

**Curiosity Killed the Cat: Attitudes Towards Vivisections, c. 1660-1820**

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## Table of Contents

Acknowledgments.....	3
List of Figures.....	4
I. Introduction.....	5
II. The Royal Society of London for Improving Natural Knowledge .....	10
III. Pulmonary Experiments .....	14
IV. Blood Pressure and Circulation Experiments.....	23
V. Sentimental Versus Satirical Responses to Vivisections .....	33
VI. Educating the Youth and Lower Classes.....	38
VII. Precursors to Nineteenth-Century Animal Welfare Critiques.....	42
VIII. Concluding Statements.....	46
Appendix.....	48
Bibliography.....	52

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Lastly, I would like to pay respect to every animal who was victim to the culture of vivisections in this period of study. During my research process, I sifted through a tremendous number of horrific experiments. The animal subjects experienced an insufferable amount of pain and anguish. It is my hope that this thesis, and my continued study in this field of history, works to ensure that their stories and sacrifices are remembered through a place in the historic record. Moreover, I believe it is crucial to draw attention to the forms of animal cruelty that persist, including animal experimentation, factory farming, and animal abuse, among so many others.

**List of Figures**

Figure One: Joseph Wright of Derby, <i>An Experiment on a Bird in an Air Pump</i> .....	5
Figure Two: Stephen Hales, <i>Haemostatics</i> .....	31
Figure Three: Edward Landseer, <i>The Old Shepherd's Chief Mourner</i> .....	46
Figure Four: William Hogarth, <i>First Stage of Cruelty</i> ..	Appendix
Figure Five: William Hogarth, <i>Second Stage of Cruelty</i> ..	Appendix
Figure Six: William Hogarth, <i>Cruelty in Perfection</i> .....	Appendix
Figure Seven: William Hogarth, <i>The Reward of Cruelty</i> ..	Appendix



*Figure 1: Joseph Wright of Derby's "An Experiment on a Bird in an Air Pump". 1768. Oil on Canvas. The National Gallery*

## **I. Introduction**

In 1768, Joseph Wright of Derby completed the largest installment of his candlelight series, “An Experiment on a Bird in an Air Pump” (See Figure 1). More than just a well-executed piece of artwork, it is emblematic of academic inquiries into human anatomy and the natural world in England throughout the long eighteenth century (c. 1660-1820). Having emerged from the scientific revolution and shaped by Baconian empirical methodology, this period saw remarkable advancements in scientific discovery. It was a monumental age of vivisections, defined as operations on live animals for the purpose of scientific research. Thus, Joseph Wright of Derby’s painting uniquely encapsulates both the scholarly interests of the era

and the diverse contemporary attitudes towards animal experiments. For these reasons, it is an indispensable source with which to introduce this topic.

The scientific advancements of this era were undoubtedly indebted to experimental animals. This is represented in Wright's painting, which depicts a scientific demonstration using a white cockatoo.<sup>1</sup> The bird is trapped in a glass vessel attached to Robert Boyle's pneumatic engine.<sup>2</sup> Onlookers witness the air being vacuumed out of the vessel and observe the bird's response to air deprivation. The painting depicts only one of the many experiments involving animals in this period, with them being the subjects of tests involving toxicology, blood transfusions, and open surgeries, among others.<sup>3</sup> The cockatoo in this representation is nearing the end of its life and has collapsed to the bottom of the vessel. Whether the bird lives or dies is left uncertain.

Using the candlelight technique, Joseph Wright strategically casts light onto the faces of his subjects to emphasise the contrast in responses among the crowd. The viewer's eyes are first drawn to the two young girls to the right of the air pump.<sup>4</sup> The youngest is looking up at the bird with an expression of both horror and curiosity. She tightly holds onto her older sister's dress for comfort. The eldest girl, on the other hand, cannot bring herself to look at the experiment unfolding. This symbolises the sensibility that was beginning to appear in this period, with a gendered element in that only the women in the image are disturbed. Whereas, while some men also had moral qualms, the social standard was for them to express their emotions in private

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<sup>1</sup> Linda Johnson, "Animal Experimentation in 18th-Century Art: Joseph Wright of Derby, An Experiment on a Bird in an Air Pump" *Journal of Animal Ethics* 6, no. 2. (2016), 165.

<sup>2</sup> Joseph Wright of Derby, *An Experiment on a Bird in an Air Pump*, 1768, Oil on Canvas. The National Gallery, London.

<sup>3</sup> Andreas-Holger Machle and Ulrich Tröhler, "Animal Experimentation from Antiquity to the End of the Eighteenth Century: Attitudes and Arguments," in *Vivisection in Historical Perspective*, ed. by Nicolaas A. (1987).

<sup>4</sup> Joseph Wright of Derby, *An Experiment on a Bird in an Air Pump*, 1768, Oil on Canvas, The National Gallery.

correspondences. The man standing behind these two young girls gently encourages them to engage with the experiment.

On the other side of the frame is a youthful couple who only have eyes for each other.<sup>5</sup> This representation of young love appears to signify those who turned a blind eye or are indifferent to scientific advancements of this kind.<sup>6</sup> In contrast, below them is a young boy who is craning his neck to observe the cockatoo, overcome with excitement. Next to him is a gentleman with a stoic appearance, diligently watching the experiment with his watch in hand. The lecturer in the centre of the painting is extending his right hand out to the audience as an invitation to engage with the performance, whilst his other hand is raised above the glass vessel. This figure has ultimate control over whether the cockatoo lives or dies. Thus, Joseph Wright is symbolising the contemporary relationship between man and nature, in which human dominion is central.

The light in the room is emanating from the candle on the table, which is placed directly behind a second glass vessel.<sup>7</sup> The contents of the latter have been seen, variously, as a human brain, an animal lung, a reference to alchemy, or a diseased human skull.<sup>8</sup> Following that interpretation, its inclusion recentres the performance within its true goal: advancing knowledge about the human body and the natural world. Staged demonstrations like the one that Joseph Wright illustrates were common practice in the eighteenth century. They aimed to spread curiosity among the educated classes and establish the experiments as noble endeavours in the

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<sup>5</sup> Joseph Wright of Derby, *An Experiment on a Bird in an Air Pump*, 1768.

<sup>6</sup> Linda Johnson, "Animal Experimentation in 18th-Century Art", 172.

<sup>7</sup> Joseph Wright of Derby, *An Experiment on a Bird in an Air Pump*, 1768.

<sup>8</sup> William L. Pressly, "Joseph Wright of Derby (1734–1794) and Natural Philosophy: A New Perspective on His Artistic Intentions." in *The British Art Journal* 18, no. 2, 2017, 10; Mathew Morgan, "An Enlightened Experiment, Joseph Wright 'of Derby', National Gallery." YouTube, National Gallery of London. May 11, 2018. Video Lecture, 28:04; Alan Barnes and Stephen Leach. "Sulphuric Acid, Carbon Dioxide, and Bone: Wright of Derby's 'An Experiment on a Bird in the Air Pump' (1768)", *The British Art Journal* 18, no. 2, 2017, 24.

face of wide-spread critiques.<sup>9</sup> Namely, vivisections were condemned for wasting resources on unworthy vermin. This painting uniquely represents this early modern enthusiasm for science, while simultaneously drawing attention to the contemporary responses to animal experimentation. These diverse responses, in particular, are the focus of this essay.

This period of study – the long eighteenth century – is uniquely positioned between two starkly different eras in consideration of their attitudes towards animal cruelty and experimentation. During the sixteenth and seventeenth centuries, people of all social classes attended, and often participated in, blood sports. Though such activities as cock-fighting and bear, bull, and badger-baiting continued well into the nineteenth century, this early period can be differentiated by the insensitivity to animal cruelty among all social classes. From the mid to late seventeenth century, the educated classes began withdrawing from these popular recreations and condemning the working class who continued to enjoy the thrills of the fighting pits.<sup>10</sup> However, this middle- and upper-class disapproval of blood sports did not stem from a place of empathy for the animals involved.<sup>11</sup> Instead, it arose from an effort to curb plebeian disorder.<sup>12</sup> Thus, notions of respectability and Enlightenment ideals were gaining prominence among the upper class, while blood sport arenas were being denounced as dens of idleness and vice.<sup>13</sup> Following this period of study lies the nineteenth-century animal rights movement, an era marked by sentimentality for the natural world, and a growing distaste of animal experimentation.<sup>14</sup> Further,

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<sup>9</sup> Andreas-Holger Maehle, “Literary Responses to Animal Experimentation in Seventeenth- and Eighteenth-Century Britain.” *Medical History*, 34, no. 1 (1990), 28-9.

<sup>10</sup> Peter Burke, *Popular Culture in Early Modern Europe*, 3<sup>rd</sup> ed. (London: Routledge, 2016), 289.

<sup>11</sup> One significant exception was of course the aristocratic pastime of fox-hunting. See Peter Burke, *Popular Culture in Early Modern Europe*, 3<sup>rd</sup> ed. (London: Routledge, 2016).

<sup>12</sup> Brian Harrison, “Animals and the State in nineteenth-century England”, *English Historical Review*, LXXXVIII, no. CCCXLIX, (1973).

<sup>13</sup> Robert W. Malcolmson, *Popular Recreations in English Society, 1700-1850*. (Cambridge: University Press, 1973).

<sup>14</sup> Hilda Kean, “The ‘Smooth Cool Men of Science’: The Feminist and Socialist Response to Vivisection.” *History workshop* 40, no. 1 (1995).



it is an era that saw legislative changes that restricted and monitored the use of vivisections in science.<sup>15</sup>

Positioned between mass insensitivity and collective sentimentality, where does the long eighteenth century stand in its attitudes towards animal experimentation? To answer this, one must first understand the history and practicality of vivisections. The scientific revolution of the sixteenth and seventeenth centuries witnessed a resurgence in both an interest in human anatomy and vivisections, previously performed in antiquity.<sup>16</sup> A critical question here is, considering the focus on human anatomy, why would physiologists choose to experiment on animals? This can be explained by the lack of both human volunteers and available human cadavers on which to experiment upon.<sup>17</sup> For the majority of the experiments of interest, the subjects had to be alive. For example, a living body was necessary to study blood circulation and pressure. Thus, some experiments were performed on condemned convict volunteers in exchange for conditional pardons. For instance, in the mid eighteenth century, the condemned robber George Chippendale was reprieved by submitting to a limb amputation in a test for a new styptic.<sup>18</sup> However, this was hardly a practical option. Using animals was much more viable, especially considering stray animals like dogs were readily available. Thus, animal vivisections became common practice by anatomists with varying medical, anatomical, and zoological interests.<sup>19</sup>

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<sup>15</sup> Nicholaas A. Rupke, *Vivisection in Historical Perspective*. (London: Croom Helm, 1987).

<sup>16</sup> Andreas-Holger Maehle and Ulrich Tröhler, “Animal Experimentation from Antiquity to the End of the Eighteenth Century: Attitudes and Arguments,” *Vivisection in Historical Perspective*, ed. by Nicholaas A. Rupke (London: Routledge, 1987).

