations* 70)

What Cavendish infers here is that experimental philosophy ignores internal workings and motions, and by so doing misses a large portion of nature’s actions by focusing only on forces and appearances from the outside. “Yet no microscope is able to present to our view those inward points by the inspection of the exterior figure and shape of those vegetables,” Cavendish argues (*Observations* 70). In her mind, experimental philosophy, especially where lenses are concerned, is not able to even approach the extent of understanding of nature that rationalism yields. On another figurative level, the mind itself is viewed as an interior place, while the body is exterior. Through emphasizing the importance of understanding interiors, and using them in natural philosophy, Cavendish returns again to the same argument made by Descartes, that the interior part of being, namely the mind, possesses a superiority, regardless of sex, that the exterior body cannot attain.

Cavendish furthers her discussion of interior and exterior shape, figure, and actions in *Observations*. She explains the distinction by saying that we may see or “pattern out” objects, be they animals, vegetables, or minerals, and we perceive what they are made of and the size of their shape, but we cannot tell “the cause of their being such

figures” (*Observations* 175). She uses an organic analogy as she compares the workings of vegetables to the digestion of a man. Others may not be able to perceive that he is digesting by looking at his exterior, but the perceptive parts of his organs tells him that he is digesting and therefore reveal to him a certain interior nature of his body (*Observations* 175). When there is a shift from the study of the external to study the internal nature of something found in the world, it takes both sense and reason to come to an accurate observation.

Although Cavendish thinks this is a pursuit suitable for reason to inquire, she does not think it is appropriate for experimental philosophy and will be useless for the improvement of humankind. She remarks that the

[... I]nspection of vegetables, doth not give us any knowledge how to sow, set, plant, and graft; so that a gardener or husbandman will gain no advantage at all by this art [...] For unless they could discover their interior, corporeal, figurative motions, and the obscure actions of nature, or the causes which make such or such creatures; I see no advantage they yield to man. (*Observations* 9)

To Cavendish, the experimental philosophy does a great disservice to natural inquiry because it remains only outward observation and fails to be processed by the rational faculties. In many cases Cavendish says that it cannot even attempt to penetrate the interiority of nature, as reason can, or it may rapidly distort it. “The truth is, most of these arts are fallacies, rather than discoveries of truth; for sense deludes more than it gives a true information, and an exterior inspection through an optic glass, is so deceiving, that it cannot be relied upon: Wherefore, regular reason is the best guide to all

arts [...]” (*Observations* 9). When sense can be employed, reason should be the governor, and when we enter a realm sense cannot reach, reason will be our means of inquiry.

Cavendish was more skeptical of experimental science than her contemporaries in the Royal Society, for although men like Boyle admitted to an extent the fallibility of science as it now stood, they believed that through the experimental process it could be perfected. Cavendish disagreed, believing “that such perfect knowledge was in principle impossible, even in the future, simply because of the infinity of nature and the finiteness of humanity” (Whitaker 307). Because Cavendish believes that science cannot be separated from the social, political, or more human elements, there should be room for subjectivity and individual reasoning. Through her dissent, Cavendish argues not that experimental philosophy has no benefits, but warns that reason must be placed first, to guide the senses and protect the philosopher from self-deception.

One of the largest weaknesses in the experimental method, according to Cavendish, is its claim to objectivity and its theoretical shunning of individual and personal thought, evaluation, and experience. Yet, Cavendish claims, there can be no such objectivity in any natural philosophy. Through their use of instruments and their methods of observation, the experimentalists have tricked themselves into thinking that they are mere onlookers and recorders of nature’s processes, ignoring their subjective and biased interpretations of not only the information placed before them, but their methods in receiving such information. Cavendish instead argues how any natural philosophy could not be subjective, how the prevailing epistemological method could not appeal to its proponents because it resonates with something subjective in themselves. It is this

subjectivity, this connection to our own rational patterns, that Cavendish lauds, for it is only when we are willing to see how our view of nature shapes our view of human and social nature that we begin to be enlightened.

CHAPTER FIVE

Gender and Narrative

With so many similarities between *Observations* and *Blazing World*, especially with regard to their detailing Cavendish's theory of matter, we may wonder why Cavendish deemed it necessary to add "a work of fancy" to her "serious philosophical contemplations" (*Blazing* 123). Beyond dramatizing her theory of matter, what more does this narrative, this early modern utopia, add to Cavendish's scientific writings? What does it allow her to accomplish that an essay or treatise could not? What response does *Blazing World* give to other male-constructed early modern utopias? We have so far examined Cavendish's two works, *Observations on Experimental Philosophy* and *Blazing World* and the ways that these texts collectively (through their congruencies and discrepancies) convey Cavendish's theory of matter and critique of experimental and mechanical philosophies of scientific inquiry. Here we will examine how the *Blazing World* narrative provides Cavendish, as a woman, an important venue to explore natural philosophy where she can control or change certain aspects of society, such as women's roles in society and their association with Eve. This chapter briefly shows how *Blazing World* contrasts with Bacon's scientific narrative, *New Atlantis*, in offering a female perspective in scientific narrative and in addressing valid concerns regarding Enlightenment science and its control over space and reproduction.

