Science, Factions, and the Persistent Specter of War: Margaret Cavendish's *Blazing World*

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Introduction

In the *Origin of the Royal Society, 1645-1662*, Dr. John Wallis explains the location, circumstances, and nature of the first meetings of the Royal Society. He notes that a widespread civil war across England disrupted University instruction. To prevent the philosophical meetings of the Royal Society from devolving into a potentially violent discourse on religion and politics, the topics of discussion in the Society were restricted to only the facts of the natural philosophy experiments at hand (Wallis, 1700). The founders of the Royal Society wanted to avoid the factions and divisions that had led to the previous 20 years of the English Civil War,[1] so their discourses were limited to discussions of experiments and demonstrations. When Robert Hooke published *Micrographia* in 1665, he noted in a brief statement to the Royal Society that all hypotheses and conclusions contained within were the products of Hooke himself, since the Society did not own theories, nor did the philosophy of the Society permit them to do so. The dogma of the Royal Society focused on the use of instruments and experiments to form inductive conclusions about the physical world.

However, this practice of inductive reasoning assisted by instruments and experiments was not universally accepted as the only way to practice the "new science." As late as the 1660s, some scholars still had an anti-instrumentalist stance. One such person was the infamous female author Margaret Cavendish, the Duchess of Newcastle. Cavendish strongly believed that the inductive experimental philosophy of the Royal Society was inherently flawed because of its dependence on artificial instruments, e.g., the microscope and the telescope. Her views on this subject can be seen throughout her various works, but in her 1666 book, *The Description of a New World, Called the Blazing World*, Cavendish levied a transparent critique of the Royal Society's experimental philosophy. In particular, she

[1] The English Civil War (1641-1651) period was characterized with a series of armed conflicts in England between the Parliamentarians and the Royalists. Parliamentarians supported Oliver Cromwell as an opposition to King Charles I while the Royalists supported the monarch, Charles I. Royalist forces were ultimately defeated, Charles I was beheaded as a tyrant, and many Royalists supporters had to flee to Continental Europe. In 1660, the monarchy was reestablished through parliamentary decision.

criticized the lack of social usefulness in microscopic and physical experiments, and she argued that the subjective interpretations of such experiments would lead to social fragmentation. Cavendish's critique of the Royal Society's beliefs was a product of her own experiences with the English Civil War. Both the Royal Society and Margaret Cavendish drew on their experiences with the English Civil War to create the theoretical foundations of their respective scientific approaches, but Cavendish's differed drastically from that of the Royal Society. This suggests that the practice of late 17th century experimental philosophy was not exclusively a product of experiments and facts. Rather, individuals' political and social perspectives influenced their own acceptance and practice of experimental philosophy.

Margaret Cavendish and the English Civil War

Margaret Cavendish was born Margaret Lucas in 1623 to a wealthy family in Colchester in Essex. Her father died in her infancy. The Lucas family was staunchly Royalist, which caused much derision among the strong Parliamentarian sentiment in the years leading up to the English Civil War. As a young lady in 1643, Margaret convinced her mother to allow her to serve as a lady in the court of Queen Henrietta Maria. As Cavendish notes in her autobiography, *A True Relation of my Birth, Breeding, and Life* (1656), upon joining the court, she discovered that she proved too bashful to be an effective lady without the support and presence of her family, but her mother insisted that she not leave the court in disgrace.

Her decision to join the court of Henrietta Maria greatly shaped her adult life. In 1644, the adamantly Catholic Henrietta was forced to flee London for Oxford. After the Royalist loss at Marston Moor, Henrietta and the remnants of the Royalist army fled to exile in France. Margaret followed the court during its exile in Paris. While in Paris, she longed to return home to her mother and sister, but remained with her queen. During this time, her brother was executed and her mother and most of her family died from illness (Bowerbank & Mendelson, 2000). Anna Battigelli (1998) notes that, while she was in Paris with Henrietta Maria, Cavendish saw "the disastrous consequences of trying to enforce religious and political change on an unyielding world" (p. 26). Even in exile, Henrietta longed to enforce a Catholic monarchy on the people of England, and that clashed with Cavendish's desire to go home.

Her romance and marriage to the Duke of Newcastle in 1645, William Cavendish, somewhat abated her homesickness for her home country. William was a Royalist general who also fled to the Continent after the Royalist defeat at Marston Moor. As a result of his Royalist stance, Parliamentarian forces plundered his estates and seized his wealth. He was a widower in his early fifties when he married Margaret.

