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# *Myth, Science, and the Power of Music in the Early Decades of the Royal Society*

Katherine Butler

The Royal Society showed considerable interest in investigating the properties of sound and music in the first few decades after its foundation in 1660. Acoustical experiments sat alongside mathematical and theoretical discussions, and even occasional musical performances.<sup>1</sup> This pairing is not unexpected for a time when music was a respected social accomplishment and natural philosophy a gentlemanly pursuit; but it was also driven by the particular musical passions of the Society's first presidents, Robert Moray (1661–62) and William Brouncker (1663–77).<sup>2</sup> While the Society's experimental and mathematical investigations opened new areas of musical and acoustical understanding, they did not simply overturn older traditions of knowledge. Notions of *musica mundana* continued to serve as models in the natural philosophy of Robert Hooke and Isaac Newton.<sup>3</sup> Another

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<sup>1</sup> Penelope Gouk, "Acoustics in the Early Royal Society 1660–1680," *Notes and Records of the Royal Society of London* 36 (1982): 155–75; Penelope Gouk, *Music, Science and Natural Magic in Seventeenth-Century England* (New Haven: Yale University Press, 1999), 61–63; Leta E. Miller and Albert Cohen, *Music in the Royal Society of London, 1660–1806* (Detroit: Information Coordinators, 1987); Llewelyn S. Lloyd, "Musical Theory in the Early 'Philosophical Transactions,'" *Notes and Records of the Royal Society of London* 3 (1940–41): 149–57; Benjamin Wardhaugh, *Music, Experiment and Mathematics in England, 1653–1705* (Farnham: Ashgate, 2008).

<sup>2</sup> Gouk, *Music, Science and Natural Magic*, 24–27, 62.

<sup>3</sup> *Ibid.*, 218, 253, 256, 267.

powerful tradition—widespread in early modern society—was the natural and ethical powers of music.<sup>4</sup> This was founded on tales from classical mythology, ancient history, and the Bible, with support from contemporary stories such as music’s ability to cure tarantula bites. What happened to these myths of musical power in the sphere of the new experimental philosophy and how were concepts of music changing as old and new knowledge combined?

While Penelope Gouk was able to draw parallels between the practice of music and of experiment—both requiring skilled individuals using technological instruments<sup>5</sup>—myths and stories might appear somewhat incongruous with the experimental philosophy of the Royal Society. For medieval and Renaissance scholars referencing mythological stories or classical authorities on the effects of music was sufficient to prove one’s argument; however, within the new empirical philosophy authority for one’s arguments was to be drawn not from the writings of antiquity but from personal observation or experiment. Ancient wisdom underwent a profound shift in status, no longer being regarded as infallible doctrine but rather as opinions and observations to be tested.<sup>6</sup> This approach was summed up in the Society’s motto “*nullius in verba*” (on the word of no-one) and elaborated in Thomas Sprat’s *History of the Royal Society*. He saw the Society’s aim as to “put a mark on the Errors, which have been strengthened by long prescription: to restore the Truths, that have lain neglected” and to achieve this through endeavoring to “separate the knowledge of Nature, from the colours of Rhetorick, the devices of Fancy, or the delightful deceit of Fables.”<sup>7</sup>

One might expect, therefore, that it was easily determined that music could not move trees or stones as the myths of Orpheus and Amphion suggested, and that such myths were disproved and discarded. Certainly there was some skepticism towards both these and other stories of music’s powers in the seventeenth century. In his *Humane Industry* (1661), Thomas Powell accepted that music had “a great impression on things endued with sense” but “that musick hath any power over things inanimate I shall suspend my faith.” Thomas Browne accused the Greeks of “mendacity” and

<sup>4</sup> Christopher Marsh, *Music and Society in Early Modern England* (Cambridge: Cambridge University Press, 2010), chap.1; Jonathan P. Willis, *Church Music and Protestantism in Post-Reformation England: Discourses, Sites and Identities* (Farnham: Ashgate, 2010), chap. 1.

<sup>5</sup> Gouk, *Music, Science and Natural Magic*, 11.

<sup>6</sup> Peter Dear, “Totius in Verba: Rhetoric and Authority in the Early Royal Society,” *Isis* 76 (1985): 145–61 (148–52).

<sup>7</sup> Thomas Sprat, *The History of the Royal Society of London for the Improving of Natural Knowledge* (London, 1667), 61–62.

“poysoning the world ever after” with their fables in *Pseudodoxia Epidemica* (1646). He also debunked the myth of the dying swan’s beautiful song on the grounds of anatomy and his observation of swans on the Thames.<sup>8</sup> Yet in practice many Royal Society members were not so willing to abandon these myths, whether classical or contemporary. Alchemy, witchcraft, ghosts and spirits, monstrous births, and marvels were all considered legitimate subjects of inquiry by many fellows, so music’s mythical and anecdotal powers were not extraordinary among their concerns.<sup>9</sup>

In the case of classical mythology, several interpretative methods (in a tradition stretching back to antiquity) offered ways of arguing for a central core of truth behind the hyperbole and poetic fiction, while even in the case of contemporary stories, disproving a musical effect proved difficult to achieve.<sup>10</sup> Furthermore, recent studies have challenged Richard Jones’ seminal work on debates concerning ancient and modern knowledge, which presented the Royal Society as hostile to the classical tradition and waging “unceasing war” against the Ancients.<sup>11</sup> Even Sprat represented the Society as children of the Ancients, deriving their knowledge from them, but also testing, increasing, and broadening it.<sup>12</sup> This was in some sense literally true as the majority of Royal Society members had a classical education.<sup>13</sup> Furthermore many engaged in philological, antiquarian, or biblical scholarship

<sup>8</sup> Thomas Browne, *Pseudodoxia Epidemica, or, Enquiries into Very Many Received Tenets and Commonly Presumed Truths* (London, 1646), 22, 171–72; Thomas Powell, *Humane Industry, or, a History of Most Manual Arts* (London, 1661), 112–13.

<sup>9</sup> K. Theodore Hoppen, “The Nature of the Early Royal Society,” *The British Journal for the History of Science* 9 (1976): 1–24, 243–73.

<sup>10</sup> Arthur B. Ferguson, *Utter Antiquity: Perceptions of Prehistory in Renaissance England* (Durham, N.C.: Duke University Press, 1993), 13–60; Jean Seznec, *The Survival of the Pagan Gods: The Mythological Tradition and Its Place in Renaissance Humanism and Art* (New York: Pantheon Books, 1953), 11–147.

<sup>11</sup> Richard Foster Jones, *Ancients and Moderns: A Study of the Rise of the Scientific Movement in Seventeenth-Century England*, 2nd ed. (St. Louis, Mo: Washington University, 1961), 183–268. Recent work includes: Stephen Gaukroger, *The Uses of Antiquity: The Scientific Revolution and the Classical Tradition* (Dordrecht: Kluwer Academic, 1991); Michael Hunter, *Science and Society in Restoration England* (Cambridge: Cambridge University Press, 1981), 148–50; Barbara Shapiro, “Early Modern Intellectual Life: Humanism, Religion and Science in Seventeenth Century England,” *History of Science* 29 (1991): 45–71; Anthony Grafton, *Defenders of the Text: The Traditions of Scholarship in an Age of Science, 1450–1800* (Cambridge, Mass: Harvard University Press, 1991), 1–5; Tina Skouen, “Science Versus Rhetoric? Sprat’s History of the Royal Society Reconsidered,” *Rhetorica: A Journal of the History of Rhetoric* 29 (2011): 23–52 (27–29).

