Abstract

This project will examine the artistic and visual culture of the late Enlightenment (roughly 1750-1830) with a focus on Great Britain. Specifically, I will be examining how the New Science of the Enlightenment, with its focus on learning from observable natural phenomena, gave rise to a new, active relationship between artwork and spectator/observer. While there is a great deal of writing on both the art and science history of the Enlightenment, this project is rare in its focus on the connection between the two and its focus on British art in particular. This connection manifests in the art of science, representations of science in art, and institutional crossover between the worlds of art and science in late Enlightenment Britain.

THE ART OF LOOKING: ART, SCIENCE, AND OBSERVATION IN LATE ENLIGHTENMENT BRITAIN

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Introduction: A New Art for a New Science

This thesis began with a single painting, Joseph Wright of Derby's *An Experiment on a Bird in an Air Pump* (1769). A group of viewers sits around a table, a scientist demonstrates the power of an invisible force, an animal clings to life, and at the center of all of it, an artificial light. The fear, intrigue, and the tension of a group of people crossing over the cusp of new knowledge are palpable. If "Enlightenment" was a painting, it would be *An Experiment on a Bird in an Air Pump*. But what does that mean?

The Enlightenment, even as a historical period is ill-defined. There are certain agreed-upon aspects of the shape and character of the capital 'E' Enlightenment, that it began sometime in the mid to late seventeenth century, and ended sometime in the very early nineteenth century and that, as Godeheu de Riville said in 1754, "new discoveries, sound experiments, advanced machines" were all factors in the enlightened age.[1] Still, there is a French enlightenment, a British enlightenment, an American enlightenment, a philosophical, a religious, and a scientific enlightenment to name only a few. Even an artistic Enlightenment is difficult to pin down. What does enlightenment-art look like? And how should we look at it?

In this project I will attempt to answer some of these questions by looking at a specific Enlightenment: the British Enlightenment in its artistic and scientific contexts, and I will track the interconnected expressions and ideas of these two facets of Enlightenment throughout the mid to late eighteenth century. It is undeniable that Britain was a leading scientific power in Europe, and that it was not a recognized center for art until the mid-eighteenth century which

[1] Godeheu de Riville in Michel Anctil, *Luminous Creatures: The History and Science of Light Production in Living Organisms*, (Montreal, McGill-Queen's University Press, 2018). P.17

coincides neatly with what is generally agreed to be the middle of the Enlightenment. The result of these intersecting factors was an artistic culture imbued with the values of Enlightenment science, namely the value of careful observation, and only believing in what could be demonstrated to be true. Observation specifically is a recurring theme in this project and in discourse about Enlightenment. It is a form of active looking, of looking with the purpose of learning something. We can see these values clearly in *An Experiment on a Bird in an Air Pump*, where dynamics of looking and learning are central and the painting's viewer is brought into the observation of the experiment, but it is not the only such work, and conventional painting is not the only medium where we see this play out.

In the first chapter of this thesis I examine two different facets of Enlightenment art in Britain: the art of science and science in art, with a focus on how each of these types of art guide their reader/viewers in a kind of observation of scientific or natural phenomena. The art of science –that is to say diagrams and technical engravings—is often overlooked as art and yet, especially in this period, there is as much artistry and technical skill involved in the production of a diagram as in a painting. A diagram has to serve both as an image of a specimen or phenomenon and as an instructor, teaching its reader/viewer how to look at and learn from the subject matter. I address the two main tactics used in mid to late eighteenth-century diagram: abstracted, typical forms and naturalism. Where abstracting specimens to a typical form allowed the artist to present their reader/viewer with a pure phenomenon, free from the distraction of natural flaws, naturalism allowed for observation much closer to the effect of studying directly from nature. Both techniques were considered objective and required the artist study a great deal directly from nature. I examine the dynamics of observation which diagrams asked of their readers and the scientific values behind them. In the second section of chapter 1 I look at how

science is used in art, focusing mainly on *An Experiment on a Bird in an Air Pump*. How do the values of the scientific enlightenment manifest in art, and what do paintings of experiments do to teach their viewers how to interact with and learn from science?

In chapter 2 I dig into an aspect of British history which has relatively little scholarship: the institutional crossover between art and science. Before the mid-eighteenth century, Britain had little in the way of regulated art institutions. The Royal Academy of Arts was only founded in 1768. As Britain's art institutions were coming into being and coming into their own, a new class of professional men of science were in a position to purchase and commission art. I follow some of the key characters through this interconnected world, from London to Liverpool to Birmingham. In London we follow Joshua Reynolds, first president of the Royal Academy who had a little-known and unsuccessful passion for chemistry and the Scottish surgeon William Hunter who served as Physician Extraordinary to the Queen and professor of anatomy at the Royal Academy, as well as writing one of the most famous and disturbing texts on female anatomy. We then follow Joseph Wright of Derby, the artist behind the *Experiment on a Bird in an Air Pump*, and many other works celebrating science and industry from the Society for the Arts in Liverpool to the Birmingham Lunar Society, a group of powerful men who met across disciplines and political lines to pursue a common love of science. These instances of institutional crossover shed more light on why the arts were so impacted by science and how artists and scientists taught each other how to look at the world.

The third chapter examines another kind of enlightenment influence on art, one which gained traction toward the end of the eighteenth century, the rebellion against it, what I will call the Anti-Enlightenment. These artists were not necessarily opposed to science (though some certainly were); rather they were working against the limits of a world newly defined by laws of

physics and reason. I examine the work of Henry Fuseli the Swiss-born artist whose strange and exaggerated paintings are often considered among the foundations of the Romantic movement of the early 19th century. Fuseli's work, though not explicitly anti-enlightenment certainly goes against the grain established by artists like Reynolds and Wright of Derby. He used misdirected gazes and strange, unstudied anatomy to emphasize emotion over reason in his work and to cater to the growing "taste for terror" at the end of the century. On the more extreme end of the anti-enlightenment, I look at the work of William Blake, an eccentric and combative man who took almost personal grievance with science and the enlightenment as a whole. Blake's work, mostly in the form of illustrated or illuminated poems, fights tooth and nail against enlightenment with its form and its content. Blake criticized the sense of sight, which was privileged in Enlightenment thought, and often mocked staples of enlightenment art which we examined previously such as diagram and observation. Finally, I look at an example of science and technology being turned into something utterly irrational. The phantasmagoria was a late eighteenth century invention which very consciously flirted with an identity as both *scientific* and *supernatural*. Examining the anti-enlightenment leaves us with the important question of why tastes changed for the grotesque, and how the art of the enlightenment, and the art which rebelled against it, led into the movements which were to come.

Overall this thesis hopes to approach the subject of the British Enlightenment from a heretofore relatively unexplored angle and through that tease out the complexity of identifications of art and science as separate disciplines and of the Enlightenment as a period. While there are massive and massively interesting bodies of scholarship on the British scientific Enlightenment, and eighteenth-century British art, there is relatively little work done on how the two overlap, especially in respect to how the key characters of each movement interacted and

shared ideas. In an era when the arts and sciences are often viewed as entirely different, even contradictory fields, it is all the more necessary to recall their shared histories.

I. The Art of Science and Science in Art

The Art of Science

In the preface to his 1774 *Anatomy of the Human Gravid Uterus Exhibited in Pictures*, the famed Scottish anatomist William Hunter credited the art of engraving with being "the distinguishing characteristic of the most enlightened age of the world."[2] They provided, in Hunter's words, "what has been the great desideratum of the lovers of science, an universal language," a means of communication and education so effective that "it conveys clearer ideas of most natural objects, than words can express; makes stronger impressions upon the mind; and to every person conversant with the subject, gives an immediate comprehension of what it represents."[3]

Hunter was writing at the peak of the Enlightenment in Great Britain, and technical engraving was indeed a major factor in the spreading of knowledge of and interest in science which was a defining characteristic of the era. Diagrams and scientific illustrations like those in Hunter's *Anatomy* served both as visual aids for the already educated and lessons on how to look at and learn from a specimen for relative newcomers. At this same moment, many established British artists were creating works which celebrated, even moralized science and scientists. While these works belong to a different world than technical engravings and their materials, techniques, and purposes are completely different, they tell similar stories about the place of

[2] William Hunter, *The Anatomy of the Human Gravid Uterus Exhibited in Pictures* (Birmingham: John Baskerville, 1774), p.4
[3] Ibid.

science in Enlightenment society and the value placed on learning by careful and directed observation.

The Enlightenment as a period is in large part defined by the advent and use of the so-called New Science. The New Science is differentiated from the old by its focus on direct observation of and experimentation on phenomena as the ultimate way to prove the phenomenon exists. As Wilbur Samuel Howell concisely states:

> The old science ... had considered its function to be that of subjecting traditional truths to syllogistic examination, and of accepting as new truth only what could be proved to be consistent with the old. [Whereas] the new science ... considered its function to be that of subjecting physical and human facts to observation and experiment, and of accepting as new truth only what could be shown to conform to the realities behind it.[4]

Thus, the art which accompanied the New Science had to visually represent that observation and experiment in order to demonstrate the truth of the phenomena being represented. These new scientific standards were a driving force in pushing engravings and diagrams to change, and by the latter half of the eighteenth-century, the New Science and the strategies for scientific art it spawned were the standard.

Engraving and scientific illustration were nothing new in 18th century Britain. Since the 16th century, scholars were publishing atlases full of engravings detailing topics from human anatomy to natural history and astrology.[5] Still, the art of engraving blossomed in the Enlightenment as interest in the sciences became fashionable, even a moral value. For most would-be scholars in the Enlightenment, engravings and diagrams were the closest they could get

[4] Wilbur Samuel Howell, *Eighteenth-Century British Logic and Rhetoric.* Princeton NJ: Princeton University, 1971.pp. 5-6

[5] Lorraine Daston & Peter Galison, "The Image of Objectivity" *Representations* No.40. (Autumn 1992). p. 84

to a class or a lecture. It had to play the role of an example and a teacher, showing the reader/viewer, in as few words as possible, how to look and what to look for in different phenomena and specimens.

As Lorraine Daston and Peter Galison lay out in their article "the Image of Objectivity," there were two main strategies by which engravings attempted to instruct their reader/viewers. The first strategy, and the one more commonly used throughout the 18th century, was to present "typical" phenomena for observation. This meant that rather than depicting a specimen exactly as it was observed in nature, the artist would study from a number of specimens, and depict the most "typical" traits between all of them. Joshua Reynolds, a founding member and first president of the Royal Academy, was a strong believer in this method, stating in his third Discourse that it was in the best interest of science to embrace a level of abstraction, that it was "the only means of advancing science, of clearing the mind from a confused heap of contradictory observations, that do but perplex and puzzle the student."[6]

The scientific focus on "typical" phenomena eliminated the "heap of contradictory observations" and allowed for observation of what Goethe called the "pure phenomenon."[7] Such observations would never be able to take place in the real world, as so much of what a person observes in nature "depends on [the observer's] mood, the state of his senses, the light, air, weather, the physical object, how it is handled, and a thousand other circumstances."[8] In this way, diagrams were able to do more than just show something to their reader/viewers, they instructed them on what was "typical," what should be looked for and what was a sign that

[6] Joshua Reynolds in Martin Kemp, "True to Their Natures: Sir Joshua Reynolds and Dr William Hunter at the Royal Academy of Arts." *Notes and Records of the Royal Society of London*, vol. 46, no. 1. (1992), p.78. Though Reynolds recognized that to 'imitate nature is the invariable rule' in art, he wrote extensively on the necessity of a level of abstraction in art, a subject on which he differed greatly from his colleague William Hunter.
[7] Goethe in Daston & Galison, *Image of Objectivity, p.*88 *eine Phnomen*
[8] Ibid.

something was off. A level of abstraction, from the real to the hypothetical typical, changes the subject from a natural phenomenon existing in nature to something which is meant to be looked at and learned from. The relationship between the subject and the reader/viewer is one of active observing rather than passive seeing.

The concept of a level of abstraction as a means to observe something in an otherwise impossible way is perhaps best illustrated (though not in the British context) in Diderot's *Encyclopedie* (1751-72) where each subject is depicted both in a scene and in white space (fig.1.1). The objects in each entry are lifted from their context, from what John Bender and Michael Marrinan, paraphrasing Barthes, call "the illusionist 'spatial box'," and into white space where they can be depicted from any angle and without the distraction of context.[9] Bender and Marrinan find a parallel development between diagrams like those in the *Encyclopedie* and developments in "more technical spheres" where there is a shift "from text-based expositions of observable events to mathematical functions and graphic notations."[10] The visual culture shifting toward one of showing rather than telling, and the diagrams of the 18th century sought to perfect the means of showing to a point where it was much more informative and efficient than a text-based or even verbal explanation.

This culture of visualizing, rather than simply describing phenomena, even in technical spheres, led to the production of diagrams on the extreme end of abstraction. They were not figurative in the way that Diderot's *Encyclopedie* was, and yet they still instructed their viewers on how to look at and learn from their subjects. Matthew Daniel Eddy examined diagrams which we might not think of as art, even in the category of the art of science. The Scottish

[9] John Bender and Michael Marrinan, *The Culture of Diagram.* (Redwood City, Stanford University Press, 2010), p. 34
[10] Ibid. p.67

professor of chemistry, Joseph Black (1728-1799) made use of exceedingly simple diagrams—tables and small figures—to teach his students. Diagrams such as these, Eddy agues, were not intended to be stand-alone pieces, "timeless abstractions" in the way that one might argue the images in the *Encyclopedie* were, but pieces whose meanings were "strongly influenced by the direct interface between natural knowledge and visual culture."[11] In other words, these were diagrams which were meant to be used alongside or after, not in lieu of observation and experimentation.