Cavendish tells her reader that she writes *Blazing World* not "out of a disparagement to philosophy" but as a "voluntary creation or production of the mind [...] agreeable to the subject treated in the former parts [*Observations*]" (*Blazing* 124). She

wants her reader to know that not everything in her narrative is to be taken literally since it is an act of the imagination, but warns the reader also not to take *Blazing World* too trivially because it is as important a companion to *Observations* as the imaginary realm is to our real-life experience, and thus the two are “joined [...] as two worlds at the ends of their poles” (*Blazing* 124). Cavendish makes it clear that the Blazing World is only in her mind, but that this mind is an immensely important creative space where infinite worlds are made and explored (*Blazing* 124). Although Cavendish uses *Observations* to explore the ‘real’ world in which we physically experience life, she intends *Blazing World* to explore the space of the rational mind, to metaphorically represent her theory of matter and through narrative dramatize what Cavendish could only imagine.

In searching to understand why a natural philosopher would write a narrative to accompany his or her “serious philosophical contemplations,” Jean-Francois Lyotard offers a postmodern perspective on the importance of scientific narrative that applies in many ways to seventeenth-century scientific writers and in some ways to Cavendish. In *Postmodern Condition: A Report on Knowledge*, Lyotard points out that science’s implications are “no less sociopolitical than epistemological,” and stresses narrative as the “quintessential form of customary knowledge,” especially in scientific knowledge (18-19). Although Lyotard feels that contemporary society (postmodern or even post-industrial) has lost its taste for narrative, he reaffirms their importance:

Narratives [...] determine criteria of competence and/or illustrate how they are to be applied. They thus define what has the right to be said and done in the culture in question, and since they are themselves a part of that

culture, they are legitimated by the simple fact that they do what they do.

(23)

Through their intricate connection with culture, narratives carry a legitimizing authority that other systems, including scientific treatises, do not carry. This is why Lyotard asserts the importance of scientific narrative as an essential legitimizing step in the rhetorical language game of epistemology:

Scientific knowledge cannot know and make known that it is the true knowledge without resorting to the other, narrative, kind of knowledge, which from its point of view is no knowledge at all. Without such recourse it would be in the position of presupposing its own validity and would be stooping to what it condemns: begging the question, proceeding on prejudice. (29)

This theory of legitimation is somewhat complicated for Cavendish's scientific narrative, which remains skeptical and "other" from her culture. Writing from a female, royalist, informally schooled, and somewhat rationalist perspective in a predominantly male, democratic, university-educated, and empiricist society, Cavendish cannot hope to have her narrative accepted wholly through a supposed connection to contemporary culture and democratic consent. Yet it is very apparent that Cavendish's narrative is another step in the language game, an attempt at dramatizing the possible ways to find truth and the limits of the senses or art in doing so.

Lyotard's argument of the necessity of narrative in legitimating science is important because it points out a prevailing problem of inquiry; epistemes are often set up to validate themselves (through language games) within their own systems, which often

result in circular reasoning and proofs, never getting at the actual evidence for their legitimacy or illegitimacy (30). To Lyotard, narrative is the answer to this problem. “Narrative knowledge makes a resurgence in the West as a way of solving the problem of legitimating the new authorities. It is natural in a narrative problematic for such a question to solicit the name of a hero as its response: *Who* has the right to decide for society? Who is the subject whose prescriptions are norms for those they obligate?” (30). Narratives legitimize science because they bring the scientific into the social and political realms. They make science a matter of authority and even morality. Lyotard explains,

This way of inquiring into sociopolitical legitimacy combines with the new scientific attitude: the name of the hero is the people, the sign of legitimacy is the people’s consensus, and their mode of creating norms is deliberation. The notion of progress is a necessary outgrowth of this. It represents nothing other than the movement by which knowledge is presumed to accumulate—but this movement is extended to the new sociopolitical subject. The people debate among themselves about what is just or unjust in the same way that the scientific community debates about what is true or false; they accumulate civil laws just as scientists accumulate scientific laws; they perfect their rules of consensus just as the scientists produce new ‘paradigms’ to revise their rules in light of what they have learned. (30)

Here Lyotard draws tight connections between science and the sociopolitical realm in narrative, showing that narrative legitimizes science because it removes it out of its self-justifying system as it comments to the social and political communities. Although