<sup>12</sup> Sprat, *History of the Royal Society*, 50–51.

<sup>13</sup> Hunter, *Science and Society*, 62; Joseph M. Levine, *Between the Ancients and the Moderns: Baroque Culture in Restoration England* (New Haven: Yale University Press, 1999), 28.

which they did not see as incompatible with their natural philosophical interests.<sup>14</sup> They did not merely abandon ancient wisdom or textual scholarship, but rather saw these as a basis on which to build new knowledge.

While Bacon's rejection of ancient authority in favor of observation as the basis for knowledge had inspired the Royal Society's experimental endeavors, he had nevertheless suggested a continuing role for mythology in works such as *The Advancement of Learning* (1605), *De Sapientia Veterum* (1609), and *De Augmentis Scientiarum* (1638). For Bacon myths were the imperfectly preserved remnants of man's greater knowledge of nature from an illiterate period soon after the Fall. They were therefore closest to the wisdom and mastery of nature originally possessed by Adam. Though no longer containing knowledge in themselves, myths could serve as "guiding threads or models of inquiry," pointing the way to knowledge that could be discovered and verified through the observation of nature.<sup>15</sup> While few fellows shared his allegorical approach—Isaac Newton being a notable exception<sup>16</sup>—it nevertheless confirmed the value of mythology to natural philosophy and its potential as an inspiration for inquiry.

The following exploration of how Royal Society fellows treated accounts of music's powers begins with two contemporary tales that were in theory testable—music's abilities to break glass and cure tarantula bites—before considering interpretations of classical mythology and ancient music. (The journal book and *Philosophical Transactions* record no discussion of biblical tales of music's power). The Society emerges as poised between ancient and modern knowledge. Furthermore perceptions of music ranged from viewing it as a poetical and rhetorical art in the Humanist vein, to treating it as a mathematical and physical science, reflecting both its place in the *Quadrivium* (alongside geometry, arithmetic, and astronomy) and the Society's own acoustical and mathematical investigations.<sup>17</sup> These

<sup>14</sup> For example: Eric Jorink and Dirk van Miert, eds., *Isaac Vossius (1618–89) Between Science and Scholarship* (Leiden: Brill, 2012); Joseph M. Levine, *Dr. Woodward's Shield: History, Science, and Satire in Augustan England* (Ithaca: Cornell University Press, 1991); Walter E. Houghton, "The English Virtuoso in the Seventeenth Century," *Journal of the History of Ideas* 3 (1942): 51–73, 190–219 (espec. 52–58); Shapiro, "Early Modern Intellectual Life," 47–57

<sup>15</sup> Stephen H. Daniel, "Myth and the Grammar of Discovery in Francis Bacon," *Philosophy and Rhetoric* 15 (1982): 219–37 (224–25); Barbara Carman Garner, "Francis Bacon, Natalis Comes and the Mythological Tradition," *Journal of the Warburg and Courtauld Institutes* 33 (1970): 264–91; Rhodri Lewis, "Francis Bacon, Allegory and the Uses of Myth," *The Review of English Studies* 61 (2010): 360–89.

<sup>16</sup> James E. McGuire and Piyo M. Rattansi, "Newton and the 'Pipes of Pan,'" *Notes and Records of the Royal Society of London* 21 (1966): 108–43.

<sup>17</sup> David Cram, "The Changing Relations between Grammar, Rhetoric and Music in the

examples reveal both the influence of myth and story in late seventeenth-century natural philosophy and how experiment and observation were changing ideas of music.

### ANECDOTE AND EXPERIMENT: BREAKING GLASS WITH MUSIC

Contemporary stories of music's powers could be investigated and tested via the new experimental method. The successful application of empirical investigation to musical anecdotes is illustrated in a report on music's ability to break glass. The report was given by Daniel Morhof, Professor of History at the University of Kiel, at a Royal Society meeting on 3 November 1670 and also included in a letter to Henry Oldenburg, the Society's secretary.<sup>18</sup> Both Morhof's investigation and the Royal Society's subsequent response follow a model of experimental philosophy traceable back to Francis Bacon. Bacon held there to be three objects of knowledge: firstly the speculative, in which one observed a phenomenon; secondly the manual, when one learned to produce the effects at will; and finally the generative, where one acquired an understanding of the hidden powers that produced the observable effects.<sup>19</sup>

Morhof's investigations proceeded through all three types of knowledge. He first heard about the phenomenon from a bookseller in Amsterdam. Convinced by the bookseller's testimony and a prior performance for the Grand Duke of Tuscany that it was worth investigating, Morhof identified the tradesman and observed the phenomenon for himself. He examined the glasses to ensure they had not been tampered with. He observed how the boy tested for the note at which the glass rang. Holding the glass, he felt the vibrations as the boy sang this note and its harmonics. Finally when the boy sang the octave above the original note and sustained it loudly over many beats, the glass vibrated, rang, and then broke.

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Early Modern Period," in *The Making of the Humanities*, ed. Rens Bod, Jaap Maat, and Thijs Weststeijn (Amsterdam: Amsterdam University Press, 2010), 263–82 (263–65).

<sup>18</sup> Thomas Birch, *The History of the Royal Society of London for Improving of Natural Knowledge*, 4 vols. (London, 1756–57), 2:450; A. Rupert Hall and Marie Boas Hall, eds., *The Correspondence of Henry Oldenburg*, 13 vols. (Madison: University of Wisconsin Press, 1965), 7:229–34, letter 1542 [3 November 1670].

<sup>19</sup> William T. Lynch, "A Society of Baconians? The Collective Development of Bacon's Method in the Royal Society of London," in *Francis Bacon and the Refiguring of Early Modern Thought: Essays to Commemorate the Advancement of Learning (1605–2005)*, ed. Julie Robin Solomon and Catherine Gimelli Martin (Aldershot: Ashgate, 2005), 173–202 (181–86, 202).