Scottish diagrams similar to Black's are preserved in the back of John Playfair's *Outlines of natural philosophy, being heads of lectures delivered in the University of Edinburgh* (fig.1.2), all of them using relatively simple geometric figures to visually represent complex scientific and mathematical concepts. Eddy uses the example of how lecturers across scientific disciplines at the University of Edinburgh used circles and semi circles to "depict the movement of matter through space."[12] To the entirely uneducated reader these diagrams make little sense, but to anyone with the proper education, they are just as useful as the diagrams in the *Encyclopedie*, and a large part of their utility is due to their abstraction. Because they explain concepts which are abstract, which do not have single physical forms, it is necessary to represent them in an abstract manner.[13] The diagram is an efficient, accessible (albeit in this case accessible only to an educated reader/viewer) means of communicating a complex concept even without a direct demonstration.

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[11] Matthew Daniel Eddy, "How to See a Diagram: A Visual Anthropology of Chemical Affinity" (Osiris, Vol. 29, No. 1, June 2014), p.179

[12] Ibid. p.190

[13] This concept is also explored in the context of some of the more complex plates in the *Encyclopedie* by Bender and Marrinan. Based on the presence of large amounts of explanatory text in diagrams explaining more complex concepts such as military drills, the Bender and Marrinan note "a breakdown of graphic intelligibility in complex diagrams" which led in some cases to a further shift to graphic notation.

That being said, abstraction and archetypes as ways to inform observation were not the only strategy used in the art of science during the latter half of the Enlightenment, nor was abstraction always the most efficient, informative means of communicating information. The second strategy, while less common at the time is perhaps more recognizable to the modern viewer as an attempt at objectivity, was to try and depict phenomena as closely as possible to how they appeared in nature. One of the most outspoken proponents of this method was William Hunter, who held the illustrators of his *Anatomy of the Human Gravid Uterus* to a high standard of naturalism (fig,1.3). Hunter was, as the historian Martin Kemp puts it, "utterly committed to observational science, founded upon minute scrutiny, systematic description in words and images, and inductive analysis," a commitment which put him on the extreme end of taste in the art of science and in art more generally.[14] In the preface to his *Anatomy* he argues that while "in many subjects of painting, indeed, the slight manner of producing an effect, without labour, is very agreeable" in the case of art for scientific purposes "the subject is supposed to be new, or only imperfectly known; and the smaller parts are to be studied with care, as well as the larger masses," the goal was representation of the object or phenomenon "exactly as it was seen."[15]

True to his word, Hunter insisted that his illustrators draw from observations of real cadavers rather than from their imaginations or from some synthesized "typical."[16] The result of this insistence on close study and naturalism is that Hunter's *Anatomy* is still considered one of the most important texts in obstetrics history. As Don C Shelton wrote for *the Journal of the Royal Society of Medicine,* "the quality and detail of the anatomical plates is of such high quality,

[14] Kemp, "True to Their Natures," p.79
[15] Hunter, *Anatomy*, p.4
[16] Ibid.

they are the equivalent of 21st-century forensic photographs, and can be studied in the same manner."[17]

To a modern reader, Hunter's method might seem unquestionably 'better' and more scientific than the alternative, but Daston and Galison wisely warn against mistaking Hunter's naturalism for realism or objectivity as we would understand it. Despite the graphic nature of the engravings in the *Anatomy*, Hunter's illustrators take their own liberties with reality, adding crisp outlines and suspending the cadavers in a white or gradient space (fig.1.4). These are artistic choices just as much as those made to create the typical. Though Hunter insisted that his goal was to depict his specimens exactly as they were seen, the reality is that the images he commissioned for the *Anatomy* "participate in the artistic conventions of naturalism of the day," products of taste as much as of scientific rigor.[18]

There was also a cost to all that direct observation. Around twenty female cadavers were studied for the *Anatomy*, most between the seventh and ninth month of pregnancy.[19] It was heavily suspected even in Hunter's own time that he acquired many of his cadavers through graverobbing to procure corpses. One contemporary cartoon depicted Hunter and an accomplice running from the night watchman and leaving behind a dead woman's body in a hamper (fig.1.5). More horrifying still, Shelton's 2010 study shows that graverobbing alone would not have provided close to enough cadavers and suggests that at least a dozen pregnant women were killed for Hunter and his colleague William Smellie to use in their anatomical atlases.[20]

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[17] Don C. Shelton, "The Emperor's New Clothes" (*Journal of the Royal Society of Medicine* vol. 103,2, February 10, 2010)
[18] Daston and Galison, "Image of Objectivity," 93
[19] Shelton, "The Emperor's New Clothes"
[20] Ibid. Though one or two scholars have attempted to absolve Hunter of the accusations of soliciting murders for his *Anatomy*, Shelton's evidence is damning. The death rate for pregnant women before birth was relatively low, and the accuracy of graverobbing, even if one had the help of a gravedigger pointing them in the right direction, was simply not adequate for the number of bodies appearing on Hunter's table. Hunter himself remarked that the

Putting aside the horror show of 18th century medical ethics, from an art historical perspective, different as they are, naturalism and the typical are two different answers to the same representational problem: how do you give the reader/viewer the benefit of direct observation while also teaching them *how* to observe? How do you most efficiently make an object which is both subject and instructor? For scholars of the typical, the answer was to abstract and augment reality so that observations could be made more easily and efficiently than in nature. Naturalists like Hunter presented subjects more or less how they were seen in nature, but still removed from their natural context, labeled, and posed in a way which made them easiest to observe. Both strategies invite and in fact require engaged *viewing* rather than passive *looking*. The scientific subject is not quite elevated to the level of spectacle that we will see in many of the cases of science in art at this same moment, but it is visually playing out the value of learning by observation.

Science in Art

In 1764, Count Francesco Algarotti, who had helped popularize Sir Isaac Newton, noted that while "the English nation claims the superiority ... in the world of science, … Painting has only recently engaged [their] attention."[21] In many ways he was correct. Even before the Enlightenment, Britain was known for its scientists, and British art, though it did exist, was not internationally recognized in the way that Italian or French art was. That was changing in the 18th century, with widely respected artists like Joshua Reynolds, William Hogarth, and Thomas

opportunities for dissecting the human pregnant uterus at leisure, very rarely occur. Indeed, to most anatomists, if they happen at all, it has been but once or twice in their whole lives."

[21] Kemp, "True to their Natures." 77. While this is an incredibly dismissive take on the subject, it is true that British art had gone through a dark period in the century or so before the Enlightenment. This is a subject we will cover more thoroughly in our discussion of institutions in chapter 2.

Gainsborough and the founding of the Royal Academy in December of 1768. British painters worked in the same genres as their continental counterparts, with portraiture being a particular strong suit, but around the same time that the art of science was being refined in the ways discussed above, science was also working its way into the fine arts, giving rise to what we will call Enlightenment genre painting. These were paintings which represented scientific phenomena and scientists –then known as natural historians or natural philosophers—using the same visual language as other contemporary genre paintings. Often, this meant moralizing science and elevating experiments and phenomena from objects to be studied to spectacles—objects to be amazed by and marveled at. The figures in these paintings are often modeling the kind of active observation, which is instructed and invited in diagrams, and in many cases the viewer is invited to observe as well.

Joseph Wright of Derby's *an Experiment on a Bird in the Air Pump* (fig.1.6) was a sensation when he showed it London in 1768. The painting depicts a group of well-dressed people gathered in a dimly lit room watching with varied reactions as a wild-haired man demonstrates a vacuum by slowly suffocating a white bird. The only visible source of light in the room is a candle hidden somewhere behind the glass jar in the center of the frame making the vacuum pump and the experiment being demonstrated a literal source of enlightenment in the painting. The demonstrator would be instantly recognizable to viewers at the time as one of a class of travelling scientists (natural philosophers in the language of the time) who gave lectures and performed scientific experiments for well to do audiences.[22] The group of observers are not unlike people Wright of Derby would have encountered in his own enlightened circles, which

[22] Marguerite Helmers, "Painting as Rhetorical Performance: Joseph Wright's 'An Experiment on a Bird in the Air Pump.'." *JAC*21, no. 1 (2001),77

included a number of members of the Freemasons and the Lunar Society.[23] They were not professionals but as Marguerite Helmers notes, paraphrasing Benedict Nicholson in her article on the piece, “"uninstructed" yet "eager" students,” excited to learn by observing the natural philosopher.[24]

There are several levels of looking, observing, and spectating happening between the figures in the painting as each person presents a different reaction to or method of interacting with the scientific spectacle and as the viewer of the painting is invited to choose their viewing approach as well. The first thing to note is that not all of the figures in the painting are looking directly at the demonstration. The two lovers on the left side of the image look directly at each other, seemingly blind to the experiment happening in front of them. On the right side of the painting a young girl turns away, presumably upset by the suffering of the bird in the vacuum. Her father looks down to comfort her and, seemingly, to convince her to look back as he points with one hand at the glass chamber and pats her back with the other. There is an undeniable gendering of the gazes in Wright of Derby’s *Experiment*, as of the three females in the painting only one (the youngest girl) looks toward the experiment and even then, it is with terror rather than active observation in pursuit of knowledge. This gendering does say something about who was expected to engage with Enlightenment thought, who was thought capable of learning from observation, and who was perceived as being too fragile. Still, fear and compassion for the animal are valid reactions to the experiment being performed and the suffering of the bird, and it is certainly a reaction Wright of Derby invites with the dramatic lighting and staging, both of which invoke ideas of the beautiful and terrible sublime.

[23] Ibid., 78
[24] Ibid.

The most engaged observers are three men in the foreground with their backs to the viewer. One of the men holds a pocket watch, possibly timing the experiment. All of these men are participating in active observation. Ironically –or perhaps appropriately—these characters who are most engaged with the spectacle of the experiment are the least visible to the viewer of the painting. Shrouded in shadow, faces turned away, they are quite literally absorbed in the spectacle.

It is at this moment that we should carefully consider the three words for looking – absorption, spectatorship, and observation—which we have used in the discussion of the painting and this particular segment of it. Representation of absorption in painting, as Michael Fried saw it requires "evoking the perfect obliviousness of a figure or group of figures to the everything but the objects of their absorption."[25] Absorption is not necessarily looking with the purpose of learning in the way that observation is, but it is another kind of active looking that can go hand in hand with observation. The three men in the foreground are absorbed in the experiment but they are also observing it. The couple looking at one another are absorbed in each other, meaning that they do not see anything outside of that, including the experiment taking place right in front of them. Spectacle has its roots in the world of theater and is deeply connected with entertainment. The demonstration of the vacuum is a spectacle like many other public demonstrations of science during the Enlightenment. All of the characters in the painting are spectators to the demonstration by virtue of being in the audience, but whether they chose to observe or whether they become absorbed depends on their personal engagement. The painting itself is also a

[25] Michael Fried, *Absorption and Theatricality*, (Berkeley: University of California Press, 1976.), p.66. Fried is a somewhat limited source on the subject of British art and Enlightenment, given that his focus is solely on France and, by his own admission "Nowhere in the pages that follow is an effort made to connect the art and criticism under discussion with the social, economic, and political reality of the age." However, his framework for discussing absorption as an emerging phenomenon is unique and a crucial element in approaching Enlightenment art where absorption abounds.

spectacle, in that it is seeking to entertain and engage as well as educate its audience. The element of spectacle, the desire to entertain, is often what differentiates science in art from the art of science.

The character whose gaze is perhaps the most engaging is the natural philosopher himself. Marguerite Helmers compares the gaze of the scientist, who looks straight out at the viewer, to Velasquez's *Las Meninas* where characters seem to look out at the viewer but in fact are looking at the king and queen of Spain who are standing just beyond the frame.[26] Helmers references Foucault's reading of the painting in which he describes how the characters "place the spectator in the field of their gaze" and "force him to enter the picture, assign him a place at once privileged and inescapable."[27] In much the same way, Helmers argues, "[the] viewer of *The Air Pump* is drawn into the picture as the ninth member of the evening lecture."[28] The direct gaze of the scientist draws us into the painting and asks us how we are going to engage with the experiment.

Like the diagrams discussed previously, *The Air Pump* provides both a fairly detailed depiction of a scientific experiment and an invitation, even a request, to engage with it. Unlike the diagrams though, Wright of Derby's painting allows a good deal more ambiguity in how its tone should be interpreted. For example, in her article Helmers sees something of horror, even of the budding genre of the gothic in the painting. She goes so far as to argue that the viewer, because they are made part of the experiment which involves violence upon an animal is made complicit in that violence. In this reading of the work, science is not moralized but Gothicized,

[26] Helmers, "Painting as Performance," p.81
[27] Ibid.
[28] Ibid.

the natural philosopher being presented as a kind of proto-doctor Frankenstein who makes our own humanity monstrous by involving us in his experiment.[29]

However one choses to interpret it, *Air Pump* is an exceptionally striking painting but it isn't without precedent. Trends toward depictions of more active spectatorship in painting, and science being presented as spectacle were both at work in the mid-18th century. Michael Fried tackles the former extensively in his 1976 book *Absorption and Theatricality*. Though Fried choses to focus on the French context, the movement he notes toward "persuasive representation of absorption and later toward the primacy of action and expression" is clearly not unique to France.[30] Beginning in the 1750's, Fried argues, depicting characters absorbed in, or actively engaging with activities or spectacles became an artistic and critical desideratum. The ability to accurately convey a sense of absorption was a sign of artistic virtuosity.