<sup>17</sup> Simon Devereaux, *Execution, State and Society in England, 1660-1900*. (Cambridge University Press, 2023), ch. 5.

<sup>18</sup> Andrea McKenzie, “Useful and entertaining to the generality of Readers’: Selecting the *Select Trials*, 1718-1764”, in David Lemmings, ed., *Crime, Courtrooms and the Public Sphere in Britain, 1700-1850*. (Farnham, Surrey, UK: Ashgate, 2012), 64.

<sup>19</sup> Nathaniel Wolloch, “Animal Experimentation and Ethics in the Early Modern Era” In *The Enlightenment’s Animals* (Amsterdam: Amsterdam University Press, 2019), 28.

In an age influenced by Enlightenment science and the emerging “culture of sensibility”, one might reasonably expect opposition to animal vivisections on the grounds that they were cruel.<sup>20</sup> However, the dominant critique was made on physiological grounds: the use of animals was a waste of time, money, and resources, because such experiments could not be generalised to human subjects. Further, it was widely argued that the study of “vermin” was unworthy of a true scholar. This essay will explore contemporary opposition and defences of animal vivisection during this period. I will begin by introducing the Royal Society of London for Improving Natural Knowledge, which was a mainstay of the English scientific community and the principal venue for vivisections. I will then examine the experiments on animals conducted by such noted scientists as Robert Boyle, Robert Hooke, Richard Lower, Stephen Hales, and John Hunter. In addition, I will look at how such men described and justified their practices and what larger inferences we can make about their own attitudes. Lastly, I will explore the precursors to the nineteenth century animal welfare movement.

## **II. The Royal Society of London for Improving Natural Knowledge**

On 28 November 1660, following a lecture by Christopher Wren, twelve scientific men of the day associated to form a permanent learned society dedicated to science at Gresham College, coined the ‘College for the Promoting of Physico-Mathematical, Experimental Learning’. The twelve founding members, dubbed ‘Fellows’, included Christopher Wren, Robert Boyle, John Wilkins, William Brouncker, Sir Robert Moray, William Ball, Jonathan Goddard, Abraham Hill, Sir Paul Neile, and William Petty. They had previously been part of a loose alliance of practitioners, academics, clergymen, and courtiers who made up the seventeenth

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<sup>20</sup> G. J. Barker-Benfield, *The Culture of Sensibility: Sex and Society in Eighteenth-Century Britain*. (Chicago: University of Chicago Press, 1992).

century “invisible college”.<sup>21</sup> Two years after this new society’s formation, in 1662, the fellowship received a Royal Charter from Charles II and an official name: The Royal Society of London for Improving Natural Knowledge.<sup>22</sup> As an enlightened establishment for scientific research, it promoted Francis Bacon’s observatory method and fostered an international network for practical and philosophical investigation of the physical world. More than that, it became a primary venue for vivisections, marking a new form of animal cruelty.

Members of the Royal Society consisted of educated upper-class men who hoped to make a mark in the growing field of science.<sup>23</sup> Prospective fellows could join by election only, making the fellowship a prestigious distinction in itself. The virtuosi met weekly at Gresham college in London to discuss theories and conduct various experiments in the fields of mechanics, air pressure, gunnery, astronomy, microscopic observations, and human anatomy.<sup>24</sup> Experiments deemed important enough to be made public were then published in the Royal Society’s journal *Philosophical Transactions*, which was established in 1665. Many of these experimental sciences were conducted with animal subjects as their backbone. This was justified by practitioners who argued that vivisections were performed for the greater good of amassing knowledge and developing skills to treat human beings.<sup>25</sup> Notably, in an address at Cambridge University in 1654, Isaac Barrow argued that vivisections could be seen as a “most innocent cruelty, and easily excusable ferocity” when scientific purposes were considered.<sup>26</sup> This suggests

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<sup>21</sup> David A. Kronick, “The Commerce of Letters: Networks and ‘Invisible Colleges’ in Seventeenth- and Eighteenth-Century Europe”, *The Library Quarterly: Information, Community, Policy*, 71, no. 1, (2001).

<sup>22</sup> “List of Charters Granted” The Privy Council Office London, 10.

<sup>23</sup> Harold Hartley, *The Royal Society: Its Origins and Founders*. (London: Royal Society, 1960).

<sup>24</sup> Harold Hartley, *The Royal Society: Its Origins and Founders*. “Virtuosi” can be defined as someone skilled, or an authority in a specific field; see Walter E. Houghton, “The English Virtuoso in the Seventeenth Century: Part I” in *Journal of the History of Ideas* 3, no. 1, (1942).

<sup>25</sup> Thomas Sprat, *The History of the Royal-Society of London, for the Improving of Natural Knowledge*. 2nd ed. (London: 1702).

<sup>26</sup> Isaac Barrow, “Oratio ad Academicos in Comitiiis”, Alexander Napier, ed. *The theological works*, 9 vols., (Cambridge, University Press, 1859), 9.

that gentlemen were supposed to have reluctance to inflicting cruelty, but could use reason to overcome that. There seems to have been a collective understanding among scientific elites that the experiments were cruel but could be justified by necessity.

A pioneer of these experimental sciences was Robert Boyle, who is well known for his advancements in chemistry, anatomy, and pneumatics. He began performing animal dissections in the late 1640s when he was barely twenty years old.<sup>27</sup> This experience, in addition to his involvement in the Oxford physiology department in the mid-1650s, led Boyle to become a leading vivisector in the early years of the Royal Society.<sup>28</sup> As a founding Fellow, his works were both influential and inspiring to his academic counterparts, promoting the systematic widening of the discipline. This quickening pace of anatomical dissection required some level of distinction between humans and animals to provide scientists with a moral justification for their experiments. Thus, a common view held by intellectuals by the seventeenth century was that animals had a kind of reason, if an inferior one.<sup>29</sup>

Boyle put forth his own discourse on this matter in an often-overlooked 1640 manuscript titled the *Moral Epistle Concerning Ethics of Treatment of Animals*.<sup>30</sup> He argues that “Beasts have as well as we a Sence of feeling”, stating that humans have no reason to suppose that their “inward skinne and outward parts too when once excoriated or gall’d” is “more dull or obtuse that in us”.<sup>31</sup> In other words, animals too could feel pain. He also draws similarities between the rationale of children and animals, by stating that “if Children have right to a more than Ordinary

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<sup>27</sup> Malcolm R. Oster. “The ‘Beame of Diuinity’: Animal Suffering in the Early Thought of Robert Boyle.” *The British Journal for the History of Science* 22, no. 2, (1989), 157.

<sup>28</sup> *Ibid*, 179.

<sup>29</sup> Keith Thomas, *Man and the Natural World: Changing Attitudes in England 1500-1800*. (London: Allen Lane, 1983).

<sup>30</sup> Robert Boyle, (c. 1640). *Moral epistle concerning ethics of treatment of animals*. Boyle Papers 37, fold., GB 117, The Royal Society, London, England.

<sup>31</sup> Robert Boyle, *Boyle Papers*. 74 vols. Royal Society Library, London. Fols., 187r.

Pitty” because of their lack of difficulty in expressing their pain, “horses upon the same scoare may pretend to as Large a share of our Compassion.”<sup>32</sup>

Throughout his career, Boyle continued to dedicate considerable efforts to thinking about man’s relationship with animals. As his experiments became more reliant on vivisections, though, his thinking and writing began to shift. His writings of the mid to late 1650s express his changing conviction, with him arguing that human physiology could be best illuminated by vivisections.<sup>33</sup> So, despite Boyle’s early aversion to unnecessary cruelty towards animals, he came to be an avid figure in the Royal Society’s dissections. He used theological contentions as a justification, stating that God would sanction necessary scientific activities of this sort. He also adopted the more widely embraced idea that vivisections were necessary in advancing human anatomical knowledge.<sup>34</sup> In one essay from 1663, Boyle purveys this through both a practical and moral lens.

For since it were too barbarous, and too great a violation of the laws, not only of divinity but humanity, to dissect human bodies alive... and since, nevertheless, divers things in anatomy, as particularly the motion of the blood and chyle cannot be discovered in a dead dissected body, (where the cold hath shut up and obliterated many passages) that may be seen in one opened alive; it must be very advantageous to a physician’s anatomical knowledge, to see the dissections of dogs, swine, and other live creatures, made by an inquisitive naturalist...<sup>35</sup>

Tampering with human bodies was considered a blasphemous act by many traditional theologians, but animal experimentation did not meet with the same objections.<sup>36</sup>

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<sup>32</sup> Robert Boyle, *Boyle Papers*, vol. 36, 38. Fols., 187r.

<sup>33</sup> Robert Boyle “On Animal Suffering” in *The Early Essays and Ethics of Robert Boyle*, ed. John T. Harwood. (Carbondale: Southern Illinois University Press, 1991).

<sup>34</sup> Robert Boyle, “Usefulness of Experimental Natural Philosophy” in *The Early Essays and Ethics of Robert Boyle*, ed. John T. Harwood,, I, 2, 17; Robert Boyle, “On Animal Suffering”, 172.

<sup>35</sup> Robert Boyle, “Usefulness of Experimental Natural Philosophy”, 17.

<sup>36</sup> Sanjib Kumar Ghosh, “Human cadaveric dissection: a historical account from ancient Greece to the modern era.” *Anatomy & cell biology*, vol. 48, 3 (2015).

Despite these shifts, some of Boyle's later publications and private correspondences still suggest that he had some sense of remorse for inflicting pain on his subjects. In March of 1656, he joined John Wilkins and Christopher Wren in the latter's attempt to "easily contrive a way to convey any liquid poison immediately into the mass of blood."<sup>37</sup> Boyle had been intrigued by the impacts of poisons on the bloodstream since his youth, so he seized on this opportunity. Together, the team fastened a stray dog's legs to the four corners of a table to prevent struggling and ligatured one of its hind legs. They then slit open a vein close to the ligature and inserted a syringe filled with "a warm solution of opium in sack".<sup>38</sup> The dog was temporarily stunned but recovered soon after the endeavour. Boyle later performed a similar experiment with Henry Pierrepont, the Marquis of Dorchester. They infused *crocus metallorum* into a dog, causing it to "vomit up life and all, upon the straw."<sup>39</sup> In his notes, he states that "I afterwards wished, that not only some vehemently working drugs, but their appropriated antidotes... and also some altering medicines, might be in a plentiful dose injected."<sup>40</sup>

### III. Pulmonary Experiments

Among the early Fellows of the Royal Society there was a keen interest in respiration. By 1659, Robert Boyle had made a breakthrough in this discipline, producing his most notable experiment, the '*machina-Boyleana*', otherwise referred to as the air pump or pneumatic engine.<sup>41</sup> Boyle was accompanied by his assistant, Robert Hooke, to create an advanced version

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<sup>37</sup> Boyle, Robert. *The works of the Honourable Robert Boyle. In six volumes. To which is prefixed 'The life of the Author'*, vol. 2. (London, 1772), 88.

