

**PETER N. JORDAN****Penultimate Curiosity in the Pre-Modern World**


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*This is a lightly edited version of a talk given at the 2017 Christians in Science Conference in Oxford. Intended as a response to Roger Wagner and Andrew Briggs' book *The Penultimate Curiosity*, it argues that in past circumstances where (as Wagner and Briggs put it) 'science swims in the slipstream of ultimate questions', at least one additional factor – a positive view of scientific curiosity – must also have been operative. Curiosity has not always been viewed in a positive light, and projects aimed at obtaining knowledge of nature have often been judged to be problematic. Those who promoted new knowledge acquisition projects often felt a need to defend those projects against accusations of misplaced or misdirected curiosity. Given this, strong slipstream effects – particular theological convictions about the relations between ultimate and penultimate things – alone must have been insufficient to encourage penultimate curiosity.*

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It is difficult to imagine a human desire more widely lauded in the twenty-first century than curiosity. Roving vehicles on Mars are named after it, Nobel Prize winners laud it,<sup>1</sup> and whole events promote it. Consider, for example, the Curiosity Carnival, an event held at the University of Oxford in September 2017. According to its website, the Carnival was designed to make research fun and interesting to non-researchers by providing the latter with 'a chance to find out what research is really all about, meet researchers, ask questions and discover how research affects and changes all our lives'.<sup>2</sup> What makes research so worthwhile, in the opinion of the Carnival's organisers, is the fact that it is all about 'feeding curiosity and answering questions'. With its focus squarely on research, the Carnival was a 'huge festival of curiosity'. The chain of argument here is clear: research should be encouraged because it changes lives; research is curiosity given free rein; therefore, curiosity should be encouraged. In its title and its founding assumptions, the Curiosity Carnival represents modernity's attitude toward curiosity more generally: curiosity is a good thing that should be maximally exercised.

There are, of course, moments when specific manifestations of curiosity might make one feel a bit queasy. Take a recent article in *The Guardian* describ-

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1 Agar, J. 'The Curious History of Curiosity-Driven Research', *Notes and Records* (2017)17, 409-429, 409-410.

2 <http://www.ox.ac.uk/curiosity-carnival/about> (accessed 13 February, 2018)

ing the tourist industry that indulges Chinese interest in North Korea.<sup>3</sup> Tourists can get on a boat in northern China and travel upriver to a point where they are surrounded by North Korean land on both sides. They do this, says a tourist guide from one of these boats, because they want to ‘satisfy their curiosity’ about North Korea. What are they curious about? A tour guide pulls no punches: ‘They want to see how poor North Koreans are.’ ‘Most’, says the article’s author, ‘come simply to gawk.’ It is regrettable that on occasion we may fail to manifest our curiosity in an admirable manner. But in the face of the benefits flowing from its exercise, that is a risk we must live with, and manage, as best we can. Intensely curious we are, and – in the absence of a stunning evolutionary reversal of some sort – curious we shall remain.

That we *are* keenly curious, and that we therefore *ought* to exercise our curiosity, might seem obvious to us today, but – curiously – many of our predecessors have been reluctant to promote curiosity as unconditionally and as energetically as we do now. People have thought and written about curiosity for a very long time, a fact that reflects the centrality of the desire to human self-understanding. Although curiosity has long been an aspect of human experience, attitudes toward it have in the past been much more ambivalent than they tend to be today. It is only relatively recently that the human race has convinced itself that passionate curiosity in (almost) every area of life is a good thing.

This ambivalence is relevant to the story that Roger Wagner and Andrew Briggs tell in their book *The Penultimate Curiosity: How Science Swims in the Slipstream of Ultimate Questions*.<sup>4</sup> According to the book’s slipstream analogy, certain configurations of ultimate curiosity – that is, theological convictions about God and God’s relationship to the world – have in the past encouraged penultimate, scientific, curiosity about the created order. As one of the authors puts it, theirs is a history of God-driven science.<sup>5</sup> One of the goals of the present article is to make this story of God-driven science a little bit more complicated by suggesting that even if the ‘right’ kind of ultimate curiosity is present, this does not mean that scientific curiosity about nature necessarily follows. History suggests that even if what are thought to be favourable views about divine transcendence and the lawfulness or regularity of the created order are in place, the pursuit of knowledge about less ultimate things, such as the scientific study of nature, independently needs to be viewed positively – or at least, successfully defended against charges of misplaced curiosity – before one can determine whether one is looking at a genuine episode of God-driven science.

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3 <https://www.theguardian.com/world/2017/sep/14/quite-backwards-chinese-tourists-gawk-at-impooverished-north-koreans> (accessed 13 February, 2018)

4 Wagner, R. & Briggs, A. *The Penultimate Curiosity: How Science Swims in the Slipstream of Ultimate Questions*, Oxford: Oxford University Press (2016).

5 Personal communication.

In other words, if curiosity about nature is frowned upon, the details of the prevailing theological vision of God and God's relationship to the created order will likely be of little consequence for the pursuit of scientific knowledge. If this is indeed the case, then for the historical moments featured in *The Penultimate Curiosity*, specific theological convictions may constitute a necessary, but not sufficient, condition for the scientific pursuits involved.

This article has two parts. The first draws on the work of recent historians to briefly highlight some of the ways in which pre-modern persons thought about curiosity. This quick overview indicates that curiosity has a more complicated history than the relatively straightforward attitude taken towards it today might lead one to imagine. The second examines a particular moment during the early modern period when Francis Bacon developed a new approach to knowing about nature, and valiantly defended it as an acceptable manifestation of curiosity. Bacon's innovations emerged from ways of knowing that were once scorned by intellectual elites as flawed expressions of curiosity. These more positive attitudes towards knowing about nature contributed to the historical development of more favourable views of curiosity more generally.

### **Attitudes toward curiosity**

It is often thought that the so-called 'Dark Ages' had a gloomy attitude towards everything. In the case of curiosity, however, historian Richard Newhauser has helped us to see that medieval figures generally thought there were three different types: good, sinful and neutral. When a medieval author uses the term 'curiosity' in their writings, one cannot simply assume that the term designates something immoral or sinful, as some modern scholars have thought.<sup>6</sup> Rather, in different contexts the term can have positive, negative, or neutral connotations depending on how someone thought about the topic. While this is obviously the same range of possible reactions to curiosity that we might have today, a critical difference between the medieval period and today is the frequency with which medieval figures attach a negative valence to certain manifestations of curiosity.

Medieval authors generally regarded the desire to know – a desire they termed *curiositas* – as a quality fundamental to being a human person. Aristotle's opening line of his *Metaphysics* – 'All men by nature desire to know' – evinces this neutral sense of curiosity, but even before Aristotle's rediscovery in the twelfth and thirteenth centuries, medieval authors saw the desire as inherently neither praiseworthy nor blameworthy.<sup>7</sup> Newhauser points to an extract from

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6 Newhauser