Lyotard is speaking mainly of post-industrial narrative, his explanation of the scientific narrative fitting into the “new” scientific attitude poses certain problems for examining Cavendish. Even though the connections between the scientific and sociopolitical realms fit our reading of *Blazing World*, Lyotard admires the progress and radical political democracy adopted by the puritans and “new” scientists that Cavendish avoids (and even shows as ridiculous in *Blazing World* when the Empresses’ counselors cannot agree on observations, and their underlying causes, after long, foolish debates). However, Lyotard’s description legitimates the narrative of Sir Francis Bacon’s *New Atlantis*, which we will examine here, with its detailed school of natural philosophers, who are upheld and revered by the society, and through consensus govern not only scientific inquiry but also the social and political realms.

Lyotard’s explanation of the importance of narrative in knowledge production both advances Cavendish’s position and complicates it through advocating democratic consent in identifying knowledge. David Norbrook realizes this uneasy position in Cavendish critique and identifies an important difference in Cavendish’s narrative writing:

Cavendish is endlessly interested in the ways identity is constructed by custom and convention, and her materialism celebrates nature and the body. In the current era of revisionist historiography, she is congenially skeptical about grand narratives, finding Fortune and contingency rather than pattern in history. *Her scientific interests were marginalized by traditional narratives of the rise of scientific truth, but now that scientific texts are often read in terms of their rhetoric rather than their verifiability,*

collapsing knowledge into power, qualities earlier regarded as eccentric become another cause for celebration. Her works offer a medley of different voices which seldom offer a conclusion as definitive. (Norbrook 182)

With this in mind, we see that because we now have developed an awareness of language games played in science,¹ we have lost the admiration for grand narratives and appreciate the eclectic and eccentric nature of Cavendish's writing.² Because we see how the experimentalists and mechanists used language and metaphor to promote their scientific views and make them the dominant scientific ideology in the seventeenth century, we are now set up to appreciate Cavendish's alternative narrative, which is so different from early modern utopias composed by her male contemporaries.

Lyotard also makes some concessions later in *Postmodern Condition* and cautions against democratic consent as an absolute means for determining knowledge; "the principle of consensus as a criterion of validation seems to be inadequate" (60). Instead, he insists on the quest for paralogy, for thinking otherwise, for removing oneself from the general hypothesis or traditional knowledge, not for innovation's sake, but for challenging the system in which the hypothesis occurs and thus re-conquering "the right to science" (61, 31). This is where Cavendish's *Blazing World* comes in as a valuable narrative. In *Blazing World*, caucus fails as a means to arrive at scientific truth among the counselors, and instead it is through a progression of presentations, with the Empress inquiring, prodding, and challenging her counselors, that some satisfaction is reached in discovering the nature of the world where the knowledge is useful (either in a

¹ Lyotard *The Postmodern Condition: A Report on Knowledge*. (Minneapolis: Minnesota UP, 1997) 40-41.

² Lyotard 37.

metaphorical/sociopolitical, military, or everyday sense) or exposes the limits of experimental observation. To Cavendish, the results of her science as shown through her narrative are a quest for paralogy, for thinking otherwise that becomes unique and legendary in her own terms. As a former political exile and female outsider in natural philosophy, she is countering the new norms of mechanical and experimental philosophy.

Contrasting *Blazing World* with Sir Francis Bacon's *New Atlantis*, we see how truly "other" Cavendish's narrative is. *New Atlantis* is a good example of a grand scientific narrative as described by Lyotard because it illustrates the "new" scientific principles of arriving at truth through consensus and blurs civil laws with scientific principles. As suggested by Marina Leslie, *New Atlantis* was very likely a source for *Blazing World*. As in *Blazing World*, Bacon's utopia explores the scientific, political, and religious implications in an imaginary society. Although all of these elements of society are discussed, it is largely felt among critics that one of the utopia's most important aspects is that it explores the hypothetical benefits of experimental science, and most of the societal issues are a result of the strong scientific program discussed in *New Atlantis*. Published "not perfected" in 1627, the narrative recounts the adventures of Spanish sailors who arrive on an uncharted island in the Americas, a country whose advances and Christian religion are far above any other country in the world. The sailors soon come to see that this is an ideal society; even its capital city, Bensalem, means literally "son of peace." Here in this city the Spanish are integrated into a pre-existing society, and are in a sense colonized by the inhabitants of Bensalem, showing an ironic twist on the other that differs from usual early-modern utopia.