Secondly, having observed the phenomenon, Morhof demanded to be taught how to break the glass himself. Although initially unsuccessful, he finally succeeded with a thinner glass. Lastly, to try to understand what causes the glass to shatter Morhof made other experiments and related the effect to other musical phenomena. For example, he set up eight glasses tuned to different pitches by filling them with water. Tracing a wet finger round the rim of one, he observed how not only the water in that glass vibrated as it rang, but also the water in those tuned to the third and fifth. He also tried (unsuccessfully) shattering glass with the sound of a trumpet. He drew comparisons with vibrations he had felt in floors or tables in rooms where music was being performed, and stories of organ music causing the collapse of church vaults. Finally in a later publication—*Epistola de scypho vitreo per certum humanae vocis sonum* (1672)—he compared the breaking of glass through sound to the same effect produced via extremes of heat or cold, explaining all three as caused by the motion of particles.<sup>20</sup>

The Royal Society followed a similar pattern in its own investigations. Rather than relying on Morhof's testimony, Robert Hooke was commissioned to reproduce the effect; however, on 17 November Robert Hooke reported that although he had been able to make the glass ring, he had not succeeded in breaking the glass with music.<sup>21</sup> He was instructed to try again, ensuring that the sound was sufficiently loud and sustained for long enough. As there are no further reports, he probably continued to be unsuccessful. Nonetheless the experiment had proved music's ability to create motion and sound in a usually inanimate object and Hooke continued to investigate these vibrational phenomena. In 1671 he performed an experiment showing how the pattern of flour in a vibrating glass changed depending on the sound the glass was producing. Again in July 1680 he demonstrated the correspondence between the different wave patterns on the surface of water in a glass and the pitch produced as the glass was vibrated with a viol bow.<sup>22</sup> John Wallis also referred to breaking glass with the sound of a trumpet as a phenomenon that he had heard of, but not yet tried.<sup>23</sup> The investigation of what began as a mere incredible anecdote about the power of singing had inspired a series of experiments over the next decade on the vibrational patterns of a sounding glass.

<sup>20</sup> Gouk, "Acoustics," 168.

<sup>21</sup> Birch, *History of the Royal Society*, 2:450, 453.

<sup>22</sup> Gouk, *Music, Science and Natural Magic*, 191.

<sup>23</sup> John Wallis, "Dr. Wallis's Letter to the Publisher, Concerning a New Musical Discovery; Written from Oxford, March 14. 1676/7," *Philosophical Transactions* 12 (1677): 839–42.

## QUESTIONING CONTEMPORARY PHENOMENA: MUSICAL CURES FOR TARANTULA BITES

Not all the Society's attempts to test contemporary musical phenomena were so rewarding. Another source of fascination were tales of music's ability to cure the bite of a tarantula, a spider that lived in Apulia, Italy. A review of Sengwerdius's *De Tarantula* (1668) in the *Philosophical Transactions* (April 1668) sparked the Society's interest.<sup>24</sup> In January 1669, Henry Oldenburg suggested to Mr Auzout (one of the fellows) that he might investigate the effects of tarantula bites while in Italy.<sup>25</sup> Then the tarantula became a topic for a Society meeting on 11 March. Discussion focused particularly on the music cure and Robert Boyle recommended Epifanio Ferdinando's treatise on the subject (*Centum historiae, seu observationes, et casus medici*, 1621).<sup>26</sup>

At this stage there was no question as to the veracity of the phenomenon, but this changed in 1671 when Oldenburg received a letter from John Doddington, His Majesty's Resident in Venice. Doddington reported the opinion of Dr Thomas Cornelio—a physician and natural philosopher from Naples—that stories of the effects and cures of tarantula bites were “fabulous” and “the fancies of the credulous vulgar.”<sup>27</sup> Having been to Apulia and observed the patients first hand, Cornelio put the disease down to the hot and dry climate of the region rather than its spiders. This unexpected new evidence sparked a flurry of correspondence and discussions in 1671–72.<sup>28</sup> Cornelio's opinion was taken seriously because, as Oldenburg noted, he was “a most Eminent man and very Curious in all Enquiries into Nature.”<sup>29</sup> Yet he contradicted a host of seemingly credible and intelligent seventeenth-century witnesses, including the published accounts of Epifanio

<sup>24</sup> “An Account of Some Books,” *Philosophical Transactions* 3 (1668): 660–62.

<sup>25</sup> Hall and Hall, *Correspondence of Henry Oldenburg*, 5: 296–302, letter 1061 [2 January 1669].

<sup>26</sup> Birch, *History of the Royal Society*, 2:355.

<sup>27</sup> Hall and Hall, *Correspondence of Henry Oldenburg*, 8:42, letter 1695 [12 May 1671].

<sup>28</sup> “An Account of Some Books,” *Philosophical Transactions* 7 (1672): 4071–78; Birch, *History of the Royal Society*, 3:9–10, 17–18, 47–48; Thomas Cornelio, “An Extract of a Letter, Written March 5. 1672 by Dr. Thomas Cornelio . . . Concerning Some Observations Made of Persons Pretending to Be Stung by Tarantulas,” *Philosophical Transactions* 7 (1672): 4066–67; Hall and Hall, *Correspondence of Henry Oldenburg*, 8:42, 306–8, 339–40, 496–97, 530–31, 534–35, 541–43, 555–57, 566–67, 606–9; 9:45–46, 161–63, 181–89; Martin Lister, “Some Additions of Mr. Lyster to His Former Communications About Vegetable Excrescencies, and Ichneumon Wasps; Together with an Inquiry Concerning Tarantula's . . .” *Philosophical Transactions* 6 (1671): 3002–5.

<sup>29</sup> Hall and Hall, *Correspondence of Henry Oldenburg*, 8:307, letter 1804 [21 October 1671].



Ferdinando (an Apulian physician), Athanasius Kircher (a priest and natural philosopher, with Jesuit correspondents in Apulia), and Wolferdus Senguerdus (lecturer in philosophy at the University Leiden).<sup>30</sup>

Cornelio's claims therefore threatened to undermine the integrity of empirical natural philosophy. In particular, the kind of co-operative natural philosophy being undertaken by the Royal Society relied significantly on building up knowledge from the reporting of observations and experiences by dependable witnesses (in addition to its own experiments).<sup>31</sup> One had to rely on the observations of fellow philosophers as one could not possibly undertake every experiment oneself. The phenomenon of the tarantula bite's effects and cure seemed to rest on such credible reports. Medical and philosophical texts discussing the phenomenon reported the cases of individual victims and those of the physician Ferdinando at least were drawn from his personal observations. If correct, Cornelio's claims cast doubt on whether the observations of intelligent and worthy men could be relied upon as evidence of natural phenomena. Writing to Martin Lister, Oldenburg expressed these concerns: "What shall we say of all ye several tracts written of this kind, if all be fictitious?"<sup>32</sup> Again in the Royal Society's meeting in February 1672 the journal book records the remarks of some members that "it would be hard to accuse of fraud or error Ferdinand Imperato [*Historia Naturale*, Venice, 1672] and many other good authors, who had delivered, from their own experience, so many mischievous effects of the bite of tarantulas."<sup>33</sup>

Yet in the same month, Oldenburg declared that "if here be no mistake, tis discovery of a monstrous fiction that hath been imposed on us by a general tradition, and particularly by Epiph Ferdinandus, Kircherus, Sengwerdus etc."<sup>34</sup> He therefore set the debate in the context of Sprat's notion of correcting received errors (above, p. 48). Yet if this "monstrous fiction" had been perpetuated by learned men of high social standing it raised the problem of how rarity and wonder were to be distinguished from mere fiction and legend. If even learned men could not be trusted to make credible observations, then how was a natural philosopher's report of observations to be distinguished from anecdote and storytelling? This would

<sup>30</sup> Ibid., 8:535, letter 1897 [10 February 1672].