One such virtuous painting which Fried uses as an example is Jean-Baptiste Greuze's *Un Père de famille qui lit la Bible à ses enfants* (1755) (fig.1.7). It is a French low-genre painting depicting a humble family gathered around a father reading aloud from the bible. Fried quotes the Abbe de La Porte's contemporary description of the work, where he notes the passion of the father "himself imbued with the moral he is imparting to them," and the way different family members are engaged or disengaged with the activity.[31] The mother "is listening to him with that air of tranquility enjoyed by an honest woman surrounded by a large family," the daughter "is astounded and grieved by what she hears," an older boy looks on with an expression "as singular as it is true," while a younger boy "is paying no attention whatsoever to things that he cannot understand."[32] This painting was praised in its day by the Abbe de La Porte and others

[29] Ibid., p.82
[30] Michael Fried, *Absorption and Theatricality*, (Berkeley: University of California Press, 1976.), p.107.
[31] Ibid., p.9
[32] Ibid.

for its depiction of virtuous rural piety. It is modelling a behavior and a lifestyle which was admirable, if not relatable to the viewers of the painting in the 1755 Salon. What won over audiences, or at least educated audiences, Fried claims, was the way in which Greuze accurately captures the state of absorption, the way "each figure in the painting appeared to exemplify in his or her own way, i.e., the state or condition of rapt attention, of being completely occupied or engrossed."[33]

Though of course *Un Père de famille* belongs to a very different geographical and social context than the *Air Pump*, the similarities of theme and structure are undeniable. We can compare the intense concentration of the more well-behaved children to the studious trio of men in the foreground of the *Air Pump,* or the grief and awe of the little girl to the young girls upset by the fate of the bird. Where Greuze uses the family's absorption in the father's reading of the bible to model the way one ought to interact with and study religion, Wright of Derby uses the same structure to model how one ought to interact with and study science. It is this kind of borrowing of the visual language formerly associated with religious subject matter to represent how one might relate to science which demonstrates the extent to which science was "moralized" during this period. "Moralized" here means that adherence to and interest in science and the scientific method was made a moral value in the same way that piety and faith in religion was in other contexts.

The most notable difference between the two paintings' approaches is their interaction (or lack thereof) with the viewer. In *Un Père de famille*, the father demonstrates his absorption in the bible by looking down at the text and giving it his full attention. We see the intense emotion in his face as he reads to his family, but crucially he doesn't see us. We are not given the sense

[33] Ibid., p.10

that this reading is for our benefit. Furthermore, because the bible is being read aloud from a book, the text of which we cannot see and the specific content of which is nowhere indicated, we do not really know what moves the family. Whatever is driving their absorption is completely inaccessible to the viewer. The painting asks us to have faith that what the family is hearing really is that powerful.

Compare this to the dynamic between viewer, demonstrator, and spectacle in Wright of Derby's *Air Pump*. In the English painting, the natural philosopher who is demonstrating the vacuum looks not at the experiment he is conducting, not at the observers assembled in the painting with him, but out, past the illusionistic space of the painting and at the viewer. Like the father in *Un Père de famille*, his role is that of the demonstrator, the one leading the absorbing activity for the other characters in the painting and the viewer, but the way that he does so is entirely different. Where Greuze uses the demonstrator character to connect the figures in the painting to the bible story which engages them, Wright of Derby uses the same character archetype as a conduit between painting and viewer to call us directly into the experiment. This is compounded by the fact that unlike the Greuze painting, we are allowed, in fact compelled, to look directly at the absorbing phenomena. The mechanism of the air pump is literally front and center, and eighteenth-century viewers, perhaps even more than modern ones, would have immediately recognized the experiment which was common in the lecture circuits of travelling scientist/showmen like the natural philosopher in the *Air Pump*. Everything about the man's body language demands that his audience, including the viewer of the painting, look at the vacuum in action. His hands frame the device, one turning a crank above the glass chamber holding the bird and the other gesturing emphatically below it. There is no faith being asked of

the viewer, we are shown exactly what engages the audience and we are asked to engage with it too.

Michael Fried offers what could be seen as one explanation as to why these paintings take such radically different approaches to depicting absorption and engaging with their viewers. He argues that over the course of the first two decades of the second half of the eighteenth-century, the question of how to handle engagement with the viewer became more and more pressing as time went on, until artists could no longer ignore that extra layer of spectatorship. He explains that:

> [F]or French painters of the early and mid 1750s the persuasive representation of absorption entailed evoking the perfect obliviousness of a figure or group of figures to everything but the objects of their absorption. Those objects did not include the beholder standing before the painting. ... By the first half of the 1760's however, the presence of the beholder could no longer be dealt with in this way;[34]

Once the presence of the beholder had to be dealt with, Fried argues, the solution of most French artists and critics was to try and "obliviate" them.[35] While the first part of Fried's explanation certainly accounts for the approach Greuze takes to absorption in *Un Père de famille*, the idea that later works dealt with their viewers by obliviating them does not hold true at all for the *Air Pump*. The natural philosopher's outward gaze, the placement of the air pump apparatus so that it is clearly visible to us, does the opposite of obliviating the beholder. It openly acknowledges us and asks us to participate. Fried does not claim his theories apply to art beyond the French context, nor does he attempt to consider reasons behind the phenomena he discusses beyond artistic and critical taste. While that approach serves him in the context of his own argument, I

[34] Ibid., p.66-7
[35] Ibid.

believe that the *Air Pump* demands to be considered in terms not just of artistic or critical taste, but in the British context which created it.

Genre paintings like the *Air Pump* and *Un Père de famille* often use the seemingly everyday scenes they depict to convey some deeper moral lesson, usually by modelling a behavior which is either ideal or cautionary. The religious devotion being modelled by Greuze's painting is fairly obvious, and the ways in which the painting withholds access to the absorbing material, asking us to have faith in the power of words we cannot hear from a book we cannot see, reinforces the religious argument.

The *Air Pump* uses almost opposite techniques to model the morals of the New Science. These morals were, as Wilbur Samuel Howell put it, "subjecting physical and human facts to observation and experiment, and ... accepting as new truth only what could be shown to conform to the realities behind it." Here we have the apparatus of the air pump and the vacuum it creates being presented to us in full view, subjected to experiment and, crucially, to observation. We, as the viewers of the painting have the same opportunity to observe the phenomena as do the characters inside the illusionistic space. The out-turned gaze of the natural philosopher does not ask us to have faith in science, or to accept something as true or spectacular based on the reactions of others. He asks us to look for ourselves and accept the validity of the experiment based on only what we can observe. Though science here takes on a spectacular role, it is not a magic trick, it is incredible in its credibility. All these factors are part of what make Wright of Derby's *Air Pump* perhaps the clearest example of what we will call Enlightenment genre painting, that specific sub-category of works which combine the visual language of traditional genre painting with the values of the New Science.

Another clear example of the Enlightenment genre painting involves a recurring character in this thesis. Johan Zoffany's 1772 conversation piece *William Hunter Lecturing*, is another work which uses similar techniques to impart similar values. In Zoffany's painting, Hunter stands before an audience made up of members of the Royal Academy and London intellectual society more generally (the specific identities of whom we will discuss in greater detail in chapter 2). The anatomist gestures to a live model, while a skeleton hangs behind him and what appears to be an ecorché is on a pedestal in the background. Though we cannot hear the lecture, it is fairly clear that Hunter is teaching his students about the musculature and bone structure of the human back. While this is not a thrilling experiment like the one being performed on the bird in Wright of Derby's *Air Pump*, it is still something which one can, and is expected to, learn from. Like the group of observers in the *Air Pump*, not every member of the audience is focused on Hunter, but the vast majority are. Joshua Reynolds who appears in the center of the crowd in a red coat even listens through an ear trumpet. As with Wright of Derby's painting, the composition of *William Hunter Lecturing* very intentionally allows the viewer of the painting to participate in the same careful observation as Hunter's audience. Furthermore, though it is not quite the piercing gaze of the natural philosopher in the *Air Pump*, William Hunter also looks out of the frame of the painting, giving the viewer a look as if to check we are paying attention.

Eighteenth-century critics like Count Francesco Algarotti were certainly correct to note the scientific achievements of the British as perhaps their most important cultural export. However, the arts did not suffer because of this scientific excellence. As we have seen, British painters like Joseph Wright of Derby created works just as technically and intellectually brilliant as their European peers. Clearly, the impact of the Enlightenment on British art was a positive one and the ideals of the New Science pushed artists to new heights in creative dynamics of

gazes and spectatorship, and in how they represented science as spectacle and observable fact. This was not lost on William Hunter who wrote optimistically of Britain's artistic future predicting that British art

> in the course of a very few years, may rival, did I say? why not excel the finest productions of Greece and Italy. When we have already gone so far beyond the ancients, in science, in every thing besides, are we never to excel them in works of imagination? Has Nature granted us with such compelling powers in all other things and denied it in that? No: ... Nature is not a partial step-mother.[36]

[36] Hunter in Kemp, *True to Their Natures*, 77

Appendix of Images

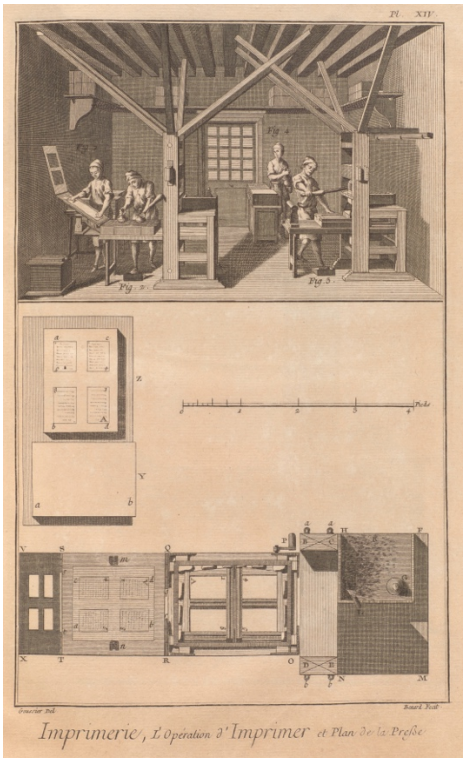

Fig.1.1 Denis, Diderot, "Volume 7, Letterpress Printing (Imprimerie) Plate XIV: Operation of Printing and Printing Press," Paris: Briasson [etc.], 1751-1772 (1769) via Lehigh University Omeka

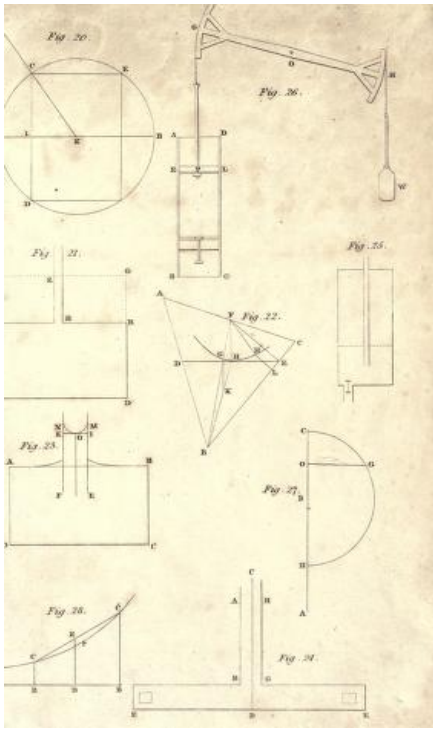

Fig.1.2 John Playfair, from the backmatter of *Outlines of natural philosophy, being heads of lectures delivered in the University of Edinburgh*. (1819) p.343

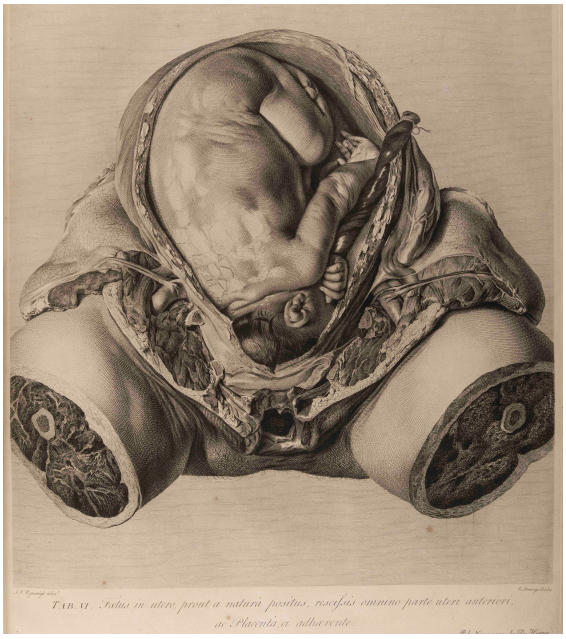

Fig.1.3. Table 6 of William Hunter, *Anatomy of the Human Gravid Uterus, Exhibited in Figures.* (Birmingham:

John Baskerville, 1774). Image courtesy of the US National Library of Medicine

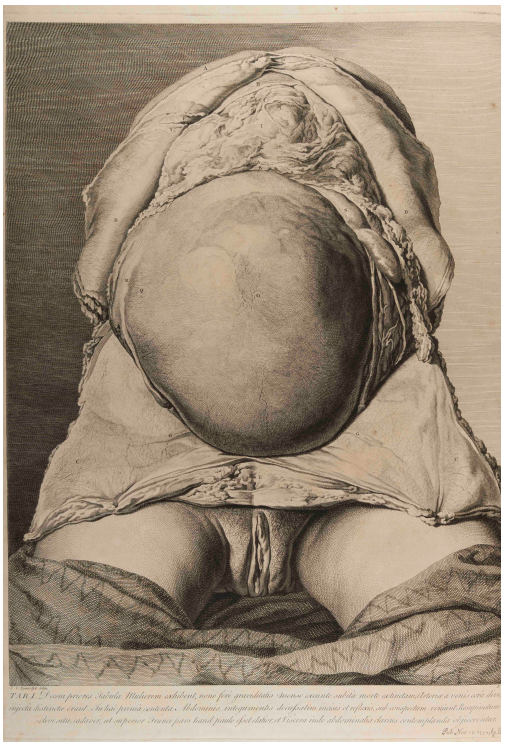

Fig.1.4. Table 1 of William Hunter, *Anatomy of the Human Gravid Uterus, Exhibited in Figures.* (Birmingham: John Baskerville, 1774). Image courtesy of the US National Library of Medicine

Fig.1.5. William Austin, *The Anatomist Overtaken by the Watch... Carrying off Miss W--ts in a Hamper*. Color etching, 1 print: 27 x 40 cm. Image courtesy of US National Library of Medicine: Digital Collections.