In *New Atlantis*, Bacon has created the perfect society, run by an oligarchy of learned men, i.e. natural philosophers, called the House of Solomon (the Royal Society would take inspiration from this fictional group). Peace reigns and patriarchy is firmly in place. Their religion is perfect Christianity, made possible by the Miracle of Renfusa, where the Holy Scriptures were sent intact to the island. In addition to having a perfect knowledge of Christian theology, there are a number of converted Jews that inhabit the land, hinting that the society is close to a millennial state (Bacon 313). In her book, *Renaissance Utopias and the Problem of History*, Marina Leslie suggests that Bacon includes religion in *New Atlantis* because he wants to show his utopia as a fable of history that is more than simply fiction (84). But there is something more at stake. Through his narrative, Bacon may be striving, as Lyotard suggests, to bring his science (including experimentalism) into the moral and sociopolitical realm, thereby justifying his scientific program and method of inquiry. And for Bacon and other contemporaries, science was necessarily part of something grander in society and the movement of history. In speaking of early-modern experimental philosophers such as Bacon, Eve Keller observes, “They were prophets of a new age, and the golden world they were striving to build would be dedicated, as Bacon said, to ‘the glory of the Creator and the relief of Man’s estate’” (447). Bacon shows that Bensalem is better for the developments of Solomon’s House, as they have relieved the state of the citizens as well as the Spaniards: “It seemed to us that we had before us a picture of our *salvation in heaven*; for we that were awhile since in the jaws of death, were now brought into a place where we found nothing but consolations” (301, emphasis added). The sailors also say that they think the island is more “Angelical, rather than magical” (306). It is interesting to note that this heavenly

peace the sailors feel is brought about by the progress of the new nation they are in and its man-made improvements through scientific mastery.

The politics of Bensalem are somewhat hard to follow. In the narrative, the island is described as both a “state” and “kingdom,” but as Denise Albanese observes, “Monarchy is in fact displaced to an antiquarian concern” (516). Solomona is the only king mentioned, and he seems to be merely a part of history, being replaced by the brotherhood of scholars who bear his name. The natural philosophy and epistemological inquiry of Bensalem has been taken out of the realm of a monarch and placed in the hands of the goodly few who poses the philosophical and political power. This society has far less class distinctions than Bacon’s England, but resembles the ideal state some parliamentarian figures and natural philosophers sought and attempted to implement in the mid-seventeenth century, a political system that Cavendish vigorously opposes.

Bacon’s utopia is largely scientific, showing his belief in the role of scientific progress in the ideal state. Bacon’s vision has been praised not only among seventeenth-century natural philosophers (such as the Royal Society), but has been applauded by some twentieth-century writers. H.G. Wells hails the science of *The New Atlantis*:

It embodies a new conception in human life, the conception of continual organized research. All the other Utopias present islands, communities and worlds of happy and exemplary completion and self-satisfaction, but the Utopia of Francis Bacon is a world of seekers after knowledge, a world growing perpetually in knowledge and wisdom and incidentally growing in power. It is a world ruled by organized science. (Qtd. in Nate 173)

The type of science Wells admires is of Enlightenment kind, and it is critiqued by some postmodern readers. Although this fictional narrative contains some mythical aspects, such as the ‘water of paradise’ (a fountain of youth) for “the health and prolongation of life,” much of the scientific advances were later achieved in reality during the seventeenth century or during the Enlightenment (306). The House of Solomon subordinates nature to man, and makes animals, “Greater or taller than their kind is; and contrariwise dwarf them, and stay their growth; we make them more fruitful and bearing than their kind is; and contrariwise barren and not generative” (318). James Hulston argues, “In contrast with Bacon’s usual insistence on the subordination of knowledge to use, the researchers seem to see an inherent value in the technological domination of nature” (54). Theodor Adorno and Max Horkheimer critique Bacon in particular for spurring the dominating ideology that was perpetuated by the Enlightenment. What they say of Bacon could be applied to his ideas as revealed in the House of Solomon, “What men want to learn from nature is how to use it in order wholly to dominate it and men. That is the only aim” (Adorno 49). Although the statement that domination is “the only aim” of Baconian experimental philosophy may be over-simplified (Bacon himself said that it was for ‘the glory of the Creator and the relief of Man’s estate’), it does seem strange that an island so remote and peace loving, which makes a practice of transforming all foreigners into natives, would need to develop “ordnance [sic] and instruments of war, and engines of all kinds: and likewise new mixtures and composition of gun-powder, wildfires burning in water, and unquenchable” (321). In the postmodern era, the implications of this kind of domineering science may strike us as eerie. However

disquieting it is to us, it was seen by many in the seventeenth century as a positive goal of science.³

In comparison with *New Atlantis*, *Blazing World* is also a utopia that describes “a world of seekers after knowledge.” The imperial counselors in this world resemble to a degree the House of Solomon, but with the important addition of accountability to a higher political figure—the Empress. Through this construction in her narrative, Cavendish is able to present an alternative to democratic consent of scientific knowledge without placing all knowledge control in the Empress’ hands, maintaining a hierarchical chain-of-command where epistemological assumptions are checked by a benevolent authority figure.⁴ Unlike Bacon, Cavendish refuses to take scientific inquiry to its uttermost limits in *Blazing World*, cutting off the imperial societies to maintain a more traditional social order. Unlike *New Atlantis*, *Blazing World* is not meant to be definitive, as Norbrook observes, but to explore the open realm of the rational mind and the limits of the physical, sensitive body (182).