<sup>31</sup> Dear, "Totius in Verba," 146; Hunter, 13–14, 37–38.

<sup>32</sup> Hall and Hall, *Correspondence of Henry Oldenburg*, 8:307, letter 1804 [21 October 1671].

<sup>33</sup> Birch, *History of the Royal Society*, 3:10 [15 February 1672].

<sup>34</sup> Hall and Hall, *Correspondence of Henry Oldenburg*, 8:535, letter 1897 [10 February 1672].

ordinarily rest on the credibility and status of the witness, but the situation regarding the tarantula bite's effects and cure drew attention to the limitations of judging the veracity of a phenomenon on the basis of the standing of its reporters.<sup>35</sup>

Doubtless the fellows would ideally have tested the phenomenon for themselves, as they had with Morhof's claims. Oldenburg forwarded several queries to Cornelio who responded both with new information and his hope to capture live tarantulas to send to the Royal Society.<sup>36</sup> Yet it seems that none were received. Without the arrival of tarantulas, the Society was left reliant on the written words of competing authorities.

With no means of testing the conflicting reports, Royal Society members came to varied conclusions. Robert Hooke continued to believe the weight of previous testimony, asserting in his "Curious Dissertation concerning the Causes of the Power & Effects of Musick" (c. 1676), that the musical cure was "soe well known in Italy, and by severall learned authors soe spread all over the world, that there are few question it."<sup>37</sup> Robert Boyle, in *An Essay of the Great Effects of Even Languid and Unheeded Motion* (1685), solved the issue to his personal satisfaction by seeking out his own witnesses, in particular an un-named "ingenious acquaintance of mine own" who had seen tarantula victims at Tarentum, and had even been bitten himself (though with little effect).<sup>38</sup>

By contrast, Martin Lister was finally converted to Cornelio's opinion and suggested in his 1678 book on English spiders that the stories were "totally rejected by a most scholarly fellow-countryman as pure fiction."<sup>39</sup> Nevertheless, Lister still held to the medical explanations behind the story and musical cure, continuing to believe that the reasoning behind these theories had value. It would not be surprising, he says, if being bitten by a spider did cause one to dance as that is the manner in which the spiders move. Moreover if the urge to dance were to subside, music would be likely

<sup>35</sup> Dear, "Totius in Verba," 155–56.

<sup>36</sup> Cornelio, "Extract of a Letter," 4066–67; Hall and Hall, *Correspondence of Henry Oldenburg*, 8:494–97, letter 1876a [19 January 1672]; 8:561–64, letter 911a [5 March 1672].

<sup>37</sup> Penelope Gouk, "The Role of Acoustics and Music Theory in the Scientific Work of Robert Hooke," *Annals of Science* 37 (1980): 573–605 (600).

<sup>38</sup> Robert Boyle, *An Essay of the Great Effects of Even Languid and Unheeded Motion* (London, 1685), 75–76.

<sup>39</sup> Malcolm Davies, Basil Harley, and John Parker, eds., *Martin Lister's English Spiders 1678* (Colchester: Harley Books, 1992), 65–66; Martin Lister, *Historiae Animalium Angliae Tres Tractatus* (London, 1678), 15–16. The "fellow countryman" was probably John Doddington.

to arouse it, while the generation of sweat through exercise could contribute to the cure.

John Ray was more skeptical: in a book review in the *Philosophical Transactions* (1699) his opinion was that the tarantula's bite and cure were "acting Fictions and Tricks to get Money."<sup>40</sup> The phenomenon was reduced to the level of a trick of the fair, much like some dancing apes that had deceived Sir Kenelm Digby (another fellow of the Royal Society). The apes framed their actions exactly to the music, which troubled Digby because apes were not considered to have the reasoning ability required for understanding the proportions of music in this way. Upon investigation, philosopher John Sergeant discovered the performance to be faked by means of strings and whips through which the apes were controlled by a keeper.<sup>41</sup> For Sergeant this story was a lesson on giving credit to men's opinions too easily.

Yet despite the skepticisms of some, neither the lack of experimental evidence for the tale nor the observations of a learned natural philosopher were sufficient to undermine belief in its veracity by some of the Royal Society's most influential members. Furthermore even for those who began to doubt, this was not enough to challenge the associated medical theories that had emerged, even if they might no longer apply to this specific case.

### CLASSICAL MYTHOLOGY AND ANCIENT VERSUS MODERN MUSIC

If even contemporary stories of music's powers proved hard to evaluate, how did members of the Royal Society respond to its more mythical effects? Classical myths were widely regarded as fiction, yet containing a core of truth. Interpretations of this underlying truth were broadly speaking either allegorical—reading myths as moral tales or ancient wisdom hidden in parables—or Euhemerist—regarding the Gods as hyperbolic personifications of historical men, admired for their exceptional talents.<sup>42</sup> In line with this tradition, Royal Society members did not simply dismiss these mythological stories but drew parallels between mythology, experiments, and their beliefs about music's effects in the modern world.

Robert Hooke opened his "Curious Dissertation concerning the Causes of the Power & Effects of Musick" with a series of stories about

<sup>40</sup> John Ray, "An Account of Books," *Philosophical Transactions* 21 (1699): 53–67 (57).

<sup>41</sup> John Sergeant, *Solid Philosophy Asserted, against the Fancies of the Ideists, or, the Method to Science Farther Illustrated* (London, 1697), 16–17.

<sup>42</sup> Ferguson, *Utter Antiquity*, 13–60, Sez nec, *Survival of the Pagan Gods*, 11–147.

music's effects that were common throughout the sixteenth and seventeenth centuries and drawn from a "praise of music" topos that stretched back to classical antiquity.<sup>43</sup> While not based on personal observations, his choice of examples leant towards the everyday (e.g. nurses using music to lull babies to sleep) and to current or historical examples, such as music curing tarantula bites or arousing King Erik I of Denmark to such a fury that he killed a servant. Hooke initially claimed that he would not discuss Arion and Orpheus because they were "generally look'd upon as Poeticall fictions," but in fact he went on to argue that "some considerable truth" inspired these poets.<sup>44</sup> In a typically Euhemerist manner, Hooke compared the characters in fables to actors on a stage who may look and act like kings and queens, but are living men and women: similarly, while "drest up in hyperbolys & rhetoricall flourishings yet certainly they [the myths] contain many reall truths."<sup>45</sup> Furthermore, he illustrated the connection between fable and truth in relation to known natural phenomena. The tale of Amphion making stones dance, for example, might be exaggerated, but inanimate objects can be made to move by music: the sound of one string being struck can cause vibrations in another string tuned to same pitch, or a glass filled with water will move if another tuned to same pitch is made to sound (an example taken from Athanasius Kircher). For Hooke, nature and experiment provided examples that confirmed the underlying truth of classical myth—even its most incredible tales of moving inanimate objects.