Fig.1.6. Joseph Wright of Derby, *An Experiment on a Bird in the Air Pump,* 1768. Oil on canvas, 183 × 244 cm. The National Gallery, London.

Fig.1.7 Jean-Baptiste Greuze, *Un Père de famille qui lit la Bible à ses enfants,* 1755*,* oil on canvas*,* 65 × 82 cm. The Louvre, Paris.

Fig.1.8. Johann Zoffany, *William Hunter lecturing*. 1770-2, Oil on canvas, 77.5 x 103.5 cm (estimate). Image © **Royal College of Physicians of London**

II. Institutional and Economic Crossover

Let us return to the last image we examined in chapter 1: Johan Zoffany's *William Hunter Lecturing*, this time with our attention on the audience. In the conversation piece, the famous (or perhaps infamous) anatomist is shown giving an anatomy lesson to a sizeable crowd of well-dressed men, presumably members of the Royal Academy. To the modern eye, the audience may look like eighteenth-century stock characters but in Zoffany's time and social circle, many of these men would have been immediately recognizable. In the bottom left corner behind the two younger boys sits George Michael Moser, the Royal Academy's keeper of schools, above him and at the head of the low table sits Sit Joshua Reynolds, founder and resident of the Royal Academy, ear trumpet in hand.[37] One man down to Reynolds's right is the American artist Benjamin West, another founding member of the Royal Academy and friend to both Reynolds and King George III, for whom he served as court history painter for many years. Beside West is the sculptor Joseph Nollkens.[38] Johan Zoffany even includes himself in the painting, appropriately sketching away. Scholars have offered even more possible identifications for other men in the audience, filling the whole room with a who's-who of the London art scene. Though the lecture Zoffany depicts here is an invented one, in a room which scholars are unable to identify, the connection between the worlds of art and science which is represented through this assembled audience was very much a real one. Recognizing this institutional crossover allows us to better understand how and why science had such a profound impact on the arts in

[37] Sarah Backhouse, "Bursary Reports: Sarah Backhouse, Exhibition coordinator, Royal College of Physicians, London" (Royal College of Physicians London)
[38] Ibid.

the late Enlightenment, to the point that it changed the very way these works engaged with the idea of viewing.

As we have observed in the previous chapter, the late Enlightenment was a period when the boundary between what was art and what was science was not always clear. Scientific diagrams, like those in Hunter's *Anatomy* were as detailed and carefully composed as any piece of art and a painting like Joseph Wright of Derby's *Air Pump* may seem to fit squarely into the category of the fine arts, but it also serves a scientific purpose by instructing its viewer. If there was a border at all, it was a permeable one. This was true of institutions too. The latter half of the 18th century saw the establishment of a number of institutions in Britain which seemed in one way or another to encompass art and science. These institutions led to major crossover in people and ideas and played a pivotal role in what scholars call Britain's "discovery of painting," resuscitating the economy and culture of British painting which was at an exceptionally low point up until the second quarter of the eighteenth century. Though there has been a great deal of scholarship on the institutions and key characters of Enlightenment-era British art and science separately, there has been very little done on the massive amount of overlap between the two, and the implications thereof. With this chapter I hope to illustrate the personal and institutional connections which allowed for the unique relationship between art and science in the 1760's and 70's.

Sir Sloshua: Joshua Reynolds and the Joint Histories of Chemistry and Art

In the mid-to-late-seventeenth century, while Sir Isaac Newton was publishing the scientific ideas which sparked the Enlightenment, the visual arts in Britain were in crisis. At the time when Charles II was restored to the throne in 1660, England had, as Matthew Hunter

explains in his article, "Joshua Reynolds's 'Nice Chymistry': Action and Accident in the 1770s," "no centralized, state-sponsored institution for the promotion of the fine arts" and would not have one until the foundation of the Royal Academy in 1768.[39] While Spain and the Dutch Republic were seeing a golden age of art, Britain's art world was unregulated and uncertain. There was no large-scale system for patronage, no official institutions for training artists, and no guild restrictions. By the 1740's, British art—especially painting—was at "its lowest ebb," as painter Joseph Farington bluntly put it.[40] Many scholars point to the foundation of or increased engagement with regulating institutions in the mid-eighteenth century with saving British painting. They regulated the training process for would-be painters and helped moderate the contentious color market where chemists were often able to charge artist extortionate prices for new paint colors.[41]

One such institution which encompassed art and science was the Society for the Encouragement of Arts, Manufactures, and Commerce ("the Society of Arts") which held a Committee on Chymistry beginning in 1758.[42] As Matthew Hunter explains, the committee established prizes to manufacturers "for the production in bulk of borax, bismuth, sal ammoniac, and other chemicals useful to the arts and industry."[43] Joshua Reynolds himself served on a committee in the Royal Society, alongside fellow British painter William Hogarth, where members were "charged with making trials of a batch of verdigris—the greenish blue pigment derived from the chemical action of acetic acid on copperplates."[44]

[39]Matthew C. Hunter, "Nice Chymistry": Action and Accident in the 1770s," (The Art Bulletin, March 3, 2015)
[40] Ibid.
[41] Ibid.
[42] Ibid.
[43] Ibid.
[44] Ibid.

As Hunter describes, chemistry in particular occupied a liminal space in the Enlightenment imagination. Especially in contrast to the already rigidly mathematicised physics of Isaac Newton, it seemed more malleable and mysterious, somewhere between science, philosophy, and art. This is something which we can also say of anatomy, given the place of anatomical atlases and anatomists we observed in chapter 1.[45] This position is due to three main factors: first, the practical connection between chemistry and the arts in the necessity of chemistry to paint mixing and the creation of new colors; second, the lingering associations between chemistry and alchemy,[46] which much of the New Science was rebelling against; and third, the great leaps chemistry had made in the last century, and the distance it had still to go, meant that chemists saw the world in a radically different way than their predecessors, but were not yet in a place to explain why these new rules applied.

To that third point, William Lewis, a lecturer of chemistry at the Society of Arts, commented on how he saw chemistry as grappling with something more ineffable than the "determinate forces, subject to mechanic laws, and reducible to mathematical calculation" of other disciplines which fit more cleanly with the New Science.[47] Chemistry, Lewis said:

> considers bodies as being composed of such a particular species of matter; dissoluble, liquefiable, vitrescible, combustible, fermentable, & c. impregnated with colour, smell, taste, &c. or consisting of dissimilar parts, which may be separated from one another, or transferred into other bodies. The properties of this kind are not subject to any known mechanism, and seem to be governed by laws of another order.[48]

[45] Ibid.
[46] We will see Chemistry compared implicitly and explicitly to alchemy throughout this chapter. References to magic, conjuration, the converting of normal metals to gold all come from the association with alchemy.
[47] Hunter, "Nice Chemistry"
[48] Ibid.

This is a view of reality which seems much more mutable than what we are accustomed to in the New Science. Perhaps this is what made chemistry seem like an apt metaphor for the creative process for Joshua Reynolds when he delivered a discourse in 1771 in which he advised his students that the best artist was one who "will pick up from dunghills what by a nice chymistry, passing through his own mind, shall be converted into pure gold."[49]

Reynolds's connections with chemistry go deeper still. The artist was not just interested in chemistry philosophically but was a would-be chemist himself, attempting to mix his own paints using new techniques which he hoped would make the pigments brighter. As conservator Rica Jones observed, Reynolds "engineered a fusion of elevated artistic theory and obsessive material experimentation that ... would transform British practice."[50] That is not to say that Reynolds's experiments were successful. The artist made many attempts to mix his own paint colors, inspired by Italian Renaissance masters like Titian who did the same, but rather than earning a reputation as a brilliant colorist, Reynolds's experiments were disaster after fleeting, fading disaster. Reynolds's problem was that his enthusiasm for bright and novel colors far outstripped his actual chemical knowledge. In one of his ledgers Reynolds describes his process and how his pigments were "to be mixed first with oil; next, with wax without oil" (fig.2.1)[51] These were not recipes for long-lasting colors. Reynolds's paintings were notoriously short-lived. The colors faded or flaked off altogether (fig.2.2). In cases like the portrait in fig.2.2, the effect of the paint degrading is quite eerie. The skin of the subject is bleached to a ghostly white and pieces of the paint have flaked off to reveal the red wood of the frame beneath. The only

[49] Ibid. It is also worth noting that Reynolds's reference to chemistry converting other elements into gold is in fact a sign that in his mind chemistry was not so separate from alchemy as creating gold from other elements was one of the main goals of the pseudoscience
[50] Rica Jones in Hunter, "Nice Chymistry"
[51] Joshua Reynolds in Hunter, "Nice Chymistry"

paint colors which seem to have survived are red and black, giving the whole thing a decidedly haunting look.

Some in his time argued that Reynolds was essentially set up to fail by the lack of structured British artistic practice in the early-eighteenth century, that his practice:

> was not only slow and interrupted, but necessarily insecure; and his experiments not only unguided by any safe theory founded in previous experience, but constantly misguided by the false theories of others founded on bad practice, sanctioned by false taste and perverted fashion.[52]

But Reynolds was not going into his experiments completely blind. Despite beginning his artistic education at an especially low point in British art history, and consequently being removed from tactics and examples that might have guided him, Reynolds was undoubtedly the heir and beneficiary of the New Science developed in the earlier part of the Enlightenment. The painter frequently cited Francis Bacon, who established much of what we think of as the New Science in his *Discourses*.[53] Reynolds's great-grandfather, Thomas Baker (ca. 1625–1690), was a mathematician who published *The geometrical key; or, The gate of equations unlock'd* (1684) which he dedicated to Joseph Williamson, then president of the Royal Society.[54] His father had planned for Reynolds to be an apothecary or a surgeon, two occupations which would have placed him firmly on the scientific track.

Though his experiments are remembered as failures, even earning him the epithet "Sir Sloshua" among 19th century artists, Reynolds's experiments, even his lineage, make him a poster child for this institutional crossover and shared history between art and science,

[52] Hunter, "Nice Chymistry"
[53] Ibid.
[54] Ibid.

specifically chemistry.[55] Knowing the artist's scientific interests and family connections casts a new light on some of the quotations from Reynolds's work which we have examined previously in which he uses science as a metaphor or applies his artistic theories to science. As previously mentioned, Reynolds compared the ideal creative process, the synthesis of different inspirations and techniques to a "nice chymistry," that the many different inspirations should be like "the mixtures of the variety of metals, which are said to have been melted and run together at the burning of Corinth, [when] a new and till then unknown metal was produced."[56] He also thought of how his own work in the field of art could be applied in the context of the art of science. As previously referenced in chapter one, in his third *Discourse* Reynolds wrote that "I have endeavoured to reduce the idea of beauty to general principles ... I am convinced that this is the only means of advancing science, of clearing the mind from a confused heap of contradictory observations, that do but perplex and puzzle the student."[57] These statements speak to the extent to which art and science informed one another, and the extent to which art was looked at through a scientific lens even by a man who embodied the British art establishment.

William Hunter and the Scientist's Role in the Art World

William Hunter, Reynolds's friend and colleague worked not only as an obstetrician and anatomist, but as the anatomy teacher at the Royal Academy. He was also an avid collector and commissioner of artworks from Britain and abroad. Examining Hunter's writing on art and his

[55] Ibid. Reynolds also garnered plenty of criticism in his own time for his Chemical misadventures. Nathaniel Hone the Elder's 1775 painting "The Conjurer" (fig.2.3) was a not-so-subtle jab at Reynolds's almost alchemical attempts to work science into his paint mixing. In 1785 one commentator remarked that "It is a pity, the pencil of Sir *Joshua Reynolds* does not possess an equal power of *magic* with that of *Hone's Conjuror!* —he might else do something to remove a *spell* which will be fatal to his reputation ages hence."
[56] Ibid.
[57] Joshua Reynolds in Kemp, "True to their Natures," p.78.

own choices in his collecting yields an important view of the role of the scientist in the art world during this period of institutional and economic crossover. Much like Reynolds's interest in chemistry, Hunter's involvement in the art world also gives us an idea of the massive impact Enlightenment science had on art, how it was produced, and for whom.