Cavendish’s narrative differs not only from *New Atlantis* but also from other early modern utopias in that Cavendish doesn’t set her utopia on the earth. Instead, she creates this world, which meets up with ours at the North Pole, in her mind. “This world... is composed of the most pure, that is, the rational parts of matter, which are the parts of my mind” (*Blazing* 224). This world, she says, is one of many imaginary and rational worlds, but is just as satisfactory as any space in our physical world; “And although I have neither power, time nor occasion to conquer the world as *Alexander* and *Caesar* did

³ The domineering nature of experimentalism is also seen by the frontispiece of Sprat’s *History of the Royal Society*, showing Brouncker, Bacon, and a bust of Charles II, with a background of military arms—a promised benefit of seventeenth-century experimental science.

⁴ Refer to our discussion regarding Hobbes’ “tyrannical” placement of reason in chapter three.

[...] I have made a world of my own” (*Blazing* 124). Cavendish’s husband William, Duke of Newcastle, in a dedicatory poem preceding the narrative, emphasizes this difference as he points out that the world of Columbus was not created but merely discovered:

Now this new World was found, it was not made,
Only discovered, lying in Time’s shade
Than what are You, having no chaos found
To make a World, or any such least ground?
But your creating Fancy, thought it fit
To make your world of Nothing, but pure Wit. (*Blazing* 121)

The attention on the difference between mere discovery and creation show Cavendish’s own deviations from early modern utopia, where the fictional characters are again mere discoverers of new lands set upon the earth, unlike the Empress and Duchess characters in *Blazing World*, who understand that an infinity of worlds may be created in their minds if they so choose (188).

The decision to create a world rather than discover one in her fiction is socially charged. In her article “Royalist, Romancist, Racialist: Rank, Gender, and Race in the Science and Fiction of Margaret Cavendish,” Sujata Iyengar argues that Cavendish believes her feminine worlds and conquests are superior to the masculine colonialist conquests of the New World (654). We see some evidence that Cavendish sees her creation of the *Blazing World* as not only more beneficial but also more harmless when she suggests that she didn’t kill as many people as the real and fictional male conquerors

of the world did because she “esteem[s] peace before war” (*Blazing* 224).⁵ Another evidence of Cavendish’s anti-colonialist thought comes when in *Blazing World* the Empress (upon the advice of the character Duchess of Newcastle) withdraws her semi-colonialist scientific programs that incorporate methods of her world, realizing that the *Blazing World* would be better off when returned to its original state of order, or turned from a “worse” world to a “better” one (*Blazing* 202). Even though this action hurts the Empress’ pride, she decides that she values a peaceful reign above an “unquiet and disorderly government,” a government that leads to factions and civil wars similar to calamities that Cavendish feared and suffered from in her own life (202). Through these examples, Cavendish confronts ideologies of her male contemporaries in suggesting that conflict and war, through conquest or through irresolvable debate, are both dangerous and destabilizing.

Blazing World spans the space of many fictional worlds including the Empress’ world (which throughout the narrative is usually identified as our ‘real’ world as well as that of the character Duchess of Newcastle), the *Blazing World*, and the world created by the character Duchess of Newcastle in her mind, “composed only of the rational, which is the subtlest and purest degree of matter” resembling in a large part the *Blazing World* comprising the narrative (a sort of frame story that includes its own origin within itself—compare the similarities between Cavendish’s assertion of *Blazing World*, “This world [...] is composed of the most pure, that is, the rational parts of matter, which are the parts of my mind” and the character Duchess’s world “composed only of the rational, which is the subtlest and purest degree of matter”) (*Blazing* 188, 124). Because Cavendish’s

⁵ In the *Blazing World*, there is no artillery: “and as for guns, there was no use of them, because they had no other enemies but the winds [...]” (129).

narrative, unlike those of her contemporaries, contains *several* intellectual worlds instead of only a fictional portrayal of our world, it is truly “other” from the rest.