Nor was this the only work in which Hooke turned to fable. In a discourse on earthquakes presented in 1687 he used classical mythology to defend his theory of the Earth's changeability through time. While still partially euhemeristic in viewing myths as telling the history of world, this was a more allegorical reading, interpreting them as stories of geological catastrophes rather than human lives. Mythology became a source of evidence to verify natural philosophical argument.<sup>46</sup> In the case of music's effects, having listed the traditional collection of stories, he goes on to explain the stories and myths via discussions of sound as vibrating motion, the structure of the ear, and its reception by the "acustick faculty." Following from his understanding of music as vibrating motions (and probably

<sup>43</sup> Gouk, "Role of Acoustics," 593–95, 598–601.

<sup>44</sup> *Ibid.*, 600.

<sup>45</sup> *Ibid.*, 595, 600.

<sup>46</sup> Kirsten Birkett and David Oldroyd, "Robert Hooke, Physico-Mythology, Knowledge of the World of the Ancients, and Knowledge of the Ancient World," in *The Uses of Antiquity: The Scientific Revolution and the Classical Tradition*, ed. Stephen Gaukroger (Dordrecht: Kluwer Academic, 1991), 145–70.

inspired by Vossius, below), he fixed on rhythm as the primary means by which music affects the passions though its ability to slow or quicken the spirits.<sup>47</sup> Experiment and theories of natural philosophy provided explanations for myths and justifications for belief in music's power.

Hooke was not a maverick among the fellows in crediting mythological stories of music's powers. In his "Elysium Britannicum" John Evelyn exemplified music's effects on the healthy with mythological evidence: Timotheus's ability to control the mood and actions of Alexander the Great through his choice of tune at a banquet, and Agamemnon's appointment of a harper to keep his wife Clytemnestra chaste with dorian-mode tunes.<sup>48</sup> Furthermore, several Royal Society members had sufficient belief in the effects of ancient music described in classical stories to create elaborate theories on how these might be recaptured.

Isaac Vossius—whose scholarly interests spanned philology, biblical criticism, geography, and experimental natural philosophy<sup>49</sup>—argued that the effects of ancient music could be regained through a reformation of rhythm and meter, which he saw as key to the powerful effects reputed in classical tales.<sup>50</sup> This was not particularly original as the notion of *rhythmus* as the foundation for moving the affections had been widely discussed in France in the sixteenth-century academy of Baif and Mersenne's *Harmonie Universelle* (1634).<sup>51</sup> Vossius believed wholeheartedly in the truth of the effects described in ancient myth, yet he regarded more recent tales such as that of the twelfth-century tale of King Erik I of Denmark (above, p. 57) as merely borrowing from the story of Alexander and Timotheus.<sup>52</sup> This was typical of his vehement attack on modern music, which he regarded as inferior to the ancient in every way (in addition to rhythm

<sup>47</sup> Gouk, "Role of Acoustics," 595–97, 601–4; Penelope Gouk, "Some English Theories of Hearing in the Seventeenth Century: Before and after Descartes," in *The Second Sense: Studies in Hearing and Musical Judgement from Antiquity to the Seventeenth Century*, ed. Charles Burnett, Michael Fend, and Penelope Gouk (London: Warburg Institute, 1991), 95–113 (110–12).

<sup>48</sup> John Evelyn, *Elysium Britannicum, or the Royal Gardens*, ed. John E. Ingram (Philadelphia: University of Pennsylvania Press, 2001), 306. The manuscript was begun in the early 1660s and was altered and expanded until 1702.

<sup>49</sup> Jorink and Miert, *Isaac Vossius*.

<sup>50</sup> "An Accompt of Two Books," *Philosophical Transactions* 8 (1673): 6019–30; Isaac Vossius, *De Poematum Cantu et Viribus Rythmi* (Oxford, 1673); Dean Tolle Mace, "Musical Humanism, the Doctrine of Rhythmus, and the Saint Cecilia Odes of Dryden," *Journal of the Warburg and Courtauld Institutes* 27 (1964): 251–92 (261–65).

<sup>51</sup> George Houle, *Meter in Music, 1600–1800: Performance, Perception, and Notation* (Bloomington: Indiana University Press, 1987), 62–77.

<sup>52</sup> Vossius, *De Poematum Cantu*, 58–59; Mace, "Musical Humanism," 272–73.

and meter he also adds criticism of word setting and modern instruments). His denigration of the modern was unusual in the Royal Society, whose members more frequently hoped that new philosophical methods would take the Moderns beyond the wisdom of the Ancients.<sup>53</sup>

More typical was Thomas Salmon's ambivalence towards the relative merits of Ancients and Moderns. Inspired by Vossius, Salmon—a clergyman, amateur musician and writer on music theory—argued that it was not only metrical, but also tonal proportions that limited the effects of modern music, offering his recommendations on musical temperament.<sup>54</sup> He too appears to have trusted classical myths, inferring from them that music (along with the other arts) had reached its perfection under the Greeks before being lost in the overthrow of civilization by “barbarous Multitudes.” Yet he held a more positive assessment of the present age as “Arriv'd near their ancient Glory.” Indeed the excellency of modern musicians might lead some to believe (falsely) that the “mighty Power of Musick, Recorded by the most Grave and Authentick Historians, may be lookt upon as Romance since all the Excellencies now perform'd, cannot conquer the Soul, and subdue the Passions as has been done of Old.”<sup>55</sup>

The Royal Society's interest in the effects of ancient music peaked in the 1690s when William Temple sparked debate by arguing that all modern knowledge was inferior to the ancient.<sup>56</sup> His “Upon Ancient and Modern Learning” (1690), followed an Ancients versus Moderns debate that had already begun in France in relation to literature (and later came to involve music).<sup>57</sup> Temple's comments on music were brief but regarded the powers of ancient music as wholly lost, while modern music was mere “fiddling” founded on the “fancy or observation, of a poor Fryar, in chanting his Mattins”<sup>58</sup> (a snipe at the eleventh-century theorist and Benedictine, Guido

<sup>53</sup> Jones, *Ancients and Moderns*, 183–267.

<sup>54</sup> Thomas Salmon, *A Proposal to Perform Musick in Perfect and Mathematical Proportions* (London, 1688), 4; Wardhaugh, *Music, Experiment and Mathematics*, 166–77.

<sup>55</sup> Salmon, *Proposal*, 1–3.

<sup>56</sup> Levine, *Between the Ancients and the Moderns*, 29–30; Douglas Lane Patey, “Ancients and Moderns,” in *The Cambridge History of Literary Criticism. Vol. 4: The Eighteenth Century*, ed. Hugh Barr Nisbet and Claude Julien Rawson (Cambridge: Cambridge University Press, 1997), 32–71; “An Account of Books,” *Philosophical Transactions* 18 (1694): 65–76; William Temple, “An Essay Upon the Ancient and Modern Learning,” in *Miscellanea. The Second Part* (London, 1690), 3–75; William Wotton, *Reflections Upon Ancient and Modern Learning* (London, 1694).

<sup>57</sup> Georgia Cowart, *The Origins of Modern Musical Criticism: French and Italian Music, 1600–1750* (Ann Arbor, Mich: UMI Research Press, 1981), 35–48.