<sup>38</sup> Robert Boyle, *Works of the Honourable Robert Boyle*, II, 89.

<sup>39</sup> *Ibid.*

<sup>40</sup> *Ibid.*

<sup>41</sup> Laura Baudot, "An Air of History: Joseph Wright's and Robert Boyle's Air Pump Narratives." in *Eighteenth-century studies* 46, no. 1, (2012).

of German physicist Otto von Guericke's air pump that allowed for pneumatical experimentation.<sup>42</sup> The air would be vacuumed out of the attached glass vessel using a pump at the rate of the physician's choosing. Essentially, this machine allowed Boyle to observe the physiological processes of live animals at reduced barometric pressures.

Pneumatic tests were carried out on subjects ranging from birds and kittens to vipers and frogs. On one occasion, to measure the necessity of respiration for creatures with lungs, Boyle and Hooke placed a lark in the vessel. He describes the experiment in his 1660 landmark book, *New Experiments Physico-Mechanical, Touching the Spring of the Air, and Its Effects*.

The bird for a while appear'd lively enough; but upon a greater Exsuction of the Air, she began manifestly to droop and appear sick, and very soon after was taken with as violent and irregular Convulsions, as are wont to be observ'd in Poultry, when their heads are wrung off: For the Bird threw her self over and over two or three times, and dyed with her Breast upward, her Head downwards, and her Neck awry.<sup>43</sup>

Boyle expressed his dissatisfaction over this result, appearing to have some form of remorse over not being able to revive the bird.

And though upon the appearing of these convulsions, we turned the stop-cock, and let in the air upon her, yet it came too late... we found that the whole tragedy had been concluded within ten minutes of an hour.<sup>44</sup>

Boyle's attitude towards this "tragedy" is similarly present in his experiment on another bird, which was performed in front of an audience. He writes,

Another bird being within about half a minute cast into violent convulsions, and reduced into a sprawling condition, upon the exsuction of the air, by the pity of some fair ladies... who made me hastily let in some air at the stop-cock, the gasping animal was presently recovered, and in a condition to enjoy the benefit of the ladies' compassion.<sup>45</sup>

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<sup>42</sup> John B. West, "Robert Boyle's Landmark Book of 1660 with the First Experiments on Rarified Air" *Journal of applied physiology*, 98, no. 1 (2005), 32.

<sup>43</sup> Robert Boyle, *New experiment physico-mechanicall Touching the Spring of the Air, and Its Effects*. (Oxford, England: h. hall, Bodleian libraries, 1660), 328.

<sup>44</sup> *Ibid.*, 97.

<sup>45</sup> Robert Boyle, *Works of the Honourable Robert Boyle*, I, 106-107.

This scenario was later depicted in Joseph Wright of Derby's painting, *An Experiment on a Bird in an Air Pump*. As previously mentioned, there was an element of performance in these experiments that intended to advance the Royal Society's status. A wide spectrum of interested observers were encouraged to attend public experiments in Gresham Hall, led by Boyle and Hooke. Even Boyle himself expressed the idea that there was an "advantage of having persons of differing qualities, professions and sexes to witness [the experiments]." <sup>46</sup> Boyle's description of the female attendants follows the same trope as illustrated in the *Air Pump* painting; they are depicted as being distressed over the bird's possible demise. Boyle takes this a step further by suggesting in the above quote that the ladies might want to show affection to the bird.

Boyle's pneumatic trials indicated that the convulsions and deaths of his animal subjects "proceeded rather from the want of Air, then that the Air was over-clogg'd by the steams of their Bodies, exquisitely pent up in the Glass". <sup>47</sup> He was also able to establish and publish his theory that a gas's pressure and volume are inversely proportional, known as Boyle's Law. <sup>48</sup> His experiments continued beyond this discovery, pursuing other understandings of the nature of respiration. In 1670, Boyle attempted to solve a question put forth by the "English Democritus" Dr William Harvey of how a foetus can "lie a while" out of the womb. He proceeded to open the abdomen of a pregnant "bitch" and remove four puppies from her womb. With his assistants, he opened the first puppy's abdomen, chest, and diaphragm, while the puppy continued to endeavour respiration. From the matter-of-fact way in which this experiment was reported, it might be interpreted that Boyle lacked empathy for the maternal bond and the lives of the puppies. Yet, on another occasion, Boyle's concern for young animals is evident.

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<sup>46</sup> Robert Boyle, *New experiment physico-mechanicall Touching the Spring of the Air, and Its Effects*. 332.

<sup>47</sup> *Ibid*, 332-333.

<sup>48</sup> John B. West, "Robert Boyle's Landmark Book of 1660 with the First Experiments on Rarified Air", 38.



In the “Fourth Title” in the series *New Pneumatical Experiments about Respiration*, Boyle experiments on newly born kittens, whom he refers to as “kitlings”.<sup>49</sup> He placed the first kitten in the receiver and after only one minute, “the little animal, who in the mean time had gasped for life, and had some violent convulsions, lay as if dead, with his head downwards, and his tongue out...”<sup>50</sup> Boyle let in some air to which the kitten was revived, and to allow him “the benefit of its good fortune”, he brought in another kitten.<sup>51</sup> The same experiment was performed again with near-same results. Boyle wrote that he thought it severe to make the same kitten undergo the measure again. Thus, a third kitten was brought out, but after undergoing experimentation, it died in Boyle’s hands.<sup>52</sup> This exemplifies Boyle’s resistance to experimenting on the same animal twice. Though he refrains from adding any ethical commentary to his accounts, this type of response seems to indicate some moral qualms. His enthusiasm for enquiries which advance the ‘empire of man’ is demonstrably evident; however, his practices and reflections evidence a certain discomfort towards animal experimentation. On the other hand, his resistance to performing on the same animal twice could be grounded in scientific reasons rather than moral. If the kitten was weak or injured, the results of the tests could have been skewed.

In 1662, Robert Hooke was appointed as the Royal Society’s curator of experiments, the first paid scientific job in Britain.<sup>53</sup> In this position, he organised the Fellows’ public experiments while also demonstrating his own. The Royal Society never had an official purpose-built laboratory, so experiments were carried out in Hooke’s rooms in Gresham college and private

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<sup>49</sup> Robert Boyle, “New Pneumatical Experiments about Respiration” *Philosophical Transactions*, vol. v (1670), 478.

<sup>50</sup> *Ibid.*, 478.

<sup>51</sup> *Ibid.*, 478-9.

<sup>52</sup> *Ibid.*, 479.

<sup>53</sup> C Andrade, “Robert Hooke, F. R. S. (1653-1703)” in *Notes and Records of the Royal Society of London*, vol. 15, 1, (Royal Society: 1960), 137.

houses, along with more public spaces like coffee houses.<sup>54</sup> Robert Hooke became increasingly well-known within the Royal Society after his work on simple harmonic oscillators, which led to the establishment of Hooke's law or the law of elasticity.<sup>55</sup> He is also credited with being one of the first scientists to observe living things at a microscopic scale, publishing his *Micrographia* in 1665.<sup>56</sup> Of particular interest, though, is Hooke's fascination with the study of respiration, which was instigated by his work with Boyle.

In one of Hooke's early private experiments, he brought a dog into his laboratory and tied it to his table.<sup>57</sup> He cut away his subject's chest to peer into its thoracic cavity. During this experiment, he learnt that lungs were not muscles. Hence, by removing the dog's chest, he had removed the dog's ability to breathe on its own. In response, Hooke used a bellows to pump air into the animal's lungs, keeping it alive for over an hour.<sup>58</sup> After some time, he presented his findings to the Royal Society but received doubtful responses from some of the Fellows who were uncertain that Hooke was able to keep the animal alive through artificial breath. To prove his findings, Hooke performed the experiment again in front of observers of the Royal Society. On the 24<sup>th</sup> of October 1667, he exhibited how the 'Motions of the Lungs' were necessary to maintain life.<sup>59</sup> This experiment required him to pin a dog to a table, and cut it so that "his Thorax was all display'd by the cutting away of the Ribbs and Diaphragme; and after the Pericardium of the Heart also was taken off."<sup>60</sup> With these body parts removed, Hooke was able to observe the dog's thorax, all the while keeping the dog alive through artificial breath. This was

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<sup>54</sup> John Ward, *Miscellaneous Collections relating to Gresham College*, British Library, fols. 27-8.

<sup>55</sup> C. Andrade, "Robert Hooke, F. R. S. (1653-1703)", 138.

<sup>56</sup> Robert Hooke, *Micrographia*. (Weinheim: Cramer, 1961).

<sup>57</sup> Robert Hooke, "An Account of an Experiment Made by M. Hooke, of Preserving Animals Alive by Blowing Through their Lungs with Bellows" *Philosophical Transactions*, vol 2, 28 (21 October 1667), 53.

<sup>58</sup> *Ibid.*

<sup>59</sup> *Ibid.*

<sup>60</sup> *Ibid.*

done through the work of a pipe and bellow placed in the dog's airway. The dog's *Aspera arteria* (trachea) was cut off just below the Epiglottis and bound to the nose of the bellows. Hooke blew air into the dog's lungs for over an hour. Thus, it was conceived that respiration promoted the circulation of blood, so the "Animal would immediately be suffocated as soon as the Lungs should cease to be moved".<sup>61</sup>

To further strengthen this finding, Hooke performed an additional experiment in front of his audience.

This, I say, having been done, and the Judicious spectators fully satisfied of the reality of the former experiment; I caused another pair of bellows to be immediately joined to the first, by a contrivance, I had prepared, and pricking all the outer-coat of the Lungs with the slender point of a very sharp pen-knife, this second pair of Bellows was mov'd very quick, whereby the first pair was always kept full and always blowing into the Lungs... This being continued for a pretty while, the Dog, as I expected, lay still, as before, his eyes being all the time very quick, and his Heart beating very regularly: But, upon ceasing this blast, and suffering the Lungs to fall and lie still, the Dog would immediately fall into Dying convulsive fits; but be as soon revived again by the renewing the fullness of his Lungs with the constant blast of fresh Air.<sup>62</sup>

With this conclusion that respiration, lungs, chest muscles, and blood circulation were all interconnected in the requirements of life, Hooke was able to conclude his experiment. He went on to say that he intended to conduct more experiments to thoroughly discover the genuine use of respiration, and its benefits to mankind.<sup>63</sup> The element of performance in this experiment contributed to its popularity, with several Fellows repeating it over the next century.

There is evidence that Hooke, like Boyle, had moral reservations about the nature of vivisections. Just a few years prior to this public experiment, Hooke had written to Boyle expressing discomfort for vivisections of this sort on dogs.

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<sup>61</sup> Robert Hooke, "An Account of an Experiment Made by M. Hooke, of Preserving Animals Alive by Blowing Through their Lungs with Bellows", 54.

<sup>62</sup> Ibid.

<sup>63</sup> C. Andrade, "Robert Hooke, F. R. S. (1653-1703)", 142-143.