Helen McCormack wrote her 2010 PhD thesis for the University of Glasgow (Hunter's alma mater and now home to his collection of art and scientific specimens) on the anatomist as art collector. She found that Hunter's first recorded purchases of paintings took place in March of 1754 when he bought a number of works, including a painting after Godfrey Kneller's portrait of Sir Isaac Newton (2.4) from the collection of Dr Richard Mead (1673-1754).[58] McCormack argues that it is no coincidence that Hunter's first purchases would be from a fellow anatomist. Mead was part of "group of highly influential anatomist-antiquarians in London in the 1740s and 1750s" that Hunter had had contact with previously.[59]

The concept of an anatomist-antiquarian is something which would have been virtually impossible before this period. In previous centuries the commissioning and collecting of art was more or less the sole privilege of the aristocracy, however the eighteenth century was in the midst of a major cultural and economic shift: the development of a professional class –including scientists—with significant disposable income.[60] As McCormack cautions, the purchase of a few paintings is not enough "to prove that easy social mobility was as yet a feature of eighteenth-century society" but it does show a shift in that direction.[61] Hunter owed a great deal of his

[58] Helen McCormack, "A collector of the fine arts in eighteenth-century Britain: Dr William Hunter (1718-1783)," (University of Glasgow, 2010), p.13. Hunter had a great deal of respect for Newton as one of the most influential scientists the last century, and as a founder of the Enlightenment. In one of his anatomy lectures at the Royal Academy, Hunter praised Newton's contribution to experimental theory saying: 'That doctrine was the source of Sir Isaac Newton's and all of the improvements which have been made since the middle of the seventeenth century.'
[59] Ibid.
[60] Ibid.
[61] Ibid.

career success to men who had also made careers in science and used their fortunes to advance the arts. Robert Foulis (1707-1776), a printer and bookseller who co-founded the Academy of Arts in Glasgow gave Hunter a letter of introduction to Dr. James Douglas (1675-1742), a Scottish man-midwife practicing in London.[62] Douglas introduced Hunter to the circle of other men of science including Mead and played a major role in advancing the career of other "lowland Scottish intellectuals."[63]

Hunter likely owed his position as Physician Extraordinaire to the Queen to an indisputably aristocratic man, but one with connections to art and science: King George's favorite, John Stuart 3rd Earl of Bute (1713-1792). Bute was the favorite of King George III and an avid patron of the sciences who kept an "extensive collection of minerals and fossils [and kept notes on] chemistry and other scientific subjects."[64] The earl's name appears in the dedications of a number of texts on subjects ranging from botany to the history of Mexico.[65] He was also one of Johan Zoffany's earliest and most important patrons (fig.2.5), likely responsible for introducing the artist to the king and queen who became regular patrons. Bute was also the man who commissioned the remodeling of Luton Hoo by neoclassical architect Robert Adam.[66] Though the Earl of Bute is by no means an example of the growing class of professional men of science, he does show us how these men of professional classes began to gain influence. As science became interesting and fashionable to men like the earl, more opportunities began

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[62] Ibid., p.14
[63] Ibid.
[64] Caroline Gillan, "Lord Bute and eighteenth-century science and patronage" (NUI Galway, 2018), p.43. It is not clear exactly what kind of relationship Bute had with the king. Often the term 'favorite' used in this context suggests some kind of illicit relationship which could be implied but not openly stated even by the king's detractors. Certainly the king had an interest in Bute, giving him a number of very influential positions, which earned the earl no friends in court.
[65] Ibid., p.153
[66] Diane Perkins, "'Three Daughters of John, 3rd Earl of Bute', Johan Zoffany, C.1763-4. Summary" (tate.org.uk, 2003)

opening up for patronage and career advancement for successful practitioners like Mead and Hunter. The fact that aristocrats like the earl were also patrons of the arts made it all the more desirable for professional men of science to spend their own newly-acquired fortunes in a similar way.

Sometime in late 1762 or early 1763, Hunter petitioned the 3rd Earl of Bute –then serving a brief stint as The First Lord of the Treasury—for the funds to establish a National School of Anatomy which would also serve as a museum.[67] The earl would not maintain his position long enough as shortly thereafter he stepped down from his position amid scandal and general popular dislike. However, Hunter would get his wish in the form of his Great Windmill Street anatomy school and museum, granted to him by the earl of Bute's successor.[68] The semi-private museum would house Hunter's growing art collection while the anatomy school provided him a base of operations for his teaching.

It is difficult to overstate the institutional impact of the Great Windmill Street anatomy school and museum of art and science in the 18th century. As Helen McCormack says in her thesis the joint institution was part of a new and "burgeoning world of exhibitions and culture of spectacle in eighteenth-century London."[69] As a private museum, its audience was restricted to invited guests, students, assistants, and colleagues, and the feel of the collection at the time "bordered on the semi-public realm of a gentleman's cabinet" with artworks and grotesque specimens rubbing shoulders, sharing one space and crucially, sharing one purpose: spectacle.[70]

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[67] McCormack, "A Collector," p.14
[68] Stuart Craig Thomson, "The Great Windmill Street School" (*Bulletin of the History of Medicine*, Vol. 12, No. 2 1942), p.371 After he resigned as Lord of the Treasury on April 8, 1763 the Earl of Bute recommended Hunter's project to his successor, George Greenville. Bute's recommendation, along with a petition to the king from Caesar Hawkins (1711-1786), surgeon general to the king ensured that Hunter would be able to go ahead with the project.
[69] McCormack, "A Collector," p.14
[70] Ibid.

The spectacularizing of science –the addition of elements of showmanship in its presentation and the sensationalizing of scientific subjects—was not new in the Enlightenment. Curiosity cabinets which McCormack alludes to had been part of aristocratic culture for centuries by Hunter's time. However, part of the spread of interest in the sciences influenced by the Enlightenment was the transition of science from niche and aristocratic curiosity to popular spectacle. These popular spectacles took the form of surgeries and dissections presented in theaters like plays and travelling chemistry demonstrations similar to the one Wright of Derby depicts in his *Air Pump.*

At Great Windmill Street, anatomy lessons preformed on real cadavers took place in a theater where students sat in tiered seats around a table on which the cadaver was placed. Hunter encouraged his students not to take notes, but to watch and engage directly.[71] Though the audience and the room Zoffany depicts in his *William Hunter Lecturing* is imagined, the theatrical energy of the piece is not far from the truth. In the same building was the museum where Hunter's growing art collection including several old master works was housed, along with a sizeable collection of medical specimens, a deliberate choice to intellectually and aesthetically link all these objects, to make an institution which, like himself, had a foot in both worlds. It was, as McCormack says, "a conflation of anatomy theatre, hospital architecture, exhibition and assembly rooms"[72] and it embodied the joining institutionally, intellectually, and aesthetically of art and science.

Reynolds and Hunter are men who would both seem easily sorted into categories: artist and scientist respectively, and yet both of them were fascinated by these very different disciplines and used their influence or the influence of their friends to blur the lines between

[71] Thomson, "Great Windmill Street," p.382
[72] McCormack, "A Collector," p.15

disciplines in the institutions they led or were part of. Not every foray across disciplines was successful or appreciated in its time, but it all contributed to the Enlightenment culture of curiosity, experimentation, and scientific observation in all fields.

Joseph Wright of Derby: Art and Industrialism Beyond London

In 1771, while Reynolds was in the midst of his chemical experimentation and William Hunter was growing his art collection, Joseph Wright of Derby, Reynolds's fellow apprentice in Thomas Hudson's portrait studio,[73] exhibited eight works at London's Society of Artists.[74] Among them are two of his famous artificial light paintings like the *Air Pump*. One, *A Blacksmith's Shop* (fig. 2.6) depicts iron workers at a forge in the artist's native Derbyshire. Like the *Air Pump* which he had exhibited three years earlier, Wright of Derby makes the machinery the undisputed main character of the paining. This time though, the delicate scientific instruments are replaced by heavy industrial tools and the aristocratic onlookers have been replaced by workers—their bodies another kind of industrial technology on display. The setting and feel of the place are different, but the tone is the same: it is an ode to progress, and Enlightenment-era modernity, though this time it is industrial rather than scientific.

The other artificial light painting Wright of Derby exhibited that year also foregrounds technology, though at first glance it seems like a much more fantastical version of this formula. The lengthily titled *The Alchymist, in Search of the Philosopher's Stone, discovers Phosphorus, and prays for the successful conclusion of his operation, as was the custom of the ancient chymical astrologers* (fig. 2.7) depicts an alchemist –represented as an old man in gothic

[73] Hunter, "Nice Chymistry"
[74] **A**lgernon Graves, *The Society of Artists of Great Britain, 1760-1791; the Free Society of Artists, 1761-1783; a Complete Dictionary of Contributors and Their Work from the Foundation of the Societies to 1791* (London, G Bell and Sons, 1907). p.287

costume—falling back on his knees in awe of the pale blue jet of light emanating from a glass vessel in front of him as two young assistants look on. There are a few immediate similarities between this work and the other artificial light paintings, especially the *Air Pump*, namely the foregrounding of an experiment and the technology making it possible. Notably though, unlike the *Air Pump* where the experiment seems practiced and methodical, there is a sense of accident and randomness in the *Alchemist*, marking the distinction between the perception of enlightenment science (methodical, well-proven, and almost unfailingly true) and alchemy (unscientific, gothic, its successes more due to accident than accuracy). Many scholars have noted the impressive accuracy of Wright's depiction of phosphorous gas.[75] As Hunter remarks, "the Derby painter was fastidious in depicting the facts and furniture of this alchemical accident."[76] Wright of Derby did not achieve this striking accuracy on his own. He consulted two friends, a surgeon and lecturer Dr. Matthew Turner (died 1789) and Peter Perez Burdett (1734-93), a draughtsman, engineer, and printmaker.[77] Both of these men were important members of the art and science community in Liverpool, where Wright of Derby spent a significant amount of time and made many of his most advantageous connections.

Aside from its connection to Joseph Wright of Derby, Liverpool might not seem like an obvious point of interest for this project. Certainly, there were other centers of institutional crossover, Edinburgh and Glasgow in Scotland could just as easily be used as examples. That said, Liverpool was home to a specific, active effort to create more art and science institutions and to connect them. It is a fascinating example specifically because it was not initially a thriving hub of institutional crossover.

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[75] Hunter, "Nice Chymistry." Hunter notes Wright of Derby's skill in depicting the gas and gives a brief history of the chemical discoveries associated with phosphorous which would have been known in Wright of Derby's time.
[76] Ibid.
[77] "The Joseph Wright of Derby Collection," Derby Museums

Liverpool in the mid-eighteenth century was the major port of the slave trade in Britain, a center of unglamorous labor and industry, certainly not the kind of place one would expect to be home to a thriving arts and sciences scene. Indeed, one contemporary writer described Liverpool as "the only town in England of any eminency that has not one single erection nor endowment for the advancement of science, the cultivation of the arts or the promotion of knowledge," a grim situation to be in.[78] However, all was not lost. As Elizabeth Barker says in her book *Joseph Wright of Derby in Liverpool*, "eighteenth-century Liverpool was not impervious to the cultural changes that were associated with ... the Enlightenment."[79] By the middle of the eighteenth century the Enlightenment had brought what Barker calls an urban renaissance along with an interest in charity, and a new found desire among the wealthy merchant class to patronize the arts and sciences.[80]

Even more so than in London, Liverpool was the site of a rapidly growing professional class. The slave trade and the burgeoning industrial economy meant that non-aristocrats suddenly had a great deal more buying power. Many of Wright of Derby's major patrons were successful merchants, a few with ties to the Corporation of Liverpool, the self-elected oligarchy who controlled the local government.[81] Though there were some aristocratic men in the Corporation, the majority were of the merchant class. These newly wealthy and powerful merchants were determined to be known as men of taste. They indulged in conspicuous consumption, purchased exotic curiosities, fine wines, and of course, good art.[82]

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[78] Elizabeth Barker, *Joseph Wright of Derby in Liverpool* (Yale University Press, 2007). p.6
[79] Ibid., p.7
[80] Ibid.
[81] Ibid.
[82] Ibid. Barker quotes a letter from Joshua Dixon, the young assistant to the apothecary and merchant Edward Parr which describes the lifestyles he encountered among the wealthy men of Liverpool. "I here am possessed of everything wch. can make life agreeable," he writes, "and all the sumptuous magnificence of a polite age"

The urban renaissance of Liverpool included many attempts to found or expand institutions for the promotion of culture. The driving force behind many of these attempts was the circle of intellectuals who met at the Liverpool public library. In 1768, influenced by the growing interest in and new technologies for astronomy, the Liverpool library circle gathered support and materials for the construction of the city's own observatory with lenses designed by some of Liverpool's most talented watchmakers.[83] In 1769, Wright of Derby's friend and member of the library circle, Peter Perez Burdett founded the Society for the Protection and Encouragement of Arts of Painting and Design in Liverpool.[84]

The founding of the Liverpool Society of Artists was a foundational moment for the arts scene in Liverpool, and it is almost certainly not a coincidence that it took place while Wright of Derby was present. The artist had arrived in Liverpool the previous year, at the encouragement of Burdett. Barker argues that Wright of Derby, as "one of the rising stars of British painting, ... would have seemed a perfect candidate to be president of any intended society."[85] The idea that Wright of Derby was intended to be the president of the society of artists is further compounded by the fact that the same year the society was founded, Wright of Derby painted another of his artificial light paintings, *An Academy by Lamplight*. The choice to depict an idealized academy scene the same year his friend founded an academy in the city he had just arrived in seems like more than coincidence. Ultimately for reasons unknown, Burdett, not Wright of Derby, claimed the first presidency. The relationship to Burdett and the intellectual circles of Liverpool was still priceless for Wright of Derby as the artist found many patrons among Burdett's friends in the library circle and beyond.