William and Margaret lived in various countries on the Continent during the Interregnum period, and without a stable source of income, they dealt with constant demands for payment from various creditors

(Cavendish, 1656). While many Royalist individuals received apartments and stipends from the French government, it was hardly a lavish or comfortable lifestyle. During the Interregnum, the majority of William's estate was either destroyed or ruined, and most of his wealth and jewels were confiscated. Margaret Cavendish estimates in the *Blazing World* (1666) that the value of the damaged property was close to half a million pounds. Cavendish petitioned the standing government in 1652 to restore the lost wealth of her husband, but the request was not honored, likely because the government was then under Parliamentarian control.

After the Restoration in 1660, William and Margaret returned to England. With William's estate in shambles, his service in the Royalist military was not honored with a position at the court of Charles II. The most traumatic result of the Civil War for Cavendish was the loss of the emotional support of her family despite also losing her husband's monetary stature. Margaret lost the family and home she so longed to return to. Cavendish never produced more children for William, and after the Restoration, they lived together in the countryside of William's estate. William spent his days in quasi-retirement restoring the grounds of his estate, and Margaret engaged herself in her writing, which focused on subjects such as natural philosophy, experimental philosophy, and feminism (Meyer, 1955). By the end of her life, she was one of the most well-published women writers with several works of philosophy, poetry, and drama, and she was likely the first woman to write extensive commentary on the new experimental philosophy.

The *Blazing World* and the Critique of the Royal Society

Sixteen hundred and sixty-six was a busy year in England, both politically and philosophically: Isaac Newton formally began his work on universal gravitation; the great Fire of London destroyed large sections of the city; and Britain was engaged in naval combat of the Second Dutch War. During this eventful year, Margaret Cavendish published one of her most interesting and imaginative works, the *Blazing World*. The *Blazing World* is a story of science, monarchy, war, and utopia. Kathleen Jones (1988) notes that this is considered one of the earliest works of science fiction, but at the time, its farfetched nature made some of Cavendish's family question her mental well-being.

The narrative of the *Blazing World* is divided into two parts, with the first part divided into three conceptual sections. The first section frames the narrative of the tale: a beautiful young lady is stolen away from her parents by a merchant sailor. Before the sailor can return home with his prize, fierce winds blow the ship to the frigid northern waters where all the men freeze to death. The lady is spared "by the light of her Beauty, the heat of her Youth, and Protection of the Gods" (p. 154) and survives the journey. As the lady floats aimlessly in the northern waters, she happens to travel through a portal to a new world.

The first creatures to greet this lady in the new world are a race of anthropomorphic bear men. They are so engrossed by her beauty that they take her to be an angel. She travels with the bear-men to meet a myriad of anthropomorphic animals, such as fox-men, bird-men, and worm-men. The *Blazing World* is also full of uniquely colored humans, and this world has a wealth of diamonds and jewels with which the people decorate their clothing and buildings. The lady notices that all of the creatures throughout the world are peaceful and socially coherent. She also notes that the animal-men have extremely well-crafted ships with jet engines that they use only for travel around the world, and not for war. Eventually, the lady is brought to the emperor of this world and he marries her. In an unconventional stroke, the emperor gives the empress[2] full power over this world. Cavendish wrote the world as her own ideal, in that all the creatures were peaceful and sociable. In Cavendish's utopia, a woman is trusted with supreme power.

In the second section, the Empress uses her power to form an emulation of the Royal Society even though the Royal Society is not mentioned by name. Each unique race specializes in a skill or talent, so the Empress forms various societies and schools in which each of the animals can practice their skill. For instance, the bird-men are natural philosophers, and the bear-men are experimental philosophers. The majority of the second section involves the Empress discussing the findings of each of the societies. Cavendish uses this second section to mirror various scientific debates that were contemporary to the book, and she reveals her opinions about experimentalism and natural philosophy in this section by directly criticizing a metaphorical version of the Royal Society.