The other experiment (which I shall hardly I confess make againe because it was cruel) was with a dog which by means of a pair of bellows ... I shall hardly be induc'd to make any further trials of this kind because of the torture of the creature but certainly the inquiry would be very noble if we could any way find a way soe to stupify the creature as that it might not be sensible which I fear there is hardly any opiate will performe.<sup>64</sup>

This is evidence that moral reservations were expressed in a private context. Hooke was well aware of how his animal subjects suffered, but his sentiments were not serious enough to deter him and other scientists from practicing vivisections.

The early years of the Royal Society was a period of significant scientific pursuits and efforts to establish itself as a respectable institution. It was widely supported by academics, both in Britain and overseas. However, their use of animals also made them the target of vehement satirical attacks. Some contemporary scholars believed that the study of “vermin” was an unworthy focus of a true scientist.<sup>65</sup> In addition, the utility of vivisections was questioned. However, missing from this criticism was any discussion of ethics and cruelty. After the society received its royal charter, making it more broadly recognised, a plethora of disparaging publications began flying off the printing press. For example, in a poem entitled “In praise of the choice company of Philosophers and Witts who meet on Wednesdays weekly, at Gresham College”, also referred to as the “Ballad of Gresham College”, Robert Boyle’s studies on the physical properties of air and on the physiology of respiration were mocked. Evidence points to it being published in 1663, with the author likely being William Godolphin.<sup>66</sup> Verses eight to ten read,

To the Danish Agent late was showne

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<sup>64</sup> John Ward’s, *Miscellaneous Collections relating to Gresham College*, British Library, fols. 27-8.

<sup>65</sup> Andreas-Holger Maehle, “Literary Responses to Animal Experimentation in Seventeenth- and Eighteenth-Century Britain”, 32.

<sup>66</sup> The British Museum’s copy of this poem contains the initials “W. G.” besides stanzas 2 to 5. It is possible that the author was William Glanvill, but William Godolphin is more likely considering his election into the Fellowship in 1663 and his poetical remains. See F. Sherwood Taylor, “An Early Satirical Poem on the Royal Society.” *Notes and Records of the Royal Society of London* 5, no. 1 (1947), 37–46.

That where noe Ayre is, there's noe breath.  
 A glass this secret did make knowne  
 Where[in] a Catt was put to death.  
 Out of the glasse the Ayre being screwed,  
 Pusse dyed and ne're so much as mewed

The selfe same glass did likewise cleare  
 Another secret more profound,  
 That nought but aire unto the eare  
 Can be the medium of the sound;  
 For in this glass emptied of aire,  
 A striking watch you cannot heare.

And that which makes the same ring lower  
 With much adoe they shewed the king.  
 To make glass buttons turne to powder  
 If off their tayles you doe but ring,  
 How this was done with soe small force  
 Did cost the Colledge a month's discourse.<sup>67</sup>

Verse eight describes “a Danish agent” and records show that a Danish ambassador was invited to the Society by John Evelyn.<sup>68</sup> During his visit, he was entertained by Boyle’s air pump experiment, though it is inconclusive whether the subject was a cat. Boyle’s experiments up until 1663 had predominantly been performed on dogs or small creatures like birds, rodents, and amphibians. It is possible that the use of a cat as the subject lent itself better to mockery. Verses nine and ten refer to Boyle’s experiments on the transmission of sound that were published in his book, *New Experiments Physico-Mechanical touching the Spring of the Air*. This piece of literature is representative of the vast number of responses that mimicked and invalidated the experiments. That being said, they focus on the Royal Society’s waste of time and resources, instead of the suffering of the animal subjects.

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<sup>67</sup> Taylor F. Sherwood. “An Early Satirical Poem on the Royal Society.” *Notes and Records of the Royal Society of London* 5, no. 1 (1947), 39.

<sup>68</sup> John Evelyn, *The Diary of John Evelyn*. Ed. Austin Dobson. Vol. II. (London: Macmillan and Co., Ltd), 158-9.

A typical example of this genre of critiques is Samuel Butler's *Hudibras*, first published in 1664, which includes mockery of Robert Hooke's *Micrographia*. The *Micrographia* was one of Hooke's most remarkable publications, drawing both positive and negative commentary. Notably, it continues to be praised for its introduction of the term "cell" in the modern biological sense.<sup>69</sup> Butler's burlesque poem features an astrologer named Sidrophel, who ridicules Hooke's microscopic observations, notably of his famous flea. Hooke's inclusion of the flea in his publication had undertones of comedy, with the plate's description stating, "The strength and beauty of this small creature, had it no other relation at all to man, would deserve a description." Butler ran with this, using satire to mock his observation of such an inferior creature.

Whether a pulse beat in the black  
List of a dappled louse's back;  
...  
How many scores will a flea jump,  
Of his own length, from head to rump;  
...  
How many different specieses [sic]  
Of maggots breed in rotten cheese<sup>70</sup>

Butler believed that the Royal Society's experimental scientists were debasing their talents in useless trivialities when they could be acquiring practical knowledge.<sup>71</sup> He was evidently not concerned about the animals themselves, but by the waste of time and resources spent on studying them.

In 1667, out of concern for negative publicity, the Fellows commissioned Thomas Sprat to write *The History of the Royal Society* to serve as both a mission statement and an account of their progress in the field to date.<sup>72</sup> The front page illustrated their motto and arms, "*Nullis in*

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<sup>69</sup> C. Andrade, "Robert Hooke, F. R. S. (1653-1703)", 139.

<sup>70</sup> Samuel Butler, *Hudibras by Samuel Butler Tom. I. I.* vol. 1, (London: printed by T. Rickaby, 1793).

<sup>71</sup> Andreas-Holger Maehle, "Literary Responses to Animal Experimentation in Seventeenth- and Eighteenth-Century Britain", 31.

<sup>72</sup> Rebecca Bushnell, ed. "Natural Philosophy and Natural Knowledge." In *The Marvels of the World: An Anthology of Nature Writing Before 1700*, 9–72. (University of Pennsylvania Press, 2021).

*verba*” (‘take nobody’s word for it’) and a blank slate.<sup>73</sup> This invoked their philosophy to discover new knowledge through first-hand experience, rather than relying on the authority of established wisdom.<sup>74</sup> A second edition was published in 1702, titled *The History of the Institution, Design, and Progress of the Royal Society of London for the Advancement of Experimental Philosophy*. It worked to present the Royal Society’s achievements from the first 42 years of its existence.

In “The Second Part”, the Society’s different manners of gathering and dispersing queries is discussed.<sup>75</sup> It is explained that the Society expressed desires to create an understanding of Natural History as a whole.

They have prescribed exact inquiries, and given punctual Advice for the trial of Experiments of rarefaction, refraction, and condensation: concerning the cause, and manner of ... Injections into the Blood of Animals; and Transfusing the blood of one Animal into another: of Currents: of the ebbing, and flowing of the sea: of the kinds, and manner of the feeding of Oysters: of the Wonders, and Curiosities observable in deep Mines.<sup>76</sup>

Such inquiries were sent abroad in the hopes of acquiring a vast collection of knowledge that would accumulate into their ideal natural history. What deserves recognition in the book, though, is the inquiries into the “Injections into the Blood of Animals; and Transfusing the blood of one Animal into another.”<sup>77</sup> Toxicology and transfusion experiments were evidently used in the early days of the Royal Society, as Butler’s *Hudibras* poem illustrates, and continued into the early eighteenth century.

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<sup>73</sup> Roger Gaskell, “The Image of Restoration Science: The Frontispiece to Thomas Sprat’s History of the Royal Society (1667). By Michael Hunter.” *Library* 19, no. 4 (2018), 522–523.

<sup>74</sup> *Ibid.*

<sup>75</sup> Thomas Sprat and D. D. Lord Bishop of Rochester, *The History of the Royal-Society of London, for the Improving of Natural Knowledge*, 2nd ed. (London: 1702), 156.

<sup>76</sup> *Ibid.*

<sup>77</sup> *Ibid.*

#### IV. Blood Pressure and Circulation Experiments

The practice of transfusion was popularised in England in the mid to late 1660s, made possible by the discoveries of English physician William Harvey. He made great advances in the fields of anatomy and physiology by observing the movements of animals' hearts, such those of frogs, snails, fish, dogs, and pigs.<sup>78</sup> Harvey's techniques made transfusion experiments within the field of physiology relatively simple, leading to their great popularity with the Royal Society.<sup>79</sup> A Fellow particularly active in this discipline was Richard Lower, who was the first to successfully perform a transfusion between two animals. In later trials, he became the first Englishman to transfuse the blood of a sheep to a man.<sup>80</sup> His initial experiments are detailed in his contributions to the Royal Society's *Philosophical Transactions*, with some commentary from Boyle.<sup>81</sup> In one account, he provides a descriptive analysis of the pioneering procedure between two dogs. He explains in great depth how the blood of the recipient is drained, whilst the donor is prepared for the transfer. In this case, for one dog to live, the other must die. The canine subjects are portrayed as merely tools in the experiment, yet Lower includes a short excerpt of their reactions.

And immediately as the blood runs into the dog unstop the other quill, coming out of the upper part of his jugular vein (a ligature being first made about his neck, or else his other jugular vein being compressed by one's finger;) and let his own blood run out at the same time into dishes, (yet not constantly, but according as you perceive him able to bear it) till the other dog begin to cry and faint, and fall into convulsions, and at last die by his side.<sup>82</sup>

...

This done, sow [sic] up the skin and dismiss him, and the dog will leap from the table and shake himself and run away, as if nothing ailed him.

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<sup>78</sup> Eduardo Fastag, Joseph Varon, and George Sternbach. "Richard Lower: The Origins of Blood Transfusion" *The Journal of emergency medicine*, 44, no. 6 (2013), 1147.

<sup>79</sup> Anita Guerrini, "The Ethics of Animal Experiments in Seventeenth Century England", in *Journal of the History of Ideas*, 50, no. 3, (1989), 403.

<sup>80</sup> Anita Guerrini, "Ethics of Animal Experimentation", 403-4.

<sup>81</sup> Richard Lower, "The Success of the Experiment of Transfusing the Blood of One Animal into Another." *Philosophical transactions*, 1 (1665), 352.

<sup>82</sup> Robert Boyle, "The Method observed in Transfusing the Blood out of one Animal into another", *Philosophical Transactions*, no. 20, (London: The Royal Society, 1666), 129.



Great care is given here in reporting on the recipient's health. In a later entry, Boyle makes note of circumstances to consider when performing this experiment to prevent the death of the recipient, stating,

...there are many circumstances necessary to be observed in the performing of this experiment, and that you may better direct any one to do it without any danger of the other dog that is to receive the others blood...

He also notes that these trials are intended to be performed "to the utmost variety the subject will bear."<sup>83</sup> At the end of this contribution, Boyle includes lengthy statements that aim to prove the usefulness of blood transfusions in the study of physiology.