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[83] Ibid., p.12 Watchmakers also produced the tools to support intellectuals' interests in electricity, chemistry, and anatomy
[84] Ibid. p.7
[85] Ibid., p.21

It is worth taking a moment to look closer at Burdett and Wright of Derby's relationship. Burdett is perhaps the best example we have seen thus far of a man who straddled art and science, and his friendship with Joseph Wright of Derby is one of the most interesting examples of what an Enlightenment-era, cross-disciplinary friendship could do. Peter Perez Burdett is best known for his work as a cartographer and engraver. His 1767 map of Derbyshire won a prize from the Royal Society for the best map of a county at the scale of one inch per mile.[86] The map details land ownership and the placement of mines, churches, and large houses. It is drawn with mathematical precision as Burdett was one of only a few mapmakers in his time to use trigonometry as part of the draughting process.[87]

Unfortunately, Burdett was not nearly as precise with his money as he was with his mapmaking, and he was forced to leave Derbyshire for Liverpool a year later fleeing his creditors.[88] While in Liverpool, Burdett became one of the most innovative printers of his time. In 1773, he created a print of Wright of Derby's *Two Boys Blowing a Bladder by Candle-light* (fig.2.8), a quintessentially Enlightenment work featuring two boys experimenting with a bladder, one blowing it up and the other observing. It is another artificial light-based Enlightenment genre painting with a similar demonstrator/observer dynamic to the *Air Pump*. Burdett's print bears no trace of etched lines, leading many to believe it is the first pure aquatint print produced in Britain.[89] Aquatint, which involves exposing a copperplate to acid through a layer of melted granulated resin, had only just been successfully attempted for the first time in France five years earlier. Wright of Derby's moralized scene of experiment seems to perfectly compliment the chemical ingenuity of Burdett's aquatint.

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[86] "Burdett's Map," BBC/the British Museum: A History of the World
[87] Ibid.
[88] Ibid.
[89] "Two Boys Blowing a Bladder by Candle-light," The Met Museum

For Wright of Derby's part, one has only to look at how the artist depicts Burdett in paintings to see how much he respected him. Burdett appears in Wright of Derby's *A Philosopher Giving A Lecture on the Orrery* (1764-66) (fig.2.9)[90], taking notes on the lecture. In this scene Burdett is cast as the perfect Enlightenment man of science, observing the demonstration of the philosopher from just over his shoulder, taking notes, perhaps even making a sketch of the device, his face, appropriately, lit by the lamp inside the orrery. The work was likely inspired by real lectures Wright of Derby and Burdett attended together.[91] Burdett appears in one of Wright of Derby's works again in the artist's 1765 portrait of *Peter Perez Burdett and his first wife Hannah* (fig.2.10). Though this is very much a portrait in the conventional sense, the couple well dressed and standing in front of a brick wall presumably on their property, the artist does not miss another chance to allude to Burdett's scientific knowledge. Standing confidently with one knee bent, Burdett holds a telescope in his right hand. Burdett was not an astronomer and the artist could just as easily have painted him with the tools of one of his own trades, but instead Wright of Derby chooses to emphasize his friend's interest in the sciences. Both of Burdett's appearances in Wright of Derby's paintings have him cast as the quintessential Enlightenment man –knowledgeable, studious, and comfortable with scientific instruments. In the visual language of Wright of Derby's work, where good science and good observation are moral values, this is high praise indeed.

Wright of Derby's repeated associations of Burdett with astronomy specifically may also be alluding to his friend's membership in another very important intellectual circle: the Birmingham Lunar Society. The Lunar Society, which still exists to this day and sells

[90] The orrery is a mechanical model of the movement of planets around the sun, or of the moon around the earth. It is named for its inventor, Charles Boyle Earl of Orrery (1676-1731).
[91] "A Philosopher Giving a Lecture on the Orrery (1764-66)," West Midlands History

memberships on its website, began in the mid-eighteenth century with a group of five highly influential, learned friends. Among them were Erasmus Darwin, a doctor and inventor, grandfather to Charles Darwin, James Watt, the Scottish industrialist who invented the steam engine in 1776, and Josiah Wedgewood, the famous potter.[92] Peter Perez Burdett would join later, as would Wright of Derby's neighbor John Whitehurst. Many of its members were also fellows in the Royal Society but the Lunar Society was, much to its benefit, outside the "establishment." It was therefore able to avoid many of the pitfalls and the drama of 18th century politics. One member, Joseph Priestly –a theologian, grammarian, and chemist who was the first to isolate oxygen gas—wrote that members "had nothing to do with the *religious* or *political* principles of each other ... [but] were united by a common love of *science,* which we thought sufficient to bring together persons of all distinctions."[93] It was an almost utopian project, bringing men of all different disciplines and backgrounds together in one common pursuit of enlightenment. In her book on the Society Jenny Uglo praises the group's "passionate common exchange and endeavor," saying that it was "of a type that would never be possible again –until today, with the fast, collaborative intimacy of the Internet."[94]

It is no wonder that Joseph Wright of Derby would be drawn to and fit in with such a group and that the Lunar men would take an interest in. As for who exactly brought him into contact with the Lunar Society, sources are divided. Some argue that it was Peter Perez Burdett who introduced him, as he had with the Liverpool Library Circle. Jenny Uglo suggests it was the artist's neighbor and one of the original Lunar Men, John Whitehurst. One way or another, Wright of Derby became, as Uglo puts it, not "a formal member of the Lunar group, but ...

[92] Jenny Uglo, *The Lunar Men,* (New York, Farrar, Strauss, and Giroux, 2002), p.xiv
[93] Ibid.
[94] Ibid., p.xv

certainly a Lunar man."[95] He painted portraits of many of the members and began seeing Erasmus Darwin to treat his "lethargy and depression."[96]

The open and idealistic pursuit of scientific knowledge within the Lunar Society almost certainly inspired the setting of *Air Pump* and especially its slightly lighter-hearted companion piece *The Orrery* (fig. 2.9). The latter painting especially contains references to the Lunar men. As previously stated, the young man taking notes is almost certainly a portrait of Peter Perez Burdett, and Uglo argues that there is the suggestion of a second portrait as "there is something of Whitehurst, crossed with Newton, in the grey-haired, benign philosopher."[97] This identification with the philosopher/astronomer is made even more appealing by the fact that at the time Whitehurst was formulating his theory of the formation of the earth, "of whirling particles drawn together by gravity in space."[98]

The Lunar Society is perhaps the site of institutional crossover which is most infused with the idealism and curiosity of the Enlightenment, but as we have seen it was far from the only place where crossover was possible. Even in the seemingly more rigid world of London institutions like the Royal Society and the Royal academy, artists and scientists were coming together, exchanging ideas and opinions, and most importantly exchanging methods of looking. Artists like Joseph Wright of Derby and to some extent Johan Zoffany, who were able to capture the Enlightenment spirit in their work were able to do so because of their associations with men of science and men of industry who made a career out of observing and teaching others how to observe. Studying this institutional crossover and the men who went out of their way to create it gives us a clearer picture of how and why artists began to create works infused with scientific

[95] Ibid., p.122
[96] Ibid.
[97] Ibid., p.123
[98] Ibid.

ideals such as direct observation. The economic changes of the eighteenth century which allowed professionals like William Hunter or the members of the Lunar Society to buy or commission art also suggests that there was an economic incentive for artists to make connections with men of science and early industrialists and to become more involved in intellectual circles. Science was also able to enter the realm almost of popular culture through the work of scientist/showmen like Hunter whose lectures and demonstrations were legendary, and who by building his anatomy theater adjacent to his museum conferred an extra layer of spectacle. All these intellectual, institutional, and economic factors came together in a moment infused with the spirit of the Enlightenment to allow the developments in representations of observation and spectatorship which we observed in Chapter I.

Appendix of Images

Fig.2.1. Joshua Reynolds, *Studio Experiments in Colour and Media*, ca. 1770–ca. 1790? oil and other media on canvas, 24 × 20 in. 60.9 × 50.9 cm). Royal Academy of Arts, London

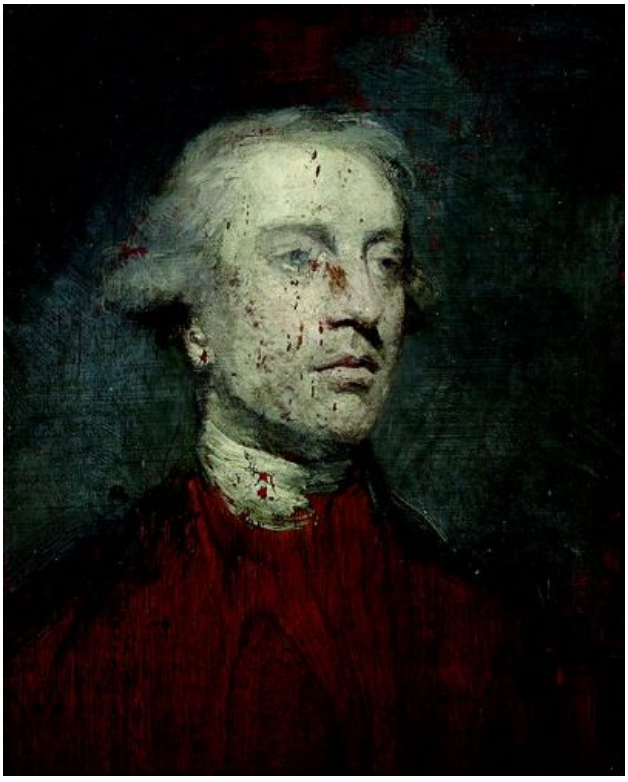

Fig.2.2 Joshua Reynolds, *Portrait of James Coutts*, ca. 1771, oil on mahogany panel, 29 × 24 in. (73.7 × 61 cm). Scottish National Gallery, Edinburgh (artwork in the public domain; photograph © Scottish National Gallery)


Fig.2.3. Nathaniel Hone the Elder, *The Conjuror*, 1775, oil on canvas, 57⅛ × 68⅛ in. (145 × 173 cm). National Gallery of Ireland, Dublin (artwork in the public domain; photograph © National Gallery of Ireland)


Fig.2.4. Godfrey Kneller, *Sir Isaac Newton,* 1702, oil on canvas, 29 3/4 in. x 24 1/2 in. (756 mm x 622 mm) NPG 2881 © National Portrait Gallery, London

Fig.2.5. Johan Zoffany, *Three Daughters of John, 3rd Earl of Bute*, 1763-4, oil on canvas, 1012 x 1265 mm. Tate Museum, London

Fig.2.6. Joseph Wright of Derby, *The Blacksmith's Shop*, 1771, oil on canvas, 50 1/2 x 41 inches (128.3 x 104.1 cm). Yale Center for British Art, Paul Mellon Collection

Fig.2.7. Joseph Wright of Derby, *The Alchymist, in Search of the Philosopher's Stone, Discovers Phosphorous, and Prays for the Successful Conclusion of His Operation, as Was the Custom of the Ancient Chymical Astrologers,* exhibited 1771, reworked and dated 1795, oil on canvas, 50 × 40 in. (127 × 101.6 cm). Derby Museum and Art Gallery

Fig.2.8. Peter Perez Burdett after Joseph Wright of Derby, *Two Boys Blowing a Bladder by Candle-light*, 1773, Aquatint printed in red and brown inks, plate: 11 1/4 x 8 3/8 in. (28.6 x 21.3 cm)
sheet: 11 1/2 x 8 11/16 in. (29.2 x 22 cm). The Met Museum, New York City, The Elisha Whittelsey Collection, The Elisha Whittelsey Fund, 1968

Fig.2.9. Joseph Wright of Derby, *A Philosopher Giving a Lecture on the Orrery*, ca.1766, oil on canvas, 147.2 cm × 203.2 cm. Derby Museum and Art Gallery

Fig.2.10. Joseph Wright of Derby, *Peter Perez Burdett and his First Wife Hannah*, 1765, oil on canvas, 145 cm × 205 cm. National Gallery, Prague

III. The Anti-Enlightenment

In the final chapter of her book *Wonders and the Orders of Nature 1150-1750*, Lorraine Daston marks the Enlightenment as the death of the wonderous. Though she allows that some lay people might have continued to see wonder in the world, for intellectuals "the star of the marvelous had indeed waned."[99] This, according to Daston led to "an anti-marvelous aesthetic of art" where verisimilitude ordered works just as Newton's laws of physics and Linnaeus's natural categorization ordered the natural world.[100] Of course, the marvelous didn't disappear in the Enlightenment, least of all for intellectuals and artists. Perhaps the marvelous ceased to exist in dragons and comets, but it was still alive in the iridescent light of a jet of phosphorous gas, or the spectacle of a master surgeon doing a public demonstration, or in the power of the human mind to grasp a complex idea. All of these versions of the marvelous appear in in the works we have examined in the previous chapters, and there can be no doubt that the Enlightenment-marvelous was a great inspiration to a number of artists.

But there was also a pronounced rebellion against it, an urge to return to an older conception of the marvelous and spectacular, to a world not constrained by the laws of science or the obligation to verisimilitude. Even as artists like Joseph Wright of Derby found inspiration, morality, even a kind of sublimity in the New Science culture of observation and experimentation, others saw scientific advancements as making the world smaller, limiting their creativity. They rebelled against it, intentionally deviating from or obfuscating reality and

[99] Lorraine Daston, *Wonders and the Orders of Nature 1150-1750*, (New York, Zone Books, 1998), p.329
[100] Ibid., p.358

rejecting the supremacy of sight and observation. Some of these artists were open about their rejection of the New Science and its supporters, while others worked quietly against the grain. Especially toward the end of the 18th century and the beginning of the 19th, we see more and more artistic rebellion against the Enlightenment, a rebellion which would lead to new artistic traditions, the most longstanding of which was Romanticism. We also see artists making use of new technologies in ways which disrupt the Enlightenment narrative of technology as a tool for clarifying our understanding of reality. While not all of these trends and tactics are actively, combatively anti-enlightenment, they are all part of a movement against the principles and morals of the Enlightenment, an aesthetic and ideological trend which we will call the Anti-Enlightenment.