The third section involves a discourse with the spirits of the world, with whom the Empress discusses various philosophical ideas. It also involves the introduction of the Empress' scribe. The Empress asks for the soul of a great thinker like Descartes, Hobbes, or Galileo, but the spirits reply "that they were [all] fine ingenious writers, but yet so self-conceited that they would scorn to be Scribes to a Woman" (p. 208). Instead, the spirits suggest the Duchess of Newcastle[3], and Cavendish becomes a character in her own story. The Empress and the Duchess visit various other worlds as spirits. Cavendish also uses this section to speak about the loss of her husband's property in the Civil War; the Duchess convinces the Empress to force the spirit of Fortune to change her stance and favor the Duchess' husband, William Cavendish.

Part two of the book contains a fanciful description of the Empress learning that her home country is under attack by a great naval power. This was probably a reference to the Second Anglo-Dutch War from 1665

[2] For clarity, the nameless heroine of *Blazing World* will hereafter be referred to as "the Empress."
[3] For clarity, the fictional character of Margaret Cavendish will hereafter be referred to as "the Duchess," while the author Margaret Cavendish will continue to be referred to as "Cavendish."

to 1667. The Empress returns to her home world with a battalion of submarines and magical firestones to turn the tide of the war in favor of her former king, "The King of E F S I" (p. 241).

The most important section of the *Blazing World* is the section where the Empress discusses philosophical issues with her society of animal experts. This discourse consists of a series of dialogues in which the Empress questions each of the groups of animals about their Society's Art, a term Cavendish uses that is synonymous with science. Through this dialogue, Cavendish reveals her three criteria on which science should be judged. First, it should be free of subjective interpretation. Second, it should not cause factions or interpersonal divisions. Third, it should produce useful information to better the lives of humanity.

The criticisms from the Empress are most animated in the discussion with the bear-men who explicitly fill the role of the experimental philosophers. The bear-men extol the virtues and powers of their telescopes that can see distant stars and planets. However, when the Empress asks about the definitive cosmology of the universe, the bears' answers are fragmented in that "some said, they perceived that the Sun stood still, and the Earth did move about it; others were of the opinion that they both did move, and other said again, that the Earth stood still, and the Sun did move…" (p. 169). The bears also debate the numbers of stars, the size of stars and planets, and the nature of the moon and other planets.

Ultimately, even with the aid of the telescope, none of the experimental philosophers are able to agree on precisely what they are seeing or on the meaning of these observations. The Empress feels that the optical instruments of the bear-men must be deluding their senses somehow. Cavendish showed with this example that, although the telescope may have revealed new objects in the night sky, the interpretation of these observations was never completely inherent or self-evident.

The bear-men's response to the Empress' criticism is that their sense organs are imperfect, and the optical glasses rectify this natural imperfection. The Empress refutes this assertion by pointing out that, if their glasses were in fact rectifying their sense organs, then they should all be able to agree on the truth that these glasses reveal to them. On the contrary, the bears are unable to reach a consensus even with the telescope. This argument was most likely a direct reference to the claims of Robert Hooke in *Micrographia* (1665), in which Hooke claimed his microscope and other optical instruments were tools that could fix the inherent deficiencies of the human sensorial organs. Battigelli (1998) claims that to Cavendish, the "real criticism lies neither in the experimentalists' tediousness nor in their lack of utility; her concern lies in their unwillingness to acknowledge the inevitable interference of their own subjectivity" (p. 107). Because of this subjectivity, the Empress tries to ban the telescopes, since they "caused more differences and divisions amongst them than ever they had before" (Cavendish, 1666, p. 169).

The Empress commands that the bear-men destroy their telescopes because they do not assist in the practice of natural philosophy. The bear-men plead with the Empress to allow them to keep their telescopes. Their justification is that they:

> take more delight in Artificial delusions, then in natural truths…for were there nothing but truth, and no falsehood, there would be no occasion for to dispute, and by this means we should want the aim and pleasure of our endeavours in confuting and contradicting each other; neither would one man be thought wiser then the other, but all would either be alike knowing and wise, or all would be fools… (p. 171).