As by exchanging the blood of old and young, sick and healthy, hot and cold, fierce and fearful, lame and wild animals, &c. and that not only of the same but also of different kinds. For which end, and to improve this noble experiment, either for knowledge or use, or both, some ingenious men have already proposed considerable trials and inquiries; of which perhaps an account will be given hereafter.

The language used in entries of this kind include specific emphasis on these experiments being 'noble' and 'useful'.

The inclusion of anecdotes in the *Philosophical Transactions*, in which the virtuosi emphasise the usefulness of their experiments, was likely aimed at maintaining the Royal Society's image of being a practical institution of scientific utility. This conveyance of this message was prioritised in the context of continuing satirical jabs from academics that believed their use of vivisections was a useless triviality. In a passage of *Hubdras*, Butler critiques the Royal Society's tests on blood transfusions.

Can no transfusion of the blood,  
That makes fools cattle, do you good?  
Nor putting pigs t' a bitch to nurse,  
To turn 'em into mungrel-curs,

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<sup>83</sup> Robert Boyle, "The Method observed in Transfusing the Blood out of one Animal into another", 131.

Put you into a way, at least,  
To make yourself a better beast?<sup>84</sup>

Another vehicle for these satirical jabs was the theatre. Thomas Shadwell enjoyed great success with his 1676 comedy “The Virtuoso”, which mocked the experiments of the Royal Society. The leading character, Sir Nicholas, served as a stock character of satire and comedy comparable to the incapable physician.<sup>85</sup> In one scene, Sir Nicholas prided himself on having found “that an animal may be preserv’d without respiration when the windpipe’s cut in two, by follicular impulsion of air: to wit, by blowing wind with a pair of bellows into the lungs”.<sup>86</sup> A young gentleman named Longvil responded to him with “I have heard of a creature preserv’d by blowing wind in the breech, sir.”<sup>87</sup> This was an effort to mock the bellows experiments performed by Robert Hooke.

In another scene in “The Virtuoso”, Sir Nicholas’ uncle, who is referred to as ‘Old Snarl’, expressed his dissatisfaction with his nephew’s experiments.

In sadness, nephew, I am asham’d of you. You will never leave lying and quacking with your transfusions and fool’s tricks. I believe if the blood of an ass were transfus’d into a virtuoso, you would not know the emittent ass from the recipient philosopher... In sadness, you deserve to be hang’d. You kill’d four or five that I know with your transfusion.”<sup>88</sup>

Shadwell’s criticism of experimentation on humans was notably empathetic in comparison to his remarks about the animal subjects. Moreover, the inclusion of such criticism of transfusions can be understood as a reference to the French physician Jean Denis’ failed attempts at transfusing blood between an animal and a human in 1667. Similar practices were carried out by the Royal

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<sup>84</sup> Samuel Butler, “In an Heroical Epistle of Hudibras to Sidrophel”, *Hudibras*, 39-44.

<sup>85</sup> Joseph Addison, “The Tatler No. 216, August 26, 1710, No. 221, September 7, 1710”, in *The Tatler*, 4 vols., ed. George A. Aitken, 1898-9, (Hildesheim and New York, Olms, 1970), vol. 4.

<sup>86</sup> Thomas Shadwell, *The Virtuoso*, ed. Marjorie Hope Nicolson and David Stuart Rhodes, (London, 1966), 47-8.

<sup>87</sup> *Ibid.*

<sup>88</sup> *Ibid.*, 52.

Society with better success. Yet, their blood transfusions were also often under attack. Men of letters made mockery of the virtuosi's work, pushing the Fellows to consistently include statements of usefulness in their contributions to the *Philosophical Transactions*. Arguably, the Royal Society's animal to human transfusions worked to establish the legitimacy of the practice as a useful discipline by proving its human-related benefits.

On 23 November 1667, a transfusion was performed between a sheep and a human subject, Arthur Coga.<sup>89</sup> Coga was a clergyman who Dr Oldenburg of the Royal Society described as “freakish and extravagant”.<sup>90</sup> He expressed interest in the procedure for its therapeutic benefits, emphasising the correlation between sheep's blood and the blood of Christ, as the shepherd. The experiment was included in the 1667 *Philosophical Transactions*.

The experiment of transfusion of blood into a human vein was made by us in this manner: Having prepared the carotid artery in a young sheep, we inserted a silver pipe into the quills to let the blood run through it into a porringer, and in the space of almost a minute about 12 ounces of the sheep's blood ran through the pipe into the porringer, which was somewhat to direct us in the quantity of blood now to be transfused into the man.<sup>91</sup>

Within this account, there is no emphasis on the sheep that was involved, with exception of the description of the procedure aforementioned. Evidently, whether the sheep lived or died was not of interest to the scientists, nor the audience. The experiment succeeded in that Coga survived and did not become seriously ill. His involvement in the experiment was justified with reference to his temperament: his brain was deemed “a little too warm”.<sup>92</sup>

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<sup>89</sup> Edmund King “An Account of the Experiment of Transfusion, performed in London Nov. 23, 1667, upon the Person of Arthur Coga, at Arundel House, in the Présence of many considerable and intelligent Spectators, under the Management of Dr. RICHARD LOWER and Dr. EDMUND KING; by the latter of whom the relation was drawn up. NO. 30, p. 557”. *Philosophical Transactions*, vol. II, 203.

<sup>90</sup> Henry Oldenburg, “Oldenburg to Boyle, 25 November 1667” (Oldenburg, Correspondence, III, 611-12) in *The Correspondence of Robert Boyle*. (Charlottesville, Va: InteLex Corporation, 2004), 203.

<sup>91</sup> Ibid.

<sup>92</sup> Edmund King, “King to Boyle, 25 November 1667” *The Correspondence of Robert Boyle*. (Charlottesville, Va: InteLex Corporation, 2004).

Arthur Coga is joined by only a small margin of the British populace who participated in these experiments as “volunteers”: marginalised individuals like convicts and the mentally ill. Such people may have been targeted because they sought the supposed therapeutic benefits of transfusions, or because they belonged to a group that could have been easily exploited. Nonetheless, their involvement was practical for the physiologists since they were able to evidence their determination to aid Britons. In his essay “Physical Experiments Upon Brutes” in the *Philosophical Transactions*, Browne Languish claimed to have “propose[d] this Method only as an Auxiliary; and even as such, I would not have it ventured upon without a great many previous Tryals upon Convicts.”<sup>93</sup> In describing experiments intended to relieve kidney stones, he goes on to say,

A long series therefore of Experiments of this Kind, first upon Brutes, and afterwards upon Men, is the only Means whereby we can reasonably hope to attain to the Knowledge of the specific Virtue of such Plants, &c. as have never yet been used in Medicine; and I make no Doubt but if proper Encouragement was given, great Advantages would, in Time, derive to the Medical Art, since, by using simple Medicines we certainly should know what it is that effects the Cure.<sup>94</sup>

Excerpts like these were integral to scientific publications to show the utility of their experiments.

Attitudes towards animal subjects cannot be accurately inferred from sources like the *Philosophical Transactions* alone, considering the purpose of their publication. Instead, private correspondences tend to shed more light on the subjective feelings of those who conducted the experiments, as was earlier exemplified in Hooke’s letter to Boyle. However, such documents are few and far between. Beyond the research limitations of the Royal Society’s *Philosophical Transactions*, there are other lacunae in the historical record. Until 1876, vivisections were

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<sup>93</sup> Browne Languish, “Physical Experiments Upon Brutes” *Philosophical Transactions*, No. 454, Royal Society, (London: Printed for C. Hitch, at the Red-Lion in Pater-Noster-Row, 1776), xvii.

<sup>94</sup> *Ibid*, xx-xxi.

neither officially recorded nor legally regulated.<sup>95</sup> Thus, our records fail to recognise the experiments excluded from the Royal Society's transactions, in addition to the experiments practiced within private quarters. Due to the lack of legal restriction, vivisections could be performed by anybody. There were no standard procedures, which often meant that the experiments carried out in private quarters were much crueller than those in an academic setting. An example of this is the Reverend Stephen Hales, curate of the parish of Teddington of Middlesex. He had a particular interest in vivisections involving the study of blood pressure, which he performed in his free time, unaided, alone in the parsonage.<sup>96</sup> Hales' experiments began to attract attention once he left Corpus Christi College in Cambridge in 1709. In these early days, he primarily worked on understanding the hydraulics of the animal vascular system. Compared to previous experiments that had elements of performance in them, which encouraged flocks of visitors, Hales' experiments were conducted very privately.

Judging from the matter-of-fact language of Hales' notes, it seems that he had minimal difficulty with animal experiments, despite recognising the animals' suffering. It is more than likely that any empathy he may have felt towards his animal subjects was outweighed by the scientific utility of the experiments. Hales' inquiries gained him some attention in the academic community, which led to him becoming an elected Fellow of the Royal Society in 1718. His widely acknowledged experiments include his blood tests carried out on horses in 1710.<sup>97</sup> Hales'

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<sup>95</sup> United Kingdom, His Majesty's Government, *Cruelty to Animals Act*, 39 & 40 Vic. C. 77. The National Archives, 1876.

<sup>96</sup> Macdonald Daly, "Vivisection in Eighteenth-Century Britain" *Journal for Eighteenth Century Studies*, 12, 1989, 56

<sup>97</sup> Stephen Hales, "An Account of some Hydraulic Experiments made on the Blood and Blood-Vessels of Animals" In *Statical Essays, Containing Haemastaticks, or, An Account of Some Hydraulick and Hydrostatical Experiments Made on the Blood and Blood Vessels of Animals : Also an Account of Some Experiments on Stones in the Kidneys and Bladder : With an Enquiry into the Nature of Those Anomalous Concretions : To Which Is Added, an Appendix, Containing Observations and Experiments Relating to Several Subjects in the First Volume, the Greater Part of Which Were Read at Several Meetings before the Royal Society*, (London, 1733), 1-3.

blood pressure experiments were similarly performed on oxen, sheep, and dogs. His results from these led him to be credited as the first to make exact measurements of blood pressure. In his 1733 publication, *Haemastaticks*, Hales describes his initial experiments on horses. His first subject was due to be put down for an abscess, so he took the opportunity to conduct research. Hales performed similar tests on all three subjects. He opened the left crural artery and inserted a brass pipe, which he connected to a glass tube. Measurements were taken based on the height of the blood in the glass tube. He describes this procedure in “Experiment I”.