Blake and Fuseli: Painting the Fantastical and Incomprehensible

Like Joshua Reynolds and Johan Zoffany, Henry Fuseli, the Swiss artist born Johann Heinrich Füssli, spent most of his career in London, working within the mainstream institution of the Royal Academy. However, from the moment he came into the public eye in the mid-1770's, his work seemed to belong to a different universe than his institutional peers. Though his Royal Academy debut, a large canvas of *Macbeth,* is lost,[101] it is not unreasonable to assume that it looked like his other works, which is to say, wild and tempestuous, imbued with dynamism and a frenzied, panicked energy bordering on madness.

Fuseli's *The Nightmare* (fig. 3.1), completed in 1781 only four years after the missing *Macbeth*, is one of the best examples of the artist's strangeness. The painting depicts a woman in the grips of a nightmare. We see her contorting in her troubled sleep, as what we must

[101] Martin Myrone, "Henry Fuseli and Gothic Spectacle," (Vol. 70, No. 2, June 2007), p.289 Fuseli would return to the subject of Macbeth a few times throughout his career with his *'Macbeth', Act I, Scene 3, the Weird Sisters* (ca.1783) and *Lady Macbeth Seizing the Daggers* (ca. 1812).

assume is the content of her dream plays out in front of us. A demon sits on her chest as a ghostly horse –a literal "night mare"—appears from behind a curtain. The logical and the illogical bleed into each other in a way which bucks every expectation of rationality and verisimilitude.[102] Perhaps the biggest departure from the norms of Enlightenment art is the depiction of an unconscious mode of experience. A spectacle experienced while asleep, while one is incapable of observation let alone reason, is antithetical to the spectacles of Wright of Derby or Zoffany, which rely on the spectators' ability to logically understand the subject to elicit a sense of wonder. Here, the spectacle of the nightmare can only be experienced while asleep, and the response it elicits is not wonder at its rationality but terror at its irrationality.

Even in Fuseli's paintings which deal with more traditionally academic subject matter, like his *Oedipus Cursing His Son, Polynices* (1786) (fig.3.2), what could easily be a history painting feels imbued with madness. Every movement is exaggerated, giving it the feeling of a theatrical performance rather than a painting of a historical or mythological scene. Oedipus's blind eyes are unnaturally large and wide, emphasizing and exaggerating his frenzied, sightless stare. Compare this to a truly conventional (though exceptionally executed) history painting, *The Choice of Hercules Between Virtue and Pleasure* (fig. 3.3), a similarly mythological work by the American artist and friend of both Joshua Reynolds and King George III, Benjamin West (who we may recall from his inclusion in Johan Zoffany's *William Hunter Lecturing*). West's work is classically neoclassical and academic with its statuesque poses and powerful, saturated colors, and inflected with Enlightenment values, rational and balanced in its composition. Even West's

[102] Maryanne C. Ward briefly discusses what Fuseli claimed his inspirations were for *The Nightmare*. Apparently, the artist talked "freely, although not always consistently" about his inspirations. At one point he claimed the painting was inspired by an experience after eating raw pork. The other, and decidedly more interesting explanation he offered was that the woman in the painting was inspired by a woman he was once in love with, Anna Landlot. This is especially interesting as the demon in the painting is supposed to be an incubus. This has led a number of scholars to wonder if the demon is Fuseli's own projection of himself.

choice of topic, a decision between virtue (fully clothed and making a gesture straight out of Raphael's *School of Athens*) and pleasure (breasts exposed, clearly more concerned with the carnal than the intellectual) is imbued with Enlightenment values regarding the importance of being governed by logic and rationality. The same cannot be said of Fuseli's chaotic piece, depicting a moment of irrational anger, where every character is portraying some form of rage or despair.

In a further deviation from Enlightenment values, Fuseli rejects the power of the gaze which is present even in West's *Hercules* where the titular hero closely inspects his choices, specifically Virtue. And the manner of Virtue and Vice's very different gazes is used to indicate their characters. In *Oedipus*, there is no clear dynamic of looking. Indeed, the only eyes we see clearly are, ironically enough, the blind eyes of Oedipus. Polynices turns away, while his sister Ismene covers her face, both siblings too overcome to look at their father with the rational and Enlightenment-privileged sense of sight. The only character looking directly at another and truly seeing them in this painting is Antigone, perhaps the only semi-rational character in the scene, and therefore the most tragic. There is no observation, no experimentation, no study in this painting, only chaos and rage and misunderstanding.

Looking at the anatomy of the characters in Fuseli's *Oedipus* and especially his *Nightmare*, it is also clear that the artist himself was not working from observation. His characters' elongated limbs and exaggerated gestures privilege drama over realism, something even the less rigidly naturalistic Enlightenment artists like Joshua Reynolds would never do. To make it clear, as Fuseli does, that study from nature comes second to dramatic and emotional effect, is a radical departure from the works and values we have looked at previously. Even

Joshua Reynolds, who wrote extensively on the value of a level of abstraction in art, always asserted that to "imitate nature is the invariable rule."[103]

Fuseli's drastic departure from the norms of British art earned him a great deal of attention, good and bad. He earned a position as professor of painting at the Royal Academy, but critics remained divided, because as art historian Martin Myrone finds, they "saw his work as tending erratically toward genuine visual power and intellectual effect, or childish shallowness, grotesque showiness, and eccentricity," or, more often than not, toward both.[104] One critic, clearly favoring the more mainstream Enlightenment paintings lamented that:

> Pictures are, or ought to be, a representation of natural objects, delineated with taste and precision. Mr. Fuseli gives us the human figure, from the recollection of its form, and not from the form itself; he seems to paint every thing from fancy which renders his works almost incomprehensible.[105]

Fuseli's painting was wild and irrational in form and subject matter, and represented a new and strange kind of spectacle, not the kind of spectacle of an anatomy theater or a natural philosophy demonstration. Indeed, Fuseli's choice of subjects, as much as his choice of tactics, indicate his difference from his peers, and the changing tastes of artistic audiences in general. He created a series of illustrations to accompany Martin Wieland's fantasy *Oberon* (1804-5) and did a painted treatment of the Fire King (1810), Sir Walter Scott's poem published in *Tales of Wonder* (1801), and privately published the previous year in *An Apology for Tales of Terror*.[106]

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[103] Reynolds in Kemp, "True to Their Natures," p.79.
[104] Ibid., p.290.
[105] An unnamed critic in Myrone, "Henry Fuseli," p.307. This is reminiscent of William Hunter's writing on art I which he promoted almost absolute naturalism, saying that "to make solid proficiency in the study of any Art, it is observed that it is of infinite service to be grounded in its Elements, its scientific and demonstrable principles." Certainly this was the view of what art ought to be through the lens of the New Science. The artist, like the scientist, should learn by observation.
[106] Ibid., p.292

Even his paintings which were not explicitly linked to such fantastical contemporary works were imbued with the same spirit. Curses, witches, fairies, and ghosts were all favorite subjects for Fuseli. These subjects, and the artist's characteristic exaggerated, long-limbed characters were termed, mockingly or lovingly, "Fuselian" or "Fusilesque."[107]

Fuseli's paintings as well as Wieland's and Scott's works were part of the burgeoning genre of the gothic which delighted in the strange, the inexplicable and the grotesque. As Maryanne C. Ward observes in her article on the relationship between Fuseli's *Nightmare* and the quintessentially gothic novel *Frankenstein,* "The Gothic is by tradition a tale of the unspeakable, the horrible, perhaps the surreal, but for the most part the 'unreal.'"[108] If the gothic sounds like the antithesis of Enlightenment values and aesthetics, that's because it is. Fuseli's work signifies a change of taste which began at the end of the 18th century, a return to that earlier version of the marvelous, the grotesque, those extreme aesthetic emotions which were more untethered before the Enlightenment. Poet Henry Lemoine wrote in the introduction to his "Phantasmagoria" of "the taste for terror, and the long train of terrific romances or novels of late years published," a reference to the growing popularity of gothic literature and other fantastical cultural products which Fuseli's work was a part of.[109] The artist is undeniably one of the first

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[107] Ibid.

[108] Maryanne C. Ward, "A Painting of the Unspeakable: Henry Fuseli's "The Nightmare" and the Creation of Mary Shelley's "Frankenstein"" (Vol. 33, No. 1 Winter, 2000). p.20. In her exploration of Fuseli and *Frankenstein* Ward explains Mary Shelly's personal interest in Fuseli's *Nightmare*. She also mentions the fact that Fuseli personally knew the famous gothic poet Lord Byron who was very interested in his art and "talked to the painter about the inspiration for one of Fuseli's illustrations." This is according to Byron's journals. There is also strong evidence that Fuseli carried on an emotional and literary if not a sexual affair with Enlightenment thinker and mother of Mary Shelly, Mary Wollstonecraft. This last connection does less to tie him to the gothic but does say something about the artist's societal reach.

[109] Lemoine in Myrone "Henry Fuseli," p.294. The phantasmagoria is a device which we will go into in depth later in this chapter, but Lemoine's poem could just as easily be describing Fuseli's work, especially his *Nightmare* when he writes "Such are the forms Phantasmagoria shows,/ And such the dread which round us glows,/ As when the weary limbs repose in sleep,/ What wild fantastic forms their vigils keep,/ Men, Devils, Angels, unconnected train,/ Compose the motley visions of the brain,/ Until the purple blush of day appears,/ And chaces from our brows nocturnal fears,/ The busy scenes from their usual brightness wear,/ And the false dreams dissolves in shapeless air."

people to visualize this gothic aesthetic, but audiences had been primed for it by at least a decade of gothic literature feeding their taste for the unreal and the inexplicable.

Radical as Fuseli's painting was compared to that of his peers, he remained firmly in the mainstream of the London art world, serving as Professor of Painting until 1805 when he was elected Keeper and then being reinstated as professor again in 1810 when a change was made to the statutes to allow him to hold both positions at once.[110] His work remained wonderful, terrible, and controversial but always in the public eye until his death in 1825. The same cannot be said for Fuseli's friend and fellow artist William Blake. After Fuseli's death, Blake, who is perhaps more well known as a poet than an artist wrote a short eulogy, affectionately calling his friend "The only man I e'er knew/ who did not make me almost spew."[111] This short poem says a great deal more about its writer than its subject. William Blake was a combative and controversial man who, like Fuseli worked against the grain of Enlightenment art, but unlike Fuseli, his approach and his reception was much more extreme. He neither got nor wanted that same institutional acceptance.

There are a number of reasons that Blake remained on the fringes of the art world. He was a printer and a poet, rather than a career painter, which inherently put him lower on the hierarchy of media, and his famously bad temperament made it difficult for him to find work as an artist. We know that he read Reynolds's discourses and annotated them extensively, but neither his annotations nor his actions suggest he had any interest in emulating Reynolds.[112]

Myrone goes into a great deal of depth on the many connections between Fuseli's work and popular entertainment spectacles of the time.

[110] "The Fire King," The Victoria and Albert Museum

[111] William Blake, "On Friends and Foes, Poem XXIV" *The Poetical Works of William Blake,* (London, New York, Oxford University Press, 1908).

[112] Mike Goode, "The Joy of Looking: What Blake's Pictures Want." (*Representations*, vol. 119, no. 1, 2012), p.25-6. Blake's annotations in Reynolds's *Discourses on Painting* point to his complicated relationship with mainstream art of the time (and the strange way he read books). On some passages he wrote notes such as "most false," "Nonsense," "Contemptible," and, cryptically, "What but a puppy will dare to do this." At the same time he wrote

His only notable long-term patron was William Hayley, a well-connected intellectual man who moved him into a cottage in Felpham where he hoped, misguidedly as it turned out, to collaborate with him on "various literary projects."[113] These were, in Blake's own words three of "the Darkest Years that ever Mortal sufferd."[114] It is unclear exactly what Blake's condition was –he himself described it as a persistent cold—but it is clear from his own accounts of his health and scholarly descriptions that he suffered from major episodes of depression and anxiety. He was diagnosed by Hayley with a "disease" of "nervous irritation" –this diagnosis, Glausser notes, is "straight out of Enlightenment conclusions" about such conditions.[115] Blake's patron found that the artist was "very apt to fail in his art" because of these illnesses. Hayley, along with many mainstream figures in art and poetry and some of Blake's own friends, grew tired of his moods and shunned him. This treatment, Glausser suspects, must have seemed "a necessary effect of Lockean hegemony" as "the Enlightenment exposes that refuge [Bacon Newton & Locke] as nervous incapacity."[116] After his time at Felpham with Hayley, Blake never again attempted such an artist-patron relationship and seemed content to work in relative obscurity for the rest of his life.

Perhaps this personal grievance is why, where Fuseli's work visually disrupts Enlightenment narratives, Blake's openly opposed them. The artist was outspoken in his dislike of Enlightenment philosophy and science, particularly Locke and Newton. He used his art and poetry, often blending the two together, to crusade against what he perceived as the limiting of

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very positive notes on other passages, remarking "Good advice," and "True!" Goode notes Blake's impressive ability to "experience each sentence of a book almost as if it were a new event, a text written in a voice potentially different from the last."

[113] Wayne Glausser, "Locke and Blake as Physicians: Delivering the Enlightenment Body" in *Reading the Social Body* ed. Catherine B. Burroughs and Jeffrey David Ehrenreich (Iowa City, University of Iowa Press, 1993), p.336

[114] Ibid.