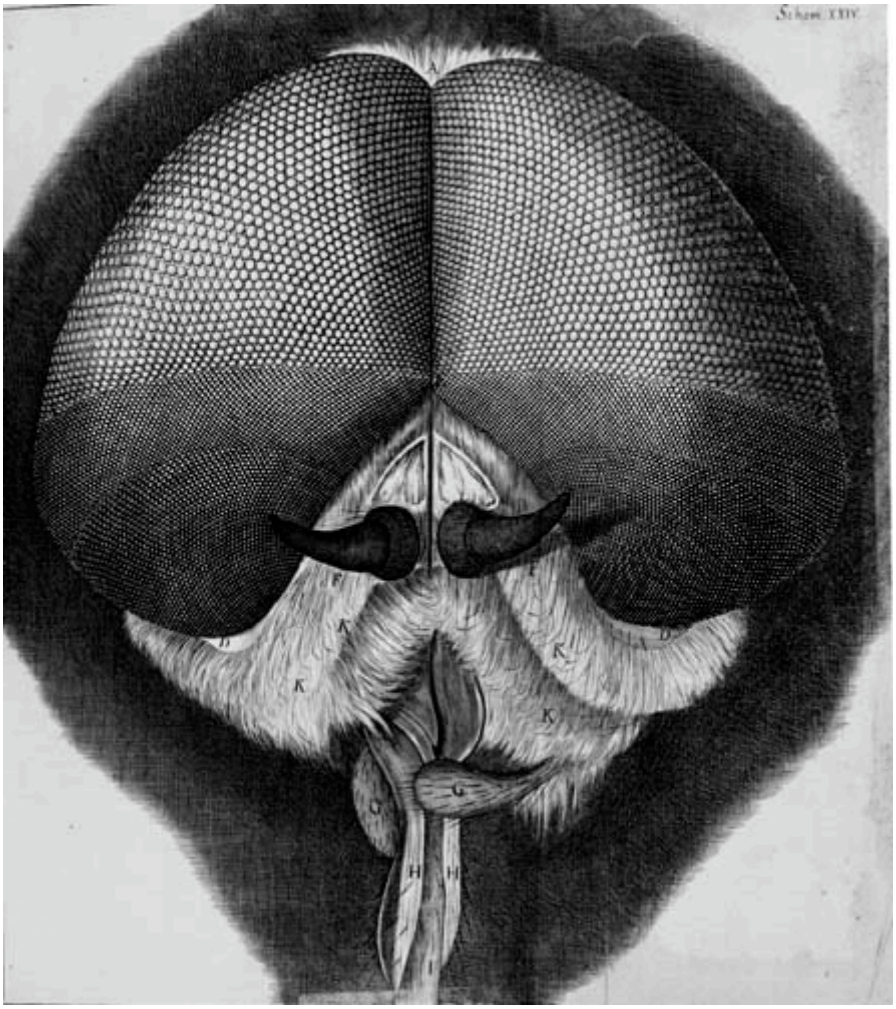
Cavendish is somewhat unfair in her characterization of the experimental philosophers, reducing them to straw men who would rather argue about experiments than know the true explanation behind them. Nonetheless, the Empress ultimately allows the bear-men to keep their instruments. However, she commands that they only discuss and argue about their instruments in the confines of their school so that they would "cause no factions or disturbances in State, or Government" (p. 171). The Empress effectively removes the optical instruments from the practice of science, because the conclusions each individual drew from them were too subjective, and these subjective conclusions could easily lead to the factions and divisions that fueled the English Civil War. Cavendish shared the intent of the Royal Society with this argument, but she reached the exact opposite conclusion. Whereas Baconian science emphasized tools and instruments to enhance human perception, Cavendish feared that the imperfections and distortions of these tools would cause more divisions than they were meant to resolve.

The Empress has similar complaints against the schools of the logicians and politicians. The magpie-men present the Empress with a series of Aristotelian logical arguments, but the birds are unable to agree on the truth of their specific arguments. The Empress decides that the art of logic and its contradictions and arguments is not useful in the arena of reason. Importantly, the Empress does not disband their society, but she allows their society to persist only as long as they do not practice their art in the public sphere. Analogously to the experimental philosophy discussed in the previous section, Cavendish expressed worry that the arguments between logicians could easily spread, causing conflicts and divisions between people in "Divinity, Policy, Religion and Laws," which would "draw an utter ruine and destruction both upon Church and State" (p. 191). For Cavendish, the important feature of logic was not the truth or understanding it offered, but that logic caused men to argue over semantics, and it led them to form social and political divisions. These were the same such divisions that could have caused the post-Restoration stability to collapse. Cavendish argued that the logicians and politicians were most dangerous in their ability to confuse people and create infighting.

The other major aspect of Cavendish's critique of experimental philosophy was that the only truly valuable projects are those

"Experiments as may be beneficial to the public" (p. 183). In the *Blazing World*, the Empress also attacks the inability of the bear-men's optical glasses to better the lives of men by analyzing the utility of the microscope. The bears bring her a microscope with which to view the head of a drone-fly (Figure 1).