In December, I caused a Mare to be tied down alive on her Back, she was fourteen Hands high, and about fourteen Years of Age, had a Fistula on her Withers, was neither very lean, nor yet lufty: Having laid open the left crural Artery about three inches from her Belly, I inserted into it a brass Pipe whose Bore was one fifth of an Inch in Diameter; and to that, by means of another brass Pipe which was fitly adapted to it, I fixed a glass Tube, of nearly the same Diameter, which was nine Feet in Length: Then untying the Ligature on the Artery, the Blood rose in the Tube eight Feet three Inches perpendicular above the Level of the left Ventricle of the Heart: But it did not attain to its full Height at once; it rushed up about half way in an Instant.<sup>98</sup>

The recording of the horse’s measurements, age, and ailments could have been included to justify him experimenting on it. Later in the publication, he seems to justify it once more by mentioning that the subjects were all work animals nearing death.<sup>99</sup> Interestingly, Hales recognises the suffering of one of his subjects while discussing the regular pulse of a horse, stating, “The Pulse of a Horse that is well, and not terrified, nor in any Pain, is about thirty six Beats in a Minute”.<sup>100</sup> He then described the pulse of his subject, in which he states, “This Mare’s Pulse beat about fifty five times in a Minute, and sometimes sixty or a hundred she being in pain.” He further describes her “violent straining” and successive “expiry”.<sup>101</sup> This

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<sup>98</sup> Stephen Hales, “An Account of some Hydraulic Experiments made on the Blood and Blood-Vessels of Animals” *Statical Essays*, 1-3.

<sup>99</sup> *Ibid.*

<sup>100</sup> *Ibid.*, 2.

<sup>101</sup> *Ibid.*, 5.

acknowledgement of his subject's fear and pain was seen as secondary to the usefulness of the experiment in understanding blood pressure; however, it is proof that Hales was aware of the horse's discomfort.



Figure 2: Stephen Hales, *Haemostatics*, 3rd ed. 1738.

By 1733, Hales estimated that he had killed sixty animals, but that his projected experiments would “probably occasion the death of 2 or 300 Animals, so I do not think it proper for one of our Profession to engage any further in it”.<sup>102</sup> Despite this comment on halting his work, he continued to practice vivisections for the remainder of his life.<sup>103</sup> In the latter years of

<sup>102</sup> D. G. C. Allan and R. E. Schofield, *Stephen Hales, An Eighteenth-Century Biography* (Cambridge, 1929), 77.

<sup>103</sup> *Ibid.*, 29.

his career, his experiments became increasingly gratuitous. He twice performed the ‘bellows dog’ procedure, first practised by Robert Hooke, an experiment that even Hooke himself viewed as too cruel to repeat.<sup>104</sup> Given this, did Hales get a thrill from performing vivisections? It is hard to draw conclusions about his views on animals, though an understanding of broader attitudes can be gained from the responses to the experiments of Hales and other prolific vivisectioners.

### V. Satirical Versus Sentimental Responses to Vivisections

By the early to mid-eighteenth century, responses to vivisections were predominantly satirical, but some seemed to indicate sympathy for the animals. Notably, eighteenth-century writers like Alexander Pope expressed very serious concerns for the suffering of animals in experiments, reflecting a growing interest in animal welfare that would be the precursor to the animal rights movement of the nineteenth century.

Alexander Pope was a prominent poet and satirist of the eighteenth century. In 1718, he moved to Twickenham and became a neighbour to Stephen Hales. Though they were reportedly close friends, Pope was a well-known critic of Hales’ work.<sup>105</sup> In a 1744 conversation between Pope and his friend Joseph Spence, Pope expressed his disapproval of Hales’ vivisections. Spence reports saying, “I shall be very glad to see Dr. Hales, and always love to see him; he is so worthy and a good man”.<sup>106</sup> To which Pope replied, “Yes he is a very good man, only – I’m sorry – he has his hands imbrued with blood.”. Spence asks the question, “What, he cuts up rats?” Pope replied:

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<sup>104</sup> Macdonald Daly, “Vivisection in Eighteenth-Century Britain”, 58.

<sup>105</sup> Andreas-Holger Maehle, “Literary Responses to Animal Experimentation in Seventeenth- and Eighteenth-Century Britain”, 41-2.

<sup>106</sup> Joseph Spence, *Observations, anecdotes, and characters of books and men collected from conversation*, ed. James M. Osborn (Oxford, 1820), vol. 1, 118.



Aye, and dogs too! (and with what emphasis and concern he spoke it). Indeed, he commits most of these barbarities with the thought of its being of use to man. But how do we know that we have a right to kill creatures that we are so little above as dogs, for our curiosity, or even for some use to us?<sup>107</sup>

Earlier in his career, in 1713, Pope published “Against Barbarity to Animals” in the *Guardian*.<sup>108</sup>

In this essay, he critiqued blood sports and animal slaughter, invoking classical authority in opposition to ‘barbarity’. Referencing Plutarch’s notion that “Humanity may be extended thro’ the whole Order of Creatures, even to the meanest”,<sup>109</sup> he made the case that animals were deserving of humane treatment. He also invoked the authority of the Old Testament, referencing Jonah 4:11 as an illustration of God’s compassion to brutes.<sup>110</sup>

Pope’s ideas were part of an evolving change in attitudes. In 1710, Richard Steele wrote an article for *The Tatler* that attacked blood sports. He warned that the cruelty of such entertainments would make the British appear ‘barbarous’ in the eyes of other nations.<sup>111</sup> He also appealed to countrymen, stating “virtues of tenderness, compassion and humanity, are those by which men are distinguished from brutes, as much as by reason itself...”<sup>112</sup> This reflects the tension between contemporary educated opinions on the relationship between man and the natural world. His view was traditionally anthropocentric, yet also represents the notion that the ideal man was one of compassion and benevolence.

A year after Steele’s article in *The Tatler*, in 1711, Joseph Addison cited a cruel experiment that seemingly demonstrated animal maternal instinct, proven by vivisectioning a

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<sup>107</sup> Joseph Spence, *Observations, anecdotes, and characters of books and men collected from conversation*, 118.

<sup>108</sup> Alexander Pope, “Against Barbarity to Animals”, [*The Guardian* No. 61, May 21, 1713], repr. Norman Alut, (ed.), *The Prose Works of Alexander Pope*, vol. 1, *The Earlier Works*, 1711-20, Oxford, Basil Blackwell, 1936, 107.

<sup>109</sup> Plutarch. “Life of Cato” in *The Parallel Lives*, Vol. VIII, (Loeb Classical Library, 1919), 5.

<sup>110</sup> Andreas-Holger Maehle, “Literary Responses to Animal Experimentation in Seventeenth- and Eighteenth-Century Britain”, 36.

<sup>111</sup> Richard Steele, “The Tatler No. 68, September 15, 1709, No. 112, December 27, 1709”, vol. 2, 135-43.

<sup>112</sup> *Ibid.*

pregnant dog.<sup>113</sup> One of its puppies was pulled out of its womb, and when the puppy was held to the mother's mouth, she immediately started licking it, as though oblivious to her own pain. When the puppy was removed, the mother began a wailing cry. The scientists blamed its cries on the loss of its young rather than by its own wounds. Addison appreciated that it showed the "natural Love in Brutes", but also called it a "very barbarous Experiment", apologising to his readers for quoting "such an Instance of Cruelty".<sup>114</sup> This apology contrasts his earlier attitudes towards experimentation, in which he avidly criticized the Royal Society for their dealings with lesser creatures. In one of his 1709 contributions to *The Tatler*, he warned that those who spend all their time studying the anatomy of minute and primitive animals would become alienated from the world of human affairs and "expose philosophy to the ridicule of the witty, and contempt of the ignorant".<sup>115</sup> Essentially, his early critiques focused on the ridiculous elements of the experiments, while his latter critiques highlighted their cruelty. This shift in attitudes is emblematic of the wide adoption of sentimentality among the educated class. During this rise in sentimentality, the satirical device was still widely used in literature to criticize the virtuosi. However, it was now being employed to service the idea that vivisections were cruel, alongside the traditional use of it to highlight the uselessness and trivialities of the experiments.

In 1724, Jonathan Swift employed the virtuosi-satire in his novel *Gulliver's Travels*. On Gulliver's journey, he visits the "grand Academy of Lagado" where he meets many 'silly' virtuosi.<sup>116</sup> Notably, he meets a physician who demonstrated his method of curing the "Cholick" by "contrary Operations" on a dog. It is explained that the physician introduces a large pair of bellows into a dog's anus, and the animal is blown up until its intestines are near bursting point.

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<sup>113</sup> Joseph Addison, "The Tatler No. 216, August 26, 1710, No. 221, September 7, 1710", 110-13.

<sup>114</sup> Ibid.

<sup>115</sup> Ibid.

<sup>116</sup> Jonathan Swift, *Gulliver's Travels*, ed. Herbert Davis, (Oxford: Basil Blackwell, 1959), 172-92.

Upon the dog's death, the physician attempts to revive the dog by using the same method.<sup>117</sup> This is a reference to both Hooke's bellows experiments and Shadwell's play, "The Virtuoso." The satirical device seemed inexhaustible in its use for anti-vivisectionists; it was still being used as late as the 1740s. However, along with the older form of ridicule which depicted such experiments as absurd and useless, there was also the sense that it is wrong to needlessly torment animals. In 1737, the *Gentleman's Magazine* published a poem entitled "The Virtuoso", written by Mark Akenside. It argued the ideology that observations of the virtuosi are useless to mankind, while drawing attention to the blood on the hands of vivisectionists. He writes that the virtuosi's "relentless hand, That oft with gory crimson was distain'd".<sup>118</sup>

In 1740, almost a century after Boyle's tests on animals in his air pump, *The Gentleman's Magazine* published a satirical poem titled "The Air Pump". It recounts the agonies of animals sacrificed in the Boylean-engine and illustrates a hostility to animal experimentation in physiology on the grounds that it was a spectator sport of slight scientific utility.

Domitian, as old story rings,  
 (That most ridiculous of kings)  
 Was wont, whole days, to divertise  
 In slaught'ring hosts of puny flies,  
 Preferring to all courtly joys  
 Sports only fit for butcher boys.  
 But had the monarch learn'd the knowledge  
 Since practis'd by our modern college,  
 Of using their pneumatic engine,  
 'Twould have afforded pleasure swinging;  
 The sight of ev'ry rare experiment.  
 Had given his heart unusual merriment.<sup>119</sup>

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<sup>117</sup> Jonathan Swift, *Gulliver's Travels*, 181.

<sup>118</sup> Mark Akenside, "The Virtuoso; in imitation of Spencer's style and stanza", *Gentlemen's Magazine*, (Westport, Connecticut: Greenwood Press, 1974), 223-4.

<sup>119</sup> *The Gentleman's Magazine*, 10, 194.

The mention of Domitian, the Roman Emperor from 81 CE to 96 CE, is an interesting reference to Boyle's early essay "On Sin", in which he references the Greek historian Suetonius' *The Lives of the Twelve Caesars*.<sup>120</sup> With the contemporary notion that Domitian was a wicked ruler, he was attempting to draw connections between those who were cruel to animals versus humans. He states that Domitian "lock't himselfe dayly [sic] in his closet for an houre, to kill flies with a Bodkin."<sup>121</sup> This insinuated that Domitian's pastime of killing flies was a pointless cruelty that should be condemned. Thus, the poem uses this expression of Boyle's early ethics to emphasise the cruelty in his work by stating that Domitian would have enjoyed the pneumatic engine.