[115] Ibid. pp.236-7

[116] Ibid. p.237. Blake believed he needed a "refuge from [the] unbelief" of the Enlightenment, and the lack of that, or the pathologizing of that, only exacerbated his issues.

the human body and mind. In his *Milton*, two books of frenzied religious poetry originally published in 1810, Blake paints a grim picture of a society in which reason dominates imagination and the human body and spirit, once limitless and beautiful, is the prisoner of the mind. Glausser casts Blake as a kind of physician attempting to undo the damage the Enlightenment had caused to the human body. As Blake perceived it, Enlightenment science and philosophy, especially that of John Locke, robbed the human body of its mystical, divine properties, and reduced it to "an atomized material object," a "narrow doleful form/ Creeping in reptile flesh."[117] Blake's artistic mission, like the mission of Milton in his poem, was to use imagination and spirituality to liberate the world from the tyranny of Enlightenment –in his words to "reenchant" the body.[118]

The body and its confinement, its disenchantment and its re-enchantment, are driving themes in the art and the poetry of his 1794 re-telling of the creation myth, *the Book of Urizen*. The book tells the story of Urizen, a god-like creator who is terrified by the infinite complexities of eternity, and so creates a world limited by the constraints of "nature."[119] Urizen's terror and confusion, and the great effort of creating the world separate from eternity, leads him to retreat into hiding, leaving the world to fall into "a state of dismal woe" as his mind and body become ever more constrained by rationality and physicality.[120] Blake depicts Urizen's time in hiding in plate 10 of the book (fig. 3.4), a page, like the rest of the book, which combines text and image with the words of the poem above the image of a hunched skeleton. This hunched skeleton is

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[117] William Blake and Glausser, "Locke and Blake as Physicians," pp.230, 235.
[118] Ibid., p.230
[119] Ibid.
[120] William Blake, the *Book of Urizen*, (1794) 10.6. *The Book of Urizen* like many of Blake's other works, is a composite work—each page combining art and text. Mike Goode writes at length about the composite nature of Blake's writing, and what we, as reader/viewers might take from it in his article "The Joy of Looking: What Blake's Pictures Want."

Urizen, constricted in his physical form. The text above the image describes the torturous process of a body conforming to the laws of anatomy:

> In a horrible dreamful slumber;
>
> Like the linked infernal chain;
>
> A vast Spine writh'd in torment
>
> Upon the winds; shooting pain'd
>
> Ribs, like a bending cavern
>
> And bones of solidness, froze
>
> Over all his nerves of joy.[121]

Blake's poetry narrates the agony of an infinite being being forced into a finite body and the image supports this. The skeletal Urizen is bent under the physical and mental pressure of what is happening, his head is cradled in his hands. His eyeless gaze is directed downward, not out, and even when he is given the sense sight, so privileged in the New Science, Blake describes his eyes as "two little orbs/And fixed in two little caves" which behold only the cave where Urizen is in hiding.[122] Here we see a mind and body tortured and contorted by the demands of nature and physicality.

It is also worth noting the composite nature of this plate. Text and image cohabitate the relatively small space of the page. We have seen this format before, in the diagrams which we examined in chapter 1. However, where diagrams used this format to make complex ideas and phenomena clearer for the reader/viewer, the purpose of the composite piece in Blake's case is almost the exact opposite. Far from wanting to clarify a subject or make it easier to look at, Blake seems to want to make his work as incomprehensible as possible. The two forces, text and

[121] Ibid.
[122] Ibid. 10.8.

image, work against each other, competing for attention, so that one cannot separate one from the other or fully comprehend them together. This seems to be what Blake wanted, as he stated that he wanted viewers to "look thro" his work and not with it.[123] Mike Goode questions how often "the struggle between looking with and looking through his walls of words" led to Blake's readers "[defensively] looking away, be it out of fetishistic denial or just plain frustration."[124]

Contemporary critics responding to *The Book of Urizen* and other of Blake's illuminated manuscripts attempted to characterize what they were seeing with words like "deflection" and "diversion."[125] We cannot know whether it was Blake's intention to make his reader/viewer's look away entirely, but there is undoubtedly something intentionally combative about the way he presents his work on the page. It certainly seems like a conscious attempt to rebel against the idea which permeated art of the Enlightenment, the idea expressed by Fuseli's critic when he wrote that "Pictures are, or ought to be, a representation of natural objects, delineated with taste and precision."

We see torment of Urizen echoed in another character who Blake saw as beset by the constraints of Enlightenment: Sir Isaac Newton. Blake had a special dislike for Newton, as one of the founders of the New Science. As Goode puts it, the artist considered the scientist "his intellectual archenemy," the embodiment of all the thought that imprisoned humanity.[126] Blake's *Newton* (fig. 3.5), composed in 1795 and printed ca.1805, is unlike any other depiction of the father of physics. Blake depicts Newton naked, muscular, hunched over like the skeletal Urizen in an abstract, non-geometric landscape resembling the ocean floor. There is a kind of irony in the image of Newton being crushed by the force of gravity which he discovered. Newton, unlike

[123] Blake in Goode, "The Joy of Looking," p.13
[124] Goode, "The Joy of Looking," p.17
[125] Ibid.
[126] Ibid. p.11

Urizen, has eyes in this image, but they are directed downward as he draws geometrical shapes on a scroll at his feet. The shapes studied and mathematical are far removed from the irrational landscape around him. We might see a connection between these figures and the most abstract diagrams we examined in chapter 1. The ridiculousness of Newton's task, drawing diagrams which seem to have no relationship to nature as it appears in the painting, ads another none-too-subtle jab at the New Science, which Blake saw not just as constricting but woefully inadequate to capture the infinite complexities of life.

Even when they are less explicit, the intentionally illogical, irrational art of William Blake –and Fuseli before him—by their very appearance, their refusal to adhere to anatomical correctness or to depict scenes which moralized science and correct ways of looking, artistically rebel against the visual language of Enlightenment and the New Science. When we dub this artistic response the Anti-Enlightenment, it does not always mean that the art or the artist himself is opposed to Enlightenment ideas.

The Phantasmagoria: Technology of the Anti-Enlightenment

Embracing the taste for terror did not always mean rejecting the contributions of science and technology. Indeed, one of the most popular public spectacles of the late 18th and early 19th century relied on cutting edge technology. The phantasmagoria was a device for wonder, a mechanized gothic spectacle. Film historian and curator Laurent Mannoni describes it as the invention of "physicists and magicians" and indeed it is a kind of love child of science and magic.[127]

[127] Laurent Mannoni and Ben Brewster, "The Phantasmagoria" (*Film History*, Vol. 8, No. 4, 1996), p.390

The name "phantasmagoria" comes from the Greek *phantazō,* to produce an illusion.[128] The device, often credited as a precursor to film, used a magic lantern to project moving images onto surfaces or into smoke. The technology for the magic lantern had existed in some form since the 16th century, but the man credited with first capitalizing on it as a spectacle was a German named Johann Georg Schröpfer, also known as the *Gespenstermacher* or ghost maker.[129] As the nickname would suggest, Schröpfer used the lantern to hold dramatic seances where he would use it to summon the ghosts of the rich, the famous, and the ordinary alike. Though Schröpfer always claimed that his seances were genuine supernatural experiences, all of the ghost maker's apparitions were things which can be found described in treatises on illusionism including the magic lantern going back a century.[130]

The first show under the name "phantasmagoria" appeared in France in the 1790's, staged by a Belgian man, Étienne-Gaspard Robert, who went by the anglicized name "Robertson" as a reference to the English gothic literature he loved.[131] These early shows conjured up ghastly specters of those who had been killed in the revolution. Under a government which insisted there was no afterlife, these eerie spectacles walked a fine line between subversion and simple illusion.[132] To avoid upsetting the Jacobins, Robertson advertised his shows as an "enlightened" form of entertainment, showcasing new technology and revealing tricks which might have been used by religions to fool their flocks in the past. However, as Fabio Camilletti wrote for the BBC's history magazine, once the show began, all of the Enlightenment premises fell way as "audiences were welcomed in an environment filled with

[128] Ibid., p.390
[129] Ibid. Camilletti's article for History Extra goes into more detail about Schröpfer. A former soldier who claimed at various points to be a Catholic priest, the head of a freemason lodge, and the illegitimate son of a prince.
[130] Fabio Camilletti, "Phantasmagoria: Creating the 'ghosts' of the Enlightenment." (History Extra, April 17, 2017.)
[131] Ibid.
[132] Ibid.

skulls, bones, and magical symbols; they were served some drugged punch and left in the dark, before the magic lantern started projecting slides" (fig.3.6).[133] Robertson turned a supposedly enlightened display of projection technology into something quite the opposite, a strange and inexplicable spectacle, designed to baffle and frighten the spectator, and blur fantasy into reality.

By the first decade of the 19th century, the phantasmagoria made the jump to Britain. One commenter for a magazine in 1802 described the subjects which were most popular for phantasmagoria in Britain, finding that "The most interesting subjects are moonlights, forges, conflagrations, banditti in caves with torches, internal views of Gothic buildings with painted glass."[134] Many of these subjects are not unlike the setting of a Joseph Wright of Derby painting (moonlight, forges, and gothic buildings all made appearances in his work), and perhaps the artist was foreshadowing something of the gothic aesthetic which would not become popular until after his time, but unlike Wright of Derby's paintings, there was no pretext of scientific learning here. According to Henry Lemoine's poem published in *Gentleman's Magazine*, the phantasmagoria was more like a waking nightmare than a Wright of Derby painting:

> Such are the forms Phantasmagoria shows,
> And such the dread which round us glows,
> As when the weary limbs repose in sleep,
> What wild fantastic forms their vigils keep,
> Men, Devils, Angels, unconnected train,
> Compose the motley visions of the brain,
> Until the purple blush of day appears,
> And chaces from our brows nocturnal fears,

[133] Ibid.
[134] Lemoine in Myrone, "Henry Fuseli," p.294.

The busy scenes from their usual brightness wear,

And the false dreams dissolves in shapeless air.[135]

The words he uses, "fantastic," "visions," "false dreams," and the imagery of dissolving in clear bright light, set the experience of the phantasmagoria miles apart from the experience Enlightenment artists or even performing scientists wanted their viewers to have.

It was a spectacle of the horrifying and the irrational, of devils and angels and ghosts cohabitating with the living. It sabotaged the ability of the spectator to use sight to study or discern reality. At the same time, though, it follows in a tradition of science as spectacle which we can trace back to William Hunter's lectures or the demonstration of the bird in the vacuum which Joseph Wright of Derby depicted. When Robertson attempted to placate the Jacobin government by marketing his phantasmagoria as Enlightenment entertainment, he wasn't so far off. What separates the phantasmagoria from those earlier scientific spectacles is its intent to deceive. The impact that the Enlightenment had on dynamics of viewing in art, as we have seen in the last two chapters, was a movement which used gazes, the privileged sense of sight, to teach the viewer something, whether it be the actual facts of a scientific phenomenon, or how to look at the world like a man of science. When technology appears in art like this, it is used to further elucidate a subject, or to confer scientific clout. The phantasmagoria uses technology to the exact opposite end, to obscure reality, to make it frightening. Thus, the spectacle of the phantasmagoria does not make reality clearer; it in fact forces the viewer to question the objectivity of their own gaze, as ghouls and gods appeared before their very eyes.

[135] Ibid. As we saw in the previous section, there is a great deal of overlap between the imagery in the phantasmagoria and the imagery in Henry Fuseli's paintings. As Myrone says, there is no way to know if the artist saw these spectacles himself, or was simply channeling the same "taste for terror"

This is a very different kind of Anti-Enlightenment art than the works of Blake and Fuseli, not least because of its medium. The phantasmagoria turns the tools associated with science and Enlightenment, even light itself, into tools of obfuscation and fantasy. It speaks to the fact that interest in science and technology, and the incorporation of these things into art, did not disappear with changing tastes. What was changing was what artists and viewers wanted from an experience with art.

Over the course of the late 18th and early 19th centuries, art would move away almost entirely from Enlightenment-era science-worship. The phantasmagoria became a much more entertaining public spectacle than the demonstration of a vacuum, reasoned and controlled neoclassicism became wild Romanticism, benevolent scientists like those in Wright of Derby's paintings became ghoulish Dr. Frankenstein's meddling dangerously with the natural order of things. This was not because society was becoming less scientific; indeed, the advances made in the Enlightenment pale in comparison to the leaps forward made by science in the age of industry. Perhaps the novelty of looking at the world through a scientific gaze simply wore off, or perhaps the move away from science-inflected art was a result of the two disciplines becoming less intertwined as science itself became more and more specialized in the 19th century.

Appendix of Images

Fig.3.1. Henry Fuseli, *The Nightmare*, 1781, oil on canvas, 101.7 × 127.1 × 2.1 cm. Detroit Institute of Art, Founders Society Purchase with funds from Mr. and Mrs. Bert L. Smokler and Mr. and Mrs. Lawrence A. Fleischman

Fig.3.2. Henry Fuseli, *Oedipus Cursing his Son, Polynices*, 1786, oil on canvas, 149.8 x 165.4 cm. National Gallery of Art, Washington DC

Fig.3.3. Benjamin West, *The Choice of Hercules between Virtue and Pleasure*, 1764, oil on canvas, Height: 40 in., Width: 48 in. Victoria and Albert Museum, London

Fig.3.4. William Blake, Plate 10 of *The Book of Urizen*, 1784, via University of Adelaide, Australia

Fig.3.5. William Blake, *Newton*, 1795-ca.1805, Color print, ink and watercolor on paper, Support: 460 x 600 mm. The Tate Museum, London

Fig.3.6. *Interpretation of Robertson's Fantasmagorie*, in Marion, Fulgence, L'Optique. (Paris, Librairie de L. Hachette, 1869).

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