<sup>58</sup> Temple, “Upon the Ancient and Modern Learning,” 45–46.

of Arezzo, with his sight-singing method derived from the hymn, *Ut queant laxis*<sup>59</sup>). In this essay Temple appears to take the mythological tales literally, asking:

What are become of the Charms of Musick, by which Men and Beasts . . . were so frequently Enchanted, and their very Natures changed; By which the Passions of Men were raised to the greatest heighth [sic] and violence, and then as suddenly appeased.<sup>60</sup>

Yet this was probably just for rhetorical effect. In “Upon Poetry,” also in the *Miscellanea*, he claimed that the powers of music are “are either felt or known by all Men” and therefore:

We need no Recourse to the Fables of Orpheus or Amphion, or the Force of their Musick upon Fishes and Beasts; ‘tis enough that we find the Charming of Serpents, and the Cure or Allay of an evil Spirit or Possession, attributed to it in Sacred Writ.<sup>61</sup>

His suggestion that all men feel the power of music offered a more positive assessment of music in current times than he allowed in “Upon Ancient and Modern Learning.”

The Royal Society felt its new philosophical method sufficiently threatened by Temple that they commissioned William Wotton to reply.<sup>62</sup> At this time music was generally a sideshow in this wider debate on the relative merits of ancient and modern knowledge and literature (although it took on greater significance in the eighteenth century).<sup>63</sup> Yet this question formed an increasingly significant undercurrent to musical inquiries in Royal Society circles. The two most detailed contributions to this musical debate among the Royal Society’s members were William Wotton’s reply to Temple—*Reflections upon Ancient and Modern Learning* (1694)—and John Wallis’s letter “concerning strange effects reported of music in former

<sup>59</sup> Claude Palisca, “Guido of Arezzo,” in *Grove Music Online*. [www.oxfordmusiconline.com/subscriber/article/grove/music/11968](http://www.oxfordmusiconline.com/subscriber/article/grove/music/11968) (accessed Aug. 3, 2013).

<sup>60</sup> Temple, “Upon the Ancient and Modern Learning,” 45.

<sup>61</sup> William Temple, “Upon Poetry,” in *Miscellanea. The Second Part* (London, 1690), 279–341 (288).

<sup>62</sup> Jones, *Ancients and Moderns*, 267.

<sup>63</sup> Herbert M. Schueller, “The Quarrel of the Ancients and the Moderns,” *Music and Letters* 41 (1960): 313–30.

times beyond what is found in later ages” printed in *Philosophical Transactions* (1698).<sup>64</sup> The two fellows approached the issue from different backgrounds, making the underlying similarities in their approach striking. Wotton was an exceptional linguist and a Church of England minister. His musical discussion formed part of his response to Temple’s criticisms of the state of modern knowledge. John Wallis was a mathematician (Savilian Professor of Geometry at Oxford) with keen interests in music theory. He had previously produced a Latin translation of Ptolemy’s *Harmonicks* (1682) and his letter expanded upon some brief observations in the appendix to this translation concerning the different effects of ancient and modern music.<sup>65</sup>

Both authors started by examining the authority of classical stories of music’s power. Wotton declared that myths were either entirely false or else to be understood allegorically as music bringing savage peoples to civility. As such they provided no insight into the excellency of ancient music (although later in the passage he did credit ancient music’s ability to move human passions).<sup>66</sup> Wallis, on the other hand, took a more Euhemerist approach. He was emphatic that “trees and stories did not dance after their pipe,” and while he saw myths as “highly hyperbolic, next door to fabulous” he nonetheless believed that music was capable of affecting the natural world and human behavior.<sup>67</sup> Furthermore, like Hooke he pointed to music’s proven ability to move inanimate objects through the same example of sympathetic vibration between two strings.<sup>68</sup> He put the exceptional power of music in ancient times down to its rarity and the unsophistication of the rustic people—an argument previously made in Francis North’s *Philosophical Essay of Musick* (1677)<sup>69</sup>—and he drew comparisons with the behavior of country people in his own time who ran after fiddlers or flocked

<sup>64</sup> John Wallis, “A Letter of Dr. John Wallis, to Mr. Andrew Fletcher; Concerning the Strange Effects Reported of Musick in Former Times, Beyond What is to be Found in Later Ages,” *Philosophical Transactions* 20 (1698): 297–303; Wotton, *Reflections*, 282–89.

<sup>65</sup> Wardhaugh, *Music, Experiment and Mathematics*, 158–66; John Wallis, “Appendix: De Veterum Harmonica Ad Hodiernam Comparata,” in *Klaudiou Ptolemaiou Armonikon Biblia 3 Claudii Ptolemaei Harmonicorum Libri Tres. Ex Codd. Mss. Undecim* (Oxford, 1682), 281–328. With thanks to David Cram and Benjamin Wardhaugh for allowing me advanced sight of their translation of Wallis’s “Appendix,” recently published in *John Wallis: Writings on Music* (Farnham: Ashgate, 2014), 75–204.

<sup>66</sup> Wotton, *Reflections*, 283–84.

<sup>67</sup> Wallis, “Concerning the Strange Effects,” 298.

<sup>68</sup> *Ibid.*, 297.

<sup>69</sup> Francis North, *A Philosophical Essay of Musick Directed to a Friend* (London, 1677), 35.



to ballad singers at a fair.<sup>70</sup> This, he argued, was all that the classical myths signified beneath their hyperbole. The impact of this difference in interpretation is that Wotton regarded the mythical effects of music as lost and unachievable, whereas Wallis believed that they could still be recreated (barring the hyperbole).

Having reduced the exceptionality of ancient music to its ability to move the passions, both authors employed a Humanist argument previously put forward in the Florentine Academies of the sixteenth century: that ancient music was able to cause its legendary effects because of its greater simplicity and clarity, being performed by a single voice, perhaps accompanied by an instrument. Wallis also pointed to the union of music with word and gesture as another reason for its effectiveness.<sup>71</sup> They contrasted this with modern music's multiple parts, emphasis on contrapuntal harmony, and (in Wotton) greater rhythmic variety.<sup>72</sup> Although initially the contrast appears to be between affective monophonic song and polyphonic instrumental consort music, this is not quite the case. In a manner typical of the increasing consideration of the affects in seventeenth-century instrumental music, Wallis allowed that simple sounds without words (such as "murmuring rivulets" or jigs on a violin) could excite the passions and "tunes and measures" could be adapted to move the affections.<sup>73</sup> The simplicity and clarity of affect was essential, not the relationship with a text. Yet in contrast to the rhetorical characterization of ancient or simple music, modern music was considered to be primarily concerned with proportion and order. Wallis characterized modern music as a "sweet Mixture of different Parts and Voices with just Cadences and Concords intermix'd" in which "only the judicious Musician can discern and distinguish the just Proportions," while Wotton wrote of "unravelling every several Part" and "observing how artfully those seemingly disagreeing Tones joyn . . . to make up that united Concord."<sup>74</sup> To make such stark distinctions both authors had to oversimplify the diversity of modern music, which spanned

<sup>70</sup> On popular music-making in this period see Marsh, *Music and Society*.