FIGURE 1. Reproduction of Robert Hooke's drawing of a drone fly from *Micrographia* (1665)



The Empress asks the bear-men what the numerous glass beads on the head of the fly are, and the bears respond that they must be eyes, since the orbs greatly resemble the eyes of larger animals. The Empress doubts the proof of this claim, suggesting they may, in fact, be pearls that look like eyes but are not actually eyes. Her response implies that the bears, again, were merely allowing their subjectivities to gain sway since there was no way to test or truly know exactly what the orbs were by only using a

microscope. Likewise, Cavendish believed that experimental philosophers were guilty of these unorthodox theories and that seeing something through a microscope did not necessarily validate their interpretations.

When the Empress is shown lice and mites through the microscope, she inquires if any useful information has come from these experiments by asking if "their Microscopes could hinder their biting, or at least shew some means how to avoid them?" The response of the bear-men is "That such Arts were mechanical and below that noble study of Microscopical observations" (p. 174). To Cavendish, the experimental philosophers were only interested in cataloguing phenomena instead of actually understanding the causes of nature. Cavendish phrased this argument in a more direct way in the companion work of the *Blazing World*, *Observations upon Experimental Philosophy* (1668):

> I cannot perceive any great advantage this art doth bring us. The eclipse of the sun and moon was not found out by telescopes; nor the motions of the loadstone, or the art of navigation, of the art of guns and gunpowder, or the art of printing, and the like, by microscopes; nay if it be true that telescopes make appear the spots in the sun and moon, or discover some new stars, what benefit is that to us? Or if microscopes do truly represent the exterior parts and superficies of some minute creatures, what advantageth it our knowledge? For unless they could discover… the obscure actions of nature or the causes which make such or such creatures; I see no great benefit or advantage they yield to man. (pp. 8-9)

The above argument has clear parallels to the claim of *Micrographia's* Preface where Hooke (1665) stated that his method of experimental philosophy had created such amazing and useful tools as "Gun-powder, the Seamans Compass, Printing, Etching, Engraving, Microscopes etc." (p. vii), and that the experimental method would produce even greater inventions. Cavendish, however, doubted the microscope's ability to produce useful results to better people's lives. She could not understand how seeing small things with such fine detail could be used to advance human society. Cavendish was not ignorant of the work of Hooke; still, she thought that books like *Micrographia* did little more than act as fanciful entertainment—they were hardly helping anyone in a tangible way.

Cavendish further emphasized the lack of social usefulness of contemporary experimental science through a discourse on the study of monsters with the Empress' anatomists, who were not associated with any animal-men. When the Empress brings up the subject of dissection of "monsters," her anatomists respond that such dissections cannot produce any information that will prevent the further formation of monsters. The Empress suggests that the experimental philosophers should take up this practice of monsters, and the anatomists respond that anyone who investigates monsters is doing so only to satisfy a vain curiosity. Cavendish used this point to reiterate her argument that much of the queries and experiments of modern philosophers did not yield any real

useful results, and that experimental philosophers were only pursuing these experiments out of personal curiosity.

It is important to note that even though Cavendish offered criticism to the animal Royal Societies, she did recognize the ability of philosophy and reason to explain the natural world. Cavendish's Introduction to the *Blazing World* states that:

> …there is but one Truth in Nature, all those that hit not this Truth, do err, some more, some less… as long as they swerve from this onely Truth, they are wrong: Nevertheless, all do ground their Opinions upon Reason; that I, upon rational probabilities, at least they think they do. (p. 152)

Cavendish believed in a type of scientific realism where there existed some definite knowledge about the universe and humans could gain access to that knowledge, although the term "scientific realism" is quite anachronistic in this context. She felt that there was some truth behind natural phenomena and that readers could understand it. She did caution her readers, however, not to not to put too much stock in their own artifices, but to instead trust their natural reason and senses.

Synthesis and Conclusions of Cavendish's Biography and Philosophy

Margaret Cavendish's philosophy was complex. She presented her natural philosophy in various works and poems, but it was never popularly accepted. Her works critiquing contemporary science in the *Blazing World* and *Observations* show us a candid view of her philosophy. To Cavendish, experiments and observations were far from useless, but she viewed machines, engines, and optic tools as artificial and inferior. Through her works, she rejected the instrumental induction of the Royal Society and, instead, promoted a form of deductive rationalism to understand the external world.