For this reason Cavendish received criticism from not only her contemporaries but some modern critics, who thought her narrative was no utopia but instead a form of wish fulfillment and psychosis.⁶ In actuality, the plurality of worlds and selves more likely comes from Cavendish’s implementation of Cartesian dualism. A recorded reader of Descartes, Cavendish rejects his separation of body and soul, but maintains many tenets of his philosophy to the point where she recommends to her readers of *Blazing World* that they create a world within their own minds (Findlen 191, *Blazing* 124). This “proliferation of worlds and selves,” as Cavendish attempts it, challenges the empiricist and mechanical view of the “discrete self and stable object” as she explicitly explores the fictional rational realm rather than the fictional physical (Keller 463). It also explains the amount of freedom Cavendish had as an early-modern woman to create her own utopia in the space provided not by the limited earth or moon, but in the space of her mind. Erin Lang Bonin contests,

The Blazing World [...] demonstrate[s] that utopia, as early modern men’s texts construct it, is a highly conflicted space fore her and for early modern women generally. In contrast [...] Cavendish does not situate her utopian designs in the new world. For the most part, early modern island utopias depend upon carefully controlled reproductive economies.

Because such utopian narratives valorize natural law and depend upon

⁶ For this reason, Frank and Fritzie Manuel refused to put *Blazing World* in their utopian encyclopedia (Leslie 128).

patriarchal paradigms for marriage, family, and the state, they seldom question women's nature and place. (339)

Cavendish's utopia is quite different from those of her male predecessors. These differences show her unique perspective as an aristocratic woman and the advances made during the century since Bacon's time. The Empress seems to have certain feminist liberties as she possesses power to convert the entire world to Christianity, the right to deliver sermons, and the ability to change policy to allow women to attend church meetings.

New Atlantis is much more exclusive in categories of gender. Bacon's description of the House of Solomon presents a patriarchal oligarchy where the male scientists are treated with the greatest reverence and set upon "throne[s] richly adorned" (316). Although this patriarchy excludes women, Bacon also hints that it seeks to control various forms of sexual reproduction. The fellows of Solomon's House maintain "enclosures of all sorts of beasts and birds," and through "dissections and trails [...] make them more fruitful and bearing than their kind is; and contrariwise barren and not generative" (318). Likewise, one of the society's most celebrated rites is the "feast of the family," which is centered on patriarchal customs rewarding males for the production of offspring. In this ceremony, a man who has lived "to see thirty persons descended of his body alive together" is honored like a king, at great cost to the state, while his wife, if she is still alive, is placed in a "traverse placed on a loft above the right hand of the [patriarch's] chair, with a private door, and a carved window of glass [...] where she sitteth, but is not seen (310-311). The society of New Atlantis revels in man's ability to

propagate life, whether through plants, animals, or human beings, all the time downplaying nature's and women's roles in the process.

Others besides Bonin have noticed how Cavendish responds to the “controlled reproductive economies” of early modern utopias by providing an alternative to tradition reproduction, therefore subverting traditional patriarchal claims to offspring. Sujata Iyengar shows that the *Blazing World's* equivalent of the fountain of youth, in this case a “philosopher's stone” containing a healing gum that renews the imperial race, presents the answer in place of reproductive control for at least imperial women (*Blazing* 155-56). “This constant renewal explains why the ‘imperial race’ does not die out, even though the princes are ‘made Eunuchs’” (*Blazing* 133, Iyengar 664). She explains that the gum-induced rebirth is a type of “spontaneous generation” instead of sexual reproduction and agrees with Carol Neely that such a system that ““can project the disabling of patriarchy,”” even while “it evades the question of where, when, and how all species, and their differences, originate—a question that was intriguing philosophers, and Cavendish herself” (Iyengar 664). There is evidence that normal sexual relationships may exist among the lower classes (or those who do not hold positions in church or state) as we learn that the inhabitants of the world feel “it is not fit [...] that men and women should be promiscuously together in time of religious worship; for [women's] company [...] makes many, instead of praying to God, direct their devotion to their mistresses” (*Blazing* 135). Yet even if there are some remnants of sexual reproduction, it is only practiced the lower classes, and those in positions of power are unencumbered by sexual circumstances (Iyengar has also shown that the imperial race “lacks the physical signs of gender difference”), showing the beginnings of the breakdown of patriarchy in the state's

function of Cavendish's utopia where the leaders are distinguished according to gender (662). The observations of the worm-men, the most admired counselors in *Blazing World*, reaffirm spontaneous generation as the means of production in nature, for "maggots [are] bred out of cheese" and worms are sometimes "produced out of flowers, some out of roots, some out of fruits, some out of ordinary earth" and that plants are bred from seeds and "joining and commixing with other parts" (or grafting) instead of natural pollination or even cloning (*Blazing* 147, 153, 152, Iyengar 663). *Blazing World* differs so dramatically from other early modern utopias through the sheer multitude of asexual instances and observations, suggesting that Cavendish sought to destabilize the patriarchal culture of sexual relations through hypothesizing other approaches to the propagation of life, consistent with her theory of matter. This destabilization of gender and traditional reproductive roles joins Cavendish's critique of other patriarchal or masculinist elements (brute force and conquest, false objectivity, and emphasis on physical experience) to create a scientific utopia that provides plausible alternatives outside of the predominant paradigms.