Despite the numerous critiques that continued to target the virtuosi, the Royal Society remained a distinguished institution that actively worked with academics and published discoveries. Among the virtuosi of the mid to late eighteenth century was John Hunter.<sup>122</sup> While he is widely acknowledged for his scientific breakthroughs and determined medical inquiry, there is no denying that he was also one of the most avid vivisectors of his day.<sup>123</sup> Many of Hunter's observations were recorded in his publication, *A Treatise on the Blood, Inflammation and Gunshot Wounds*, published posthumously in 1794. It lists ingenious yet cruel experiments on a wide variety of animals.<sup>124</sup> For example, he gained recognition for his methods of operation on aneurisms, which were reputedly originally carried out on the deer of Richmond Park in July

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<sup>120</sup> Suetonius, (121 AD) *The Lives of the Twelve Caesars*. Ed. J. Eugene Reed and Alexander Thomson. (Philadelphia: Gebbie & Co., 1889).

<sup>121</sup> Robert Boyle, "On Sin" in *The Early Essays and Ethics of Robert Boyle*, Ed. John T. Harwood, (Carbondale: Southern Illinois University Press, 1991), 145.

<sup>122</sup> Charles Singer and E. Ashworth Underwood, *A Short History of Medicine*, 2nd ed. (Oxford: Clarendon Press, 1962), p.174.

<sup>123</sup> Macdonald Daly "Vivisection in Eighteenth-Century Britain", 62.

<sup>124</sup> John Hunter, *A Treatise on the Blood, Inflammation, and Gunshot Wounds*, (Philadelphia: James Webster, 1817).

1785.<sup>125</sup> In other works he performs similarly cruel investigations. In 1779, he investigated the breathing of a dog who had had his chest opened.

I made an opening between the ribs into the chest of a dog, and touched the edges of the wound all round with the caustic, to prevent it from healing by the first intention, and then allowed the dog to do as he pleased. The air at first passed in and out of his chest by the wound. He ate, etc. for some days, but his appetite gradually began to fall off. He breathed with difficulty, which increased; he lay principally on that side which we find people do who have the lungs diseased on one side only or principally, and he died on the eleventh day after the opening.<sup>126</sup>

Similar to Boyle and Hooke, Hunter devised his own bellows experiments to observe the effects on circulation. He fixed the nozzle of the bellows into a dog's trachea and watched it breath artificially. He then removed the dog's sternum and cartilages and opened the pericardium to observe the colour of blood which oozed from its lungs upon wounding them.<sup>127</sup> Along with the experiments aforementioned, he researched tendons of dogs to learn more about his own ailments and is credited with publishing the earliest recorded experiments in endocrinology, the study of hormones. Hunter anatomised at least five hundred different species of animals, while the number of physiological preparations left in his collection numbered almost four thousand.<sup>128</sup> His publications appear to show little to no empathy for his animal subjects. However, it is possible that he withheld any reservations about vivisections considering the widely held view among the virtuosi of the utility of such experiments.<sup>129</sup>

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<sup>125</sup> Stephen Paget, *Experiments on Animals*, 3<sup>rd</sup> ed. (London: 1906), 13-14.

<sup>126</sup> John Hunter, *The Works of John Hunter*, ed. James F. Palmer, 4 vols (London: Longman, 1837), III, 352.

<sup>127</sup> *Ibid.*

<sup>128</sup> Stephen Paget, *John Hunter: Man of Science and Surgeon* (London: T. Fisher Unwin, 1897), 248.

<sup>129</sup> Jesse Foot, *The life of John Hunter. By Jesse Foot, Surgeon.* (London: printed for T. Becket, Pall-Mall, 1794).

## VI. Educating the Youth and Lower Classes

As vivisections continued, so did the critical responses to them. Many Enlightenment thinkers believed that the seeds of a person's criminal inclinations could be discerned through their treatment of animals. If a person could torture and harm a defenseless creature as a child, then they might well develop homicidal tendencies when they get older.<sup>130</sup> Many writers aimed to reshape the values of the youth who were most vulnerable to this by presenting them with benevolent morals through fictional stories. Vivisections, on the other hand, were rarely condemned for cruelty in this capacity. The educated class was the one promoting this idea in an effort to control the working classes like they were attempting with the condemnation of blood sports.<sup>131</sup> Moral arguments against vivisections would not become as popular until the nineteenth century. That being said, these early efforts at animal welfare are important to highlight, since they created the foundation of latter movements.

A number of contemporary literary and artistic works drew attention to this idea of the demoralising effects of cruelty. This notion can be traced back to the seventeenth century picaresque novel *The English Rogue Described in the Life of Meriton Latroon*, which acted as a moral warning against the dangers of sin and vice.<sup>132</sup> It was a fictional biography about Meriton Latroon, a criminal whose character was drawn from contemporary accounts of highwaymen and thieves. At the beginning of the book, Meriton Latroon tells the reader about an incident that happened when he was a child.

Thus happen'd, my father kept commonly many turkeys; one among the rest could not endure a fight with a red coat, which I usually wore. But that which most of all

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<sup>130</sup> Aubrey Manning and James Serpell, "Pets and the Development of Positive Attitudes to Animals" *Animals and Human Society*, 136.

<sup>131</sup> Brian Harrison, "Animals and the State in nineteenth-century England", *English Historical Review*, LXXXVIII, no. CCCXLIX, 1973, 792.

<sup>132</sup> Richard Head, *The English Rogue: Described, In the Life Of Meriton Latroon, a Witty Extravagant. Being a Compleat History Of the Most Eminent Cheats Of Both Sexes*, (London: Printed for Henry Marsh, 1665).

exasperated my budding passion, was, his assaulting my bread and butter, and instead thereof, sometimes my hands; which caused my bloomy revenge to use this stratagem: I enticed him with a piece of custard (which I temptingly shewed him), not without some suspicion of danger which fear suggested, might attend my treachery, and so led me to the orchard gate, which was made to shut with a pulley; he reaching in his head after me, I immediately clapt fast the gate, and so surprized my mortal foe: Then did I use that little strength I had, to beat his brains out with my cat-stick; which being done, I deplum'd his tayl, sticking those feathers in my bonnet, as the insulting trophies of my first and latest conquest. Such then was my pride, as I nothing but gazed up at them; which so tryed the weakness of mine eyes and so strain'd the optick nerves, that they ran a tilt at one another, as if they contended to share with me in my victory.<sup>133</sup>

The message of this novel was simple: Meriton took pleasure in cruelty as a child, which led him to become a criminal in adulthood.

Arguably, the most memorable association between animal cruelty and criminality from the eighteenth century is William Hogarth's 1751 etchings *The Four Stages of Cruelty*. The work consists of four inter-connected works that show the progress of cruelty and vice.<sup>134</sup> They represent the notion that an exposure to cruelty at a young age might lead to homicidal tendencies later in life. This narrative follows the lead figure Tom Nero, who progresses through life committing various cruel acts until he finally murders somebody. In the first stage of cruelty, Nero is witness to a dog mauling a cat on the street (see Appendix). Meanwhile, two cats hang by their tails from a street sign, two adolescents stick an arrow into a dog's rectum, and a bird is blinded with a red-hot poker in its eye.

The inscription under this artwork shows the bloodthirstiness of London's youth:

While various scenes of sportive woe  
 The infant race employ,  
 And tortur'd victims bleeding shew  
 The tyrant in the boy.  
 Behold! A Youth of gentler heart,  
 To spare the creature's pain  
 O take, he cries – take all my tart,

<sup>133</sup> Richard Head, *The English Rogue*, 7.

<sup>134</sup> James A. Steintrager, "Monstrous Appearances: Hogarth's 'Four Stages of Cruelty' and the Paradox of Inhumanity." *The Eighteenth century (Lubbock)*, 42, no. 1 (2001), 64.

But teard and tart are vain.  
 Learn from this fair example – You  
 Whom savage sports delight,  
 How cruelty disgusts the view  
 While pity charms the sight.<sup>135</sup>

In “The Second Stage of Cruelty”, Tom Nero is a young man working as a coachman (see Appendix). His horse is shown to have collapsed with a broken leg. In response, Nero relentlessly beats it. Elsewhere in this image, a lamb is beaten to death and a young boy is crushed by a wagon, among other cruelties. The accompanying moral reads,

The generous Steed in hoary Age,  
 Subdu'd by Labour lies;  
 And mourns a cruel Master's rage,  
 While Nature Strength denies  
 The tender Lamb o'er drove and faint,  
 Amidst expiring Throws;  
 Bleats forth it's innocent complaint  
 And dies beneath the Blows.  
 Inhuman Wretch! say whence proceeds  
 This coward Cruelty?  
 What Int'rest springs from barb'rous deeds?  
 What Joy from Misery?<sup>136</sup>

By the third plate, “Cruelty in Perfection”, Tom Nero has become a thief and a murderer (see Appendix). He is pictured being apprehended for his crimes. He is then tried and found guilty, leading to his death by hanging. The last plate shows him on the surgeon’s table, receiving the fate of a convict. He undergoes public dissection, and as a further deterrent, is denied the act of burial. Ironically, a dog is pictured feasting on Nero’s intestines.

In 1786, the novelist Sarah Trimmer published *Fabulous Histories: Designed for the Instruction of Children Respecting Their Treatment of Animals*, filled with morals and messages

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<sup>135</sup> Julie L. Melby, “The Four Stages of Cruelty”, *Graphic Arts*, Princeton University Library, 2008.

<sup>136</sup> *Ibid.*



exhorting compassion towards lesser beings.<sup>137</sup> Following the lives of two families, one of humans and one of robins, Trimmer creates a mythological narrative through a series of fables.

In the introductory advertisement, she writes:

It certainly comes within the compass of Christian benevolence to shew compassion to the Animal Creation; and a good mind naturally inclines to do so. But as, through an erroneous education, or bad example, many children contract habits of tormenting inferior creatures, before they are conscious of giving them pain; or fall into the contrary fault of immoderate tenderness to them; it is hoped that an attempt to point out the line of conduct, which ought to regulate the actions of human beings towards those over whom the supreme Governor has given them dominion, will not be thought a useless undertaking; and that the mode of conveying instruction on this subject, which the Author of the following sheets has adopted, will engage the attention of young minds, and prove instrumental to the happiness of many an innocent animal.<sup>138</sup>

Trimmer writes with the hope that her young readers will become immersed in the world of the “redbreasts”, her robin characters, and be able to apply their newfound care for other beings in their lives. The novel was an instant success, captivating audiences and legitimising beliefs held by many. In 1796, the editors of the *Quarterly Review* wrote:

The nestlings are reared on a footing of easy intimacy with the model children who are their patrons and benefactors. Primness and conscientious principle are the key-notes of this novelette with a purpose.<sup>139</sup>

It is important to note that this early literature focused on the corrupting influence of animal abuse, which became a primary reason to treat animals well. This shift in attitudes was certainly an anthropocentric approach to animal welfare, with little emphasis on any sympathy for the animals themselves. Throughout this period, vivisections continued. It was believed by the virtuosi that animal experimentation could be justified if it served one of three purposes: human safety, convenience, and nourishment. Essentially, the educated class could justify its

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<sup>137</sup> Sarah Trimmer, *Fabulous Histories: Designed for the Instruction of Children Respecting Their Treatment of Animals*. 5th ed. (London: T. Longman, 1793).