To understand Cavendish, the sociological factors surrounding and influencing her opinions of natural philosophy must be examined. Steve Shapin (1996) argues that, for a historical argument to appropriately study sociological effects in history of science, one "cannot simply set aside the body of what the relevant practitioners knew and how they went about obtaining that knowledge. Rather, the task for the sociologically minded historian is to display knowledge making and knowledge holding as social processes" (p. 9). Cavendish was well aware of current thought in natural philosophy. Her husband and his brother, Charles, educated her in the basics of experimental natural philosophy. While the two were in exile, they were able to buy state-of-the-art Dutch microscopes (Meyer, 1955). She was not ignorant of the tenets and experiments of experimental philosophy, but her rejection of the method of the Royal Society was just as much, if not more, about the social factors surrounding Cavendish's life.

The philosophy of Cavendish was eclectic. Gerald Meyer (1955) argued that her rational tendencies were due to the fact that she was "immoderately devoted to Cartesian rationalism" (p. 2), but, contrary to that, she emphasized the abilities of the natural and unaltered senses of man to experience truth about the world. She embraced the Baconian democratization of science in that she encouraged women and individuals without a formal education to participate in science, but she rejected the importance of instruments to enhance human observations and experiments. She ultimately had the same goals as the Royal Society: she did not want English society to be torn apart by arguments over theories, but, where the Royal Society emphasized the dangerous effects of theories and hypotheses, Cavendish was concerned about the possible divisions caused by arguments over instruments and other apparatuses.

Cavendish's life was negatively affected by the English Civil War in many ways, in contrast to *the Blazing World*, in which the Empress takes control of a world that is peaceful and ordered. Cavendish perfected this utopia under the control of a new queen. Lee Khanna (2007) points out that the monarchial utopia of *the Blazing World* stands in direct contrast to the representative democracy of Thomas Moore's *Utopia*. Christine Rees (1996) notes that women's power in the utopian tradition was a tool used to invoke fear and elicit situations of satire, but Cavendish paved a new way with a functional utopia ruled effectively by a woman.

The *Blazing World* was a world that Cavendish created with her own imagination, and, as a utopian fiction, the world was perfectly ordered because she controlled the philosophy of her people. There were no factions and no wars between different groups with conflicting ideologies. The inhabitants of the *Blazing World* used natural and experimental philosophy to significantly better their lives. They had jet engines to cross the oceans and they were able to mine the stars for diamonds; however, they did not achieve these feats through the philosophy of the Royal Society.

Cavendish shared the goals and ideals of the Royal Society. She wanted philosophy to better the lives of people and, above all else, not cause social divisions; however, she endorsed an entirely different method of scientific discourse. Robert Hooke and Robert Boyle promoted their empirical and experimental reasoning as purely a product of objective facts and self-evident conclusions, but if that were the case, then Margaret Cavendish should have been easily won over by their method. She valued science for social utility and feared that unchecked discourse could have led to social divisions and chaos, but she did not settle for the method of the Royal Society. Instead, Cavendish promoted a method fueled by human reason, deductive reasoning, and use of the unaided senses to study the external world.

Henry Perry (1968) rejects that the arguments in *The Blazing World* mesh into a substantive argument, instead stating that:

> The *Blazing World* is made up of one episode after another, strung together in the most casual helter-skelter way, without beginning, middle or end. To analyze the confused result would be well-nigh impossible; we can accept it only as it stands and follow its winding course." (p. 258)

However, it is possible that Cavendish had very clear goals and arguments but chose not to organize her story in a conventional fashion. She was in effect helping invent the genre of science fiction, so she deserved a little stylistic license. Cavendish expressed her beliefs and justified them in the *Blazing World*, and in this utopian story, Cavendish explained that she did not want the method of the Royal Society to create a world where science caused divisions of people arguing over experimental interpretations. She wanted natural philosophy to improve the lives of men and women and not only produce coffee table books filled with fantastic pictures viewed through an optical glass. These beliefs came from her negative experiences with the English Civil War that destroyed her family and the life of her husband. Margaret Cavendish crafted a truly unique story for her readers, and her philosophy was an amalgam of the social experiences from her life in addition to being a product of rationalism. She valued the same goals as the Royal Society, but she did not agree with their philosophy.

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