<sup>71</sup> As in Vincenzo Galilei, *Dialogue on Ancient and Modern Music*, trans. Claude V. Palisca (New Haven: Yale University Press, 2003), lix–lx, 198–226; Claude V. Palisca, *Music and Ideas in the Sixteenth and Seventeenth Centuries* (Urbana: University of Illinois Press, 2006), 107–30; Claude V. Palisca, ed., *Girolamo Mei, Letters on Ancient and Modern Music to Vincenzo Galilei and Giovanni Bardi* ([n.p.]: American Institute of Musicology, 1960), 45–47; Mace, "Musical Humanism," 252–58.

<sup>72</sup> Wallis, "Appendix," 317; Wallis, "Concerning the Strange Effects," 299; Wotton, *Reflections*, 285–87.

<sup>73</sup> Wallis, "Concerning the Strange Effects," 301–2.

<sup>74</sup> *Ibid.*, 301; Wotton, *Reflections*, 286.

accompanied solo song (recitatives and airs), English operas in which musical scenes punctuated spoken action, and instrumental genres such as airs, dances, and solo/trio sonatas (the more contrapuntal fantasia was in fact declining).<sup>75</sup> This lack of direct engagement with musical practice or experience is a feature I shall return to.

The important difference between Wallis and Wotton and the earlier Humanists (and Vossius) is that rather than arguing for modern music to return to the simple effectiveness of the ancient, instead they valued modern music's advances in harmony as evidence of the progress of musical knowledge. Wotton's structure of knowledge contrasted the arts of imitation that rely on judgment to ascertain excellence ("Poesie, Oratory, Architecture, Painting") with the arts in which knowledge is cumulative ("Natural History, Physiology, and Mathematicks"). The Ancients were generally regarded as having the greater achievement in the former, while the Moderns excelled in the latter.<sup>76</sup> He followed the traditional *Quadrivium* (and also the acoustic and harmonic investigations of the Royal Society) in placing music alongside astronomy, optics, and medicine, as well as defining music as a "physico-mathematical science" with "fixed rules and stated proportions."<sup>77</sup> As we shall see below, he was not oblivious to music's pleasurable and artistic qualities, and mediating between music's mathematical and artistic properties finally leads Wotton to a more ambivalent evaluation. Yet by crediting modern music with the invention of harmony and counterpoint Wotton could argue for its superiority on the basis of the accumulation of knowledge.

As modern music was a more knowledgeable art it also required more experienced listeners. Both Wallis and Wotton regarded a skillful, knowledgeable listener capable of comprehending the counterpoint and harmony as the ideal audience for modern music. This ideal listener was contrasted with unskillful ones, who were both the common listeners of modern times—for example, Wallis's country-folk who run after fiddlers and flock to ballad sellers—and the ancient audience. To these unskillful listeners the complexities of the best modern art music would seem merely confusion or noise. The pairing of classical listeners and uneducated modern listeners implied a progression of the human mind since ancient times. The modern

<sup>75</sup> For further information see, for example, Ian Spink, ed., *The Seventeenth Century: Music in Britain* (Oxford: Blackwell, 1992).

<sup>76</sup> Joseph M. Levine, "Giambattista Vico and the Quarrel between the Ancients and the Moderns," *Journal of the History of Ideas* 52 (1991): 55–79 (56); Wotton, *Reflections*, 8–9, 18–19.

<sup>77</sup> Wotton, *Reflections*, 160, 284.

musical connoisseur could understand and enjoy more complex music than ancient listeners were able to.<sup>78</sup>

This contrast has implications for how Wotton and Wallis viewed music's aims and effects. Wotton described how the common listener:

hears a numerous Song, set to a very moving Tune, exquisitely sung to a sweet Instrument, will find his Passions raised, whilst his Understanding, possibly, may have little or no Share in the Business. He scarce knows, perhaps, the Names of the Notes, and so can be affected only with an Harmony, of which he can render no Account. To this Man, what is intricate, appears confused.

By contrast for the sophisticated listener:

the Skill or Ignorance of the Composer serve rather to entertain the Understanding, than to gratifie the Passions of a skilful Master; whose Passions are then the most thoroughly raised, when his Understanding receives the greatest Satisfaction.<sup>79</sup>

Wotton's common listeners' experience of music is a sensual one—understanding plays little or no part—whereas the skillful listener's experience is primarily intellectual with the passions raised only via the mind's understanding. A similar contrast between the sensual effects of ancient music and the intellectual ones of modern music was made by another fellow of the Royal Society, William Holder, who was involved in the musical training of choirboys as Sub-dean of the Chapel Royal and also a composer.<sup>80</sup> Taking his cue from Vossius he believed Greek music's effects to be created by "rhythmus," but this "violently attacks and hurries the imagination" and is "more proper . . . to make great impressions upon the Fancy." By contrast modern music "more Sedately affects the Understanding and Judgement" and "quietly, but powerfully affects the Intellect by true Harmony."<sup>81</sup> Holder seems to hold an Aristotelian notion in which imagination is an inferior part of the mind that mediates between reason and the senses, as the "internal representation of sense to the reason."<sup>82</sup> At a time when

<sup>78</sup> Wallis, "Concerning the Strange Effects," 299, 301–2; Wotton, *Reflections*, 285–86.

<sup>79</sup> Wotton, *Reflections*, 287–88.

<sup>80</sup> Jerome Stanley, *William Holder and His Position in Seventeenth-Century Philosophy and Music Theory* (Lewiston, N.Y.: E. Mellen Press, 2002), 4–10.

<sup>81</sup> William Holder, *A Treatise of the Natural Grounds and Principles of Harmony* (London, 1694), 127–28.

<sup>82</sup> Richard Kearney, *The Wake of Imagination: Ideas of Creativity in Western Culture* (London: Hutchinson, 1988), 106–8.

reason and the mind was considered superior to the body and senses, limiting Greek music to sensual effects or inferior aspects of the mind while emphasizing the intellectual qualities of modern music, was another way of demonstrating the superiority of the present age.

Wotton's "great End of Musick," however, was pleasing the audience and this inflected his somewhat ambivalent final judgment on ancient versus modern music. He credited the modern composer with discovering "the Extent and Perfection of the Art," but suggested that the ancient musician must have better achieved this "great End" of pleasing the audience. While he had argued that modern composers aimed to entertain the mind, such intellectual pleasure was available only to the judicious listener (whereas ancient or common listeners responded to the more sensual pleasure of having one's passion moved). Despite its technical advances, therefore, modern music was "not much pleasanter to an unskillful Audience than it ever was amongst the Ancient Greeks."<sup>83</sup>

Theorizing on the relative merits of ancient and modern music led these Royal Society fellows to question the contemporary focus on moving the affections and to emphasize instead the pleasurable experience of music. Wallis went furthest, characterizing musicians as able to act as either cooks or physicians. Cooks mix a sauce to make it palatable and enjoyable just as one aim of music is to please the ear by blending parts in sweet consort. In this modern music "equals if not excels" the ancient. By contrast, physicians mix a potion for curing a distemper or procuring a particular habit in the body. Those who would excite particular affections should imitate the physician and use simple ingredients fitted to the affection one would produce. This was where ancient music excelled, but he did not doubt that modern composers could do this too and produce as great feats (barring the hyperbole surrounding these myths).<sup>84</sup> In Wallis's model there was no need for modern music to be concerned with the passions—pleasure alone was sufficient. But his idea of pleasure was an intellectual one open to the "judicious musician," not the common ear to whom complex music is mere noise. While one might protest that moving the passions is nevertheless pleasurable, for Wallis it was what music does for the common ear. Moving the intellect was what satisfied the musically knowledgeable.