<sup>138</sup> Ibid.

<sup>139</sup> *Quarterly Review*, 185, (January and April) 388-399.

cruelty towards animals in the name of science, all the while exhorting working classes to adopt better morals. This thinking was part of a larger attack on the disorderly recreations of plebeian society.<sup>140</sup> In many ways, the upper class had already started withdrawing from performances involving cruelty, evidenced by their reduced attendance at blood sports. However, the virtuosi were not held accountable for the suffering they inflicted on animals and would not be until the nineteenth century.<sup>141</sup> That is, they became legally bound to practice more ethical forms of experimentation that included the use of anaesthetics for live procedures.

## VII. Precursors to Nineteenth-Century Animal Welfare Critiques

Despite the dominant responses to vivisections being satirical or anthropocentric, there were early trailblazers that critiqued animal cruelty from a sentimental perspective. For example, the continued enthusiasm for animal dissections in the eighteenth century was attacked by novelist Francis Coventry in his 1751 work *The History of Pompey the Little or the Life and Adventures of a Lap-dog*. Using Pompey's journey from master to master, Coventry provides a satirical yet sympathetic picture of contemporary British life through the perspective of the dog. In the third revised edition published in 1752, he includes a scene in which Pompey is taken by a medical student who wanted to end his university career by vivisectioning a dog in the presence of his fellow students.<sup>142</sup> The student intended to unveil the secrets of the "iliac passion" (colic). His goal of finalising his university career with an anatomical endeavour is representative of the

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<sup>140</sup> Robert W. Malcolmson, *Popular Recreations in English Society, 1700-1850*, (Cambridge: University Press, 1973).

<sup>141</sup> Brian Harrison, "Animals and the State in nineteenth-century England", 791.

<sup>142</sup> Francis Coventry, *The History of Pompey the Little or the life and adventures of a lap-dog*, 1752. ed. Robert Adams Day, (London: Oxford University Press, 1974), 184-6.

supposed noble-aspect of advancing scientific knowledge through animal experimentation.

Coventry is evidently contesting this notion.

And here, good-natured reader, I am sure it moves thy compassion to think that poor Pompey, after suffering already so many misfortunes, must at last be dissected alive to satisfy a physician concerning the peristaltic motion of the guts.<sup>143</sup>

This narration is made ironically, for Pompey manages to escape that fate. Coventry's messaging represented the commonly-held lay opinion that vivisections were cruel. He goes on to say that physiological knowledge derived from vivisections is "supplemental, and as many think, superfluous."<sup>144</sup>

Similar to Coventry, Samuel Johnson was an avid satirist of the practice of vivisection. He went one step further, though, by connecting the experiments to grave misgivings about the treatment of human patients. In 1758 he included a highly emotional denunciation of animal experimentation in *The Idler*. He begins by employing the satirical device and ridiculing the microscopist, botanist, physicist, and chemist.

The Idlers that sport only with inanimate nature may claim some indulgence; if they are useless they are still innocent: but there are others, whom I know not how to mention without more emotion than my love of quiet willingly admits ... Among the inferior professors of medical knowledge, is a race of wretches, those lives are only varied by varieties of cruelty; whose favourite amusement is to nail dogs to tables and open them alive; to try how long life may be continued in various degrees of mutilation, or with the excision or laceration of the vital parts; to examine whether burning irons are felt more acutely by the bone or tendon; and whether the more lasting agonies are produced by poison forced into the mouth or injected into the veins.<sup>145</sup>

This fierce critique continues later in his publication.

...the anatomical novice tears out the living bowels of an animal, and stiles himself physician, prepares himself by familiar cruelty for that profession which he is to exercise upon the tender and the helpless, upon feeble bodies and broken minds, and by which he

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<sup>143</sup> Francis Coventry, *The History of Pompey the Little or the life and adventures of a lap-dog*, 184-6.

<sup>144</sup> Ibid.

<sup>145</sup> Samuel Johnson, "The Idler No. 17, 5 August 1758" *The Idler and the Adventurer*, ed. W. J. Bate, J. M. Bullit, and L. F. Powell, (New Haven: Yale University Press, 1963), 53-6.

has opportunities to extend his arts of torture, and continue those experiments upon infancy and age, which he has hitherto tried upon cats and dogs.<sup>146</sup>

Johnson held the general view that cruelty to animals would lead to cruelty to men. Further, these excerpts illustrate the more specific suspicion that animal experimentation would end in human experimentation. In a similar manner to Addison, Johnson apologises to his readers for having offended “the sensibility of the tender mind with images like these”. He states that he only quotes such cruelties because they were anyhow being “published every day with ostentation.”<sup>147</sup> This alone implies a growing sensitivity to animal suffering among the educated populace.

As seen above, in the mid to late eighteenth century, sensitivity to animal suffering was beginning to enter the literary consciousness. Popular poets, novelists, and moral philosophers paved the way for a new attitude towards animals and nature by encouraging the English populace to reflect on their relationships with animals.<sup>148</sup> The suffering and death of animals was beginning to be weighed against the improvement of human knowledge and, by the end of the eighteenth century, cruelty became the central point of literary responses to experiments. Early supporters of this shift were Alexander Pope, Jonathan Swift, and Joseph Addison, as previously mentioned. By the end of the eighteenth century, a large group of female writers were contributing to this literature.

As part of the group excluded from politics and decision making, women had few opportunities to gain a voice. In the late eighteenth century, female writers began attacking the widespread cruelty against animals alongside their concerns over slavery, and the treatment of other subjugated communities.<sup>149</sup> The women of the era used their prescribed identities, notably

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<sup>146</sup> Ibid., 55.

<sup>147</sup> Samuel Johnson, *The Idler*, no. 17, (5 August 1758), 56.

<sup>148</sup> Michael L. Frazer, *The Enlightenment of Sympathy: Justice and the Moral Sentiments in the Eighteenth Century and Today*, (2010), 40-64.

<sup>149</sup> Moira Ferguson, *Animal Advocacy and Englishwomen, 1780-1900: Patriots, Nation, and Empire*. (Michigan: The University of Michigan Press, 1998), 2.

their sensibility, to their advantage, taking on the role of protector of the weak. Their work aimed to create an understanding of what womanhood, good citizenship, and nationalism meant to marginalised people, while bringing attention to the cruelty of animal experiments.

A notable female figure is British writer and philosopher Mary Wollstonecraft, whose publications challenged the traditional values of her time. In her famous *Vindication of the Rights of Woman*, Wollstonecraft calls on the argument that women were comparable to animals, suggesting that women are “the link which unites man with brutes.”<sup>150</sup> She likens them to caged birds, horses, and spaniels, united by their submissiveness to men. This notion connects the Enlightenment ideals of liberty and equality to sentimental attitudes towards nature.

In many ways, upper class women of the period used the mainstream discourse about animal treatment as a way to reflect on their own inferior status. Further, other late eighteenth-century female writers such as Catherine Macaulay and Mary Hays combined rational egalitarianism with sympathy for animals.<sup>151</sup> Another avenue that Wollstonecraft used to present her views on human-animal relations was through her 1788 children’s book, *Original Stories from Real Life*, that opens with three chapters centred on the treatment of animals. It presents kindness as a crucial duty to be extended to all walks of life.<sup>152</sup> It is important to recognise that within these messages is the underlying assumption that human separateness needs to be maintained. It was still widely believed that animals lacked reason, so expressing kindness to them was a way for children to learn their human superiority.<sup>153</sup> There must be a human-animal kinship, but not a human-animal duality.

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<sup>150</sup> Mary Wollstonecraft, *The Works of Mary Wollstonecraft*, edited by M. Butler and J. Todd, (London: William Pickering, 1989), vol. 5, 104.

<sup>151</sup> Jane Spencer, “‘The Link Which Unites Man with Brutes’: Enlightenment Feminism, Women and Animals.” *Intellectual history review* 22, no. 3 (2012), 434.

<sup>152</sup> Mary Wollstonecraft, *Original Stories from Real Life, 1791*. (Oxford, England: Woodstock Books, 1990).

<sup>153</sup> Jane Spencer, “‘The Link Which Unites Man with Brutes’: Enlightenment Feminism, Women and Animals.”, 440.

## IX. Conclusion



Figure 3. Edwin Henry Landseer, *The Old Shepherd's Chief Mourner*. 1837. Oil Painting. V&A Museum.

In comparison to Joseph Wright of Derby's painting *An Experiment on a Bird in an Air Pump*, the late-eighteenth century and Victorian era saw an artistic and literary phenomenon that illustrated sentimental attitudes towards the natural world. Edwin Landseer was a pivotal figure in this shift. Notably, his painting *The Old Shepherd's Chief Mourner* acknowledges animals' capacity to experience human-like feelings.

Landseer's art captures the era's burgeoning culture of sentimentality, which unlike the eighteenth century, extended towards experimental animals. The adoption of these attitudes by all classes of society occurred because of the early advocates of animal welfare discussed in this essay. Their varying practical, theological, and ontological critiques of animal cruelty,

particularly vivisections, influenced their successors who advocated for the regulation of animal experimentation. Essentially, they formed the foundation of the heightened awareness of animal cruelty in the nineteenth century.<sup>154</sup>

From the establishment of anti-cruelty institutions like the RSPCA, the implementation of legislature like the 1876 Cruelty to Animals Act, and the fashion of pet-keeping, popular attitudes towards animals were becoming increasingly sympathetic.<sup>155</sup> That being said, cruelty towards animals continued to exist under a different guise, with anaesthetics being used as an ethical justification for the practice of vivisections. Further, while animals like dogs were gaining rights, other animals like cows, pigs, and chickens were being subjected to new forms of cruelty with the establishment of industrial animal agriculture. Thus, despite legislative changes and new, positive attitudes towards many animals, the foundational Western characteristics of human dominance and exploitation have prevailed from the 19<sup>th</sup> century onwards.

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<sup>154</sup> Nicholaas A. Rupke, *Vivisection in Historical Perspective*, (London: Croom Helm, 1987).

<sup>155</sup> Brian Harrison, "Animals and the State in nineteenth-century England", 787-797; Ingrid H. Tague, "Pets and the Eighteenth-Century British Family." *The history of the family*, 26, no. 2 (2021), 188.







Figure 5: William Hogarth, *Second Stage of Cruelty*, 1751, Etching and engraving. New York, Metropolitan Museum of Art.



Figure 6: William Hogarth, *Cruelty in Perfection*, 1751, Etching and engraving. New York, Metropolitan Museum of Art.



Figure 7: William Hogarth, *The Reward of Cruelty*, 1751. Etching and engraving. New York, Metropolitan Museum of Art.

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