Iyengar's observation of the imperial eunuchs is also an important one in resolving some feminist critique against Cavendish. Some critics find it curious that Cavendish doesn't have the Empress surround herself with women or offer them more than a private place to worship. In speaking of *Blazing World*, Eve Keller offers one such critique:

Cavendish's work relentlessly deconstructs the supposedly stable epistemological categories that service the masculinist science she derides, but it does not oppose at all the class and gender divisions that regulate the

social structures of her society. When forced because of her sex to be an outsider to the strongholds of the scientific community, Cavendish was able to discern, presciently perhaps, the constitutive role of gender in knowledge production. But when she is allowed by her fantasy to be an insider, the gender critique vanishes before a non-critical engagement with the privileges and pleasures of her class. (466)

Keller makes an important argument about Cavendish maintaining the hierarchy of social class in the *Blazing World* (as we have examined in previous chapters as being represented in her theory of matter), although the case against Cavendish's lack of "gender critique" begins to dissolve when we examine how Cavendish has altered the reproductive economy in the *Blazing World*. Perhaps the problem is that Cavendish resolves the concern of gender and power in a way that we wouldn't expect her to, which is through physically altering the imperial race to a sexually neutral state. Only the Empress and the Emperor seem to maintain their sexual identity, (even though this is somewhat later obscured as the Empress' spirit is able to enter the male body of the character Duke of Newcastle), asserting again that scientific inquiry and politics in this world, this Paradise, is best kept under a woman's control (*Blazing* 194).

A second important difference in Cavendish's narrative is that by placing it on another planet instead of the new world, she is able to have the Empress recover the preciously unreachable Paradise of Eden. The Empress is told by her counselors that Eden is "this world" of which she is "now Empress of," and that Adam fled into "the world [she] came from" (*Blazing* 170). Upon this revelation, Cavendish's new world takes readers back to a picture of the restored Paradise (the capital city) and Garden of

Eden, where a woman is again put in charge of the fate of the world, and this time is successful at last (here the blame for the fall is placed entirely on Adam, but the Empress, as a type of Eve, is left to rule unrestrained). This idea that the Empress has stumbled upon the only true paradise is important for several reasons. John Rogers observes, “Neglecting in this account any mention of Adam’s helpmeet, Cavendish invites our identification of the Empress with Eve, an Eve who in the powerfully utopian space of Cavendish’s fictional and scientific writings has been left to govern Paradise alone” (178). Seeing the Empress (who, unlike most of the imperial race, conspicuously maintains her gender identity) as an Eve character is another way to respond to the critique that Cavendish abandons other females once she has placed her Empress at the head of the Blazing World, for if she intends to use the Empress as a type of Eve, then she also can use the Empress as an archetype for women in general, as Eve is commonly used. As Cavendish makes her Empress/Eve character the heroine and redeeming factor of the narrative, she is able to redeem women from the accusation that they are linked with the fall and current corrupt state of the world. If seventeenth-century men (such as John Swetnam in *The Arraignment of Women*) could curse women for being heirs to Eve’s sin and legacy simply by their given sex, then having the Empress discover the passageway back into paradise would again redeem women by association of their sex.

But this idea is even more important for our purposes as the idea of an Edenic Paradise relates to scientific knowledge in the seventeenth century. Although Cavendish may be unique in setting her Edenic return on another planet, other early modern utopias, such as *New Atlantis*, hint at a return to a paradisiacal state (the Spanish sailors call Bensalem “angelic”) (Bacon 306). Eve Keller suggests that Cavendish’s utopia is

similar to others because it “responds to the routine promises of Edenic return made possible by science” (463).⁷ But Keller shows how the response of *Blazing World* to the benefits of science is quite different from contemporary utopias. “But far from endorsing the simple belief in science as a means to paradise, Cavendish exposes the working of the connection: freely practiced, scientific association in the Blazing World produces disunion and dangerous discensus more than any useful knowledge” (463-64). This is why the Empress and Duchess of Newcastle decide that it would be best to “dissolve” all the learned “societies” (*Blazing* 202). Through Cavendish’s narrative, then, the Empress is able to recover Paradise, endanger its existence through an elaborate and excessive (to Cavendish) quest for knowledge, and at last restore it to its original state, maintaining what Cavendish sees as a healthy balance of authority and natural philosophy, avoiding harsh debate and factions; This in many ways imitates the cycle of Eve in paradise, falling to Satan’s power in her pursuit of knowledge, but again restoring hope, although not through posterity (Christ) this time but through the birth of her own ingenuity. In this way Cavendish is able to take the masculine space of early modern utopia and change it into a new type of narrative, a narrative of the mind, where gender roles are secondary and Eve (and therefore all women’s characters) is redeemed. In addition, that the redemption is brought about through the powers of the mind rather than the abilities of

⁷ See also the discussion in chapter two regarding Cavendish’s critique of the fall: “But I perceive man has a great spleen against self-moving corporeal nature, although himself is a part of her, and the reason is his ambition; for he would fain be supreme, and above all other creatures, as more towards a divine nature: he would be a God, if arguments could make him such, at least God-like, as is evident by his fall, which came merely from an ambitious mind of being like God” (*Observations* 209). See also Whitaker’s account of Robert Hooke’s claim: “that experiments were the only true foundation for a philosophy of nature, that the society’s experimental results were certain, incontrovertible truth, and that their discoveries would bring practical benefits as great as the inventions of printing and gunpowder, producing revolutions in the arts of navigation and agriculture, and restoring mankind to its pristine knowledge and happiness before the fall” (Whitaker 280).

the physical body, once again reaffirming the highest importance Cavendish reserves for the infinite intellectual realm and rational matter.

Through understanding how Cavendish's narrative contrasts with *New Atlantis* and departs in several ways from other male-authored early modern utopias, we begin to see how surprising, how "other" *Blazing World* is. In some ways it functions as a scientific narrative that seeks to legitimize Cavendish's theory of matter by taking it into the social and political realms by combining her science with a review of women's place in scientific utopia, and presenting a hypothetical balance between scientific inquiry and political order. In other ways the narrative works quite differently from what we would expect. Instead of elevating other women in the narrative, she reduces gender distinctions within positions of power, hinting, as Descartes claimed, that the mind, and therefore the rational realm, has no sex.

The narrative of *Blazing World* functions as a space for the science presented in *Observations* to more fully enter the sociopolitical realm. Through the narrative, the sociopolitical hierarchies serve figuratively for the degrees of Cavendish's theory of matter, and the classes represent the knowledge and limits of rational, sensitive, and inanimate matter. Through this narrative Cavendish is able to deliberately use figurative ideas and metaphor and present it to the literal scientific community by passing it off as a piece of fiction, or "fancy." Although Cavendish, as a wealthy aristocrat, had access to many of the scientific tools, she still remained at a disadvantage to her male contemporaries in engaging in experimental philosophy. She lacked the education and a group of individuals to converse with frequently concerning her findings. In this way it is her mind that gives her the most opportunity to engage in inquiry.

There are many ways in which Cavendish's natural philosophy, as revealed through *Observations upon Experimental Philosophy* and *Blazing World*, demonstrates what Lyotard refers to as paralogy or "otherness." Unlike many of her contemporaries, she insists that subjectivity is not only unavoidable but necessary in philosophical inquiry, and that any claim to pure objectivity is false and misleading. It is only in the subjective realm, the rational realm, where philosophical exploration may be infinite, unfettered by the limits of the senses and the instruments that aid them. Sense is often valuable, but only when it is tempered by governing reason.

The fusion of matter and motion, promoted by Cavendish and other vitalists in the seventeenth century and verified in current theoretical models today, counters the mechanist model where motion and force act upon lifeless matter. Along with the scientific implications, this model carries with it an important feminist critique. While the mechanists favored brute "masculine" force in nature through their scientific metaphors, Cavendish asserts a more gender neutral model, claiming that all matter is living and equally endowed with reason and sense, choosing for itself if and when it will change speed or direction.

While Cavendish presents her natural philosophy, a synthesis of ancient and contemporary methods, as a scientific alternative to pure experimentalism and mechanism, she cannot help but enter the sociopolitical realm. Indeed, this is unavoidable if she is going to legitimize her science outside of its own paradigms. She creates a purely subjective narrative, staking herself as both Empress and Duchess to validate her subjective stance. By structuring her theory of matter into three parts, she is

able to mimic her three-tiered society and support the traditional social strata while at the same time argue for gender equality.

Through her use of scientific narrative in *Blazing World*, Cavendish dramatizes her theory while weakening the “discrete and stable object,” making the mind an infinite realm, purely subjective, full of plural selves and thoughts and void of sexual identity. Unlike mechanism’s exclusionary emphasis placed on masculine force and experimentalisms political biases and false sense of objectivity, Cavendish’s natural philosophy seeks to include not just women, but members of both sexes. The only qualification to which they must succumb is to recognize the limits of their own bodies and the infinity of their own minds, to see their thoughts and observations as filtered through an individual lens, and to recognize the strength of the rational processes, even imagination, for, as Cavendish asserts, it is not only a prerogative available to her alone, but it is “in every one’s power to do the like” (*Blazing* 24).

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