What began as a comparative analysis of modern and ancient music, and an evaluation of the truth within classical mythology, has ended by challenging the centrality of the passions and musical rhetoric that had

<sup>83</sup> Wotton, *Reflections*, 288.

<sup>84</sup> Wallis, "Concerning the Strange Effects," 302–3.

underpinned musical thought throughout the seventeenth century and by promoting intellectual pleasure as a respectable end for music. Also noteworthy is the fact that the Royal Society entertained and published these debates, which rely not on experiment, observation, or analysis of personal musical experiences, but purely verbal argument. This turn toward text-based arguments was to some extent inevitable. Wallis started his letter by pointing out how he would have responded differently if he had merely been asked to explain music's effects. Then he would have discussed the nature of sound as motions in the air, the organs of hearing, and how music moves the animal spirits and then the passions.<sup>85</sup> By contrast, reconstructing the nature of ancient music (for which they relied on commonly received conceptions of its nature subjected to little criticism) and theorizing about the comparative effects of music in different ages did not lend itself to the modes of enquiry of empirical philosophy. Even when discussing modern music in this context, these authors made little use of either personal observations or music theory, causing their distinctions between ancient and modern music to become caricatures. Supposed examples from real life, such as Wallis's allusions to the effect of fiddlers on country people, are mere generalizations about responses to music rather than the personal observation more typical of experimental or observational reporting in the *Philosophical Transactions*. Instead these examples show the flexibility with which members of the Royal Society merged both mythology and experimental natural philosophy, and old and new methods of scholarship. Wallis—one of the members most actively involved in musical investigations—is revealed as the firm believer in the powers of music, while Wotton—the linguistics expert and theologian—is the more skeptical.

## CONCLUSION

While the Royal Society's acoustical experiments and mathematical investigations of musical harmony have drawn most attention, these were firmly intertwined with music's mythical and anecdotal capabilities. In their treatment of musical myths and stories, Royal Society members had a surprisingly firm commitment to the traditional powers of music; if anything the properties of sound they discovered seemed to confirm the underlying truth of these tales. Although the idea that ancient music's simplicity was the

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<sup>85</sup> *Ibid.*, 297–98. These elements are typical of seventeenth-century explanations of music's effects, as we have already seen in Hooke. See also Gouk, "Some English Theories of Hearing," 95–113.

cause of its power dated back to Humanist debates of the sixteenth century, it also had new parallels in acoustical experiments that used single sounds to produce natural effects. Indeed when contemporary stories came under threat from new evidence, the reluctance of many members to abandon them as false tales indicates an underlying belief in the power of music that was not entirely founded on experiment. Furthermore their work reveals a tendency to blend empirical philosophy with more humanistic endeavors such as Wallis' translations of Greek harmonic treatises, Hooke's use of the "praise of music" trope, and their contributions to Ancients versus Moderns debates via rhetoric and verbal argument, rather than experiment or observation. In a reversal from older Humanist discussion of music's powers, the ancient stories were no longer the authoritative proof, but rather experiment and personal experience needed to support the mythology. Yet this did not stop such stories from forming the basis of lively discussions within the Royal Society and its publications (even when experimental evidence was lacking and observational evidence contradictory) or providing inspiration for investigating both the immediate phenomenon and its wider implications. Despite the will to test out natural phenomena the Royal Society's musical inquiries were far from simply demythologizing, but rather the result of a mind-set that amalgamated myth, anecdote, and experiment.

While a certain degree of skepticism towards mythology was not new, the turn toward pleasure over affect weakened the importance of these stories for conceptualizing music. In creating an opposition between ancient music's effects on the body and senses versus modern music's appeal to the rational mind, Wallis and Wotton valued music not primarily for its affective properties but for its capacity to bring intellectual pleasure. This was the beginning of a noticeable decrease in confidence in the validity of the theory of affections, which Donald Boomgaarden sees as a growing trend in the eighteenth century.<sup>86</sup> For the eighteenth century's more progressive thinkers, including Alexander Malcolm, pleasure became the primary aim of music and ancient music's focus on the affections was replaced with an emphasis on the intellect and judgment.<sup>87</sup> Such new assessments of music's worth inspired investigations into the aesthetic experience of music and the development of theories of musical beauty based on harmony and proportion. Francis Hutcheson's *Inquiry into the Original of our Ideas of Beauty*

<sup>86</sup> Donald R. Boomgaarden, *Musical Thought in Britain and Germany During the Early Eighteenth Century* (New York: Peter Lang, 1987), 77, 82.

<sup>87</sup> *Ibid.*, 84–85; Alexander Malcolm, *Treatise of Musick: Speculative, Practical and Historical* (Edinburgh, 1721), 589, 597–99; Maria Semi, *Music as a Science of Mankind in Eighteenth Century Britain*, trans. Timothy Keates (Farnham: Ashgate, 2012), 115–17.

*and Virtue* (1725), for example, would categorize the charms of music as twofold—the beauty of harmony and the raising of the passions—mirroring Wallis’s division of the aims of music.<sup>88</sup> Furthermore, this emphasis on a harmonic understanding rather than a rhetorical, word-based one reflected the growing status of instrumental music in this period.

Ancients versus Moderns debates were not specific to England and nor were Englishmen the earliest to take up the issue, but these Royal Society fellows were among the first to move beyond judging music against the moral and ethical criteria of antiquity towards theories of beauty and intellectual pleasure.<sup>89</sup> In the eighteenth century, an expansion of the definition of “ancient” to include all music up to and including the Renaissance meant that the counterpoint Wotton and Wallis had regarded as modern instead became associated with the ancient.<sup>90</sup> Nevertheless the underlying conceptions behind their arguments had lasting value. In the eighteenth century, oppositions between simplicity and expressiveness, complexity and sonority, or the sensual and rational appreciation of music became the basis for debates across Europe evaluating not only ancient and modern, but also French versus Italian music.<sup>91</sup> The Royal Society’s blend of Humanism and empirical philosophy, and of respect for the Ancients with a confidence in modern progress, proved a productive site for the development of new conceptions of musical creativity and purpose. Music’s traditional role as an ethical or affective art was beginning to be perceived as separate from music’s qualities as a pleasurable, aesthetic practice.

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<sup>88</sup> Peter Le Huray and James Day, *Music and Aesthetics in the Eighteenth and Early-Nineteenth Centuries* (Cambridge: Cambridge University Press, 1988), 24–25.

<sup>89</sup> For the Ancient and Moderns and other aesthetic debates across Europe in the seventeenth and eighteenth centuries, see Cowart, *Origins of Modern Musical Criticism*.

<sup>90</sup> Schueller, “Quarrel of the Ancients,” 318.

<sup>91</sup> Cowart, *Origins of Modern Musical Criticism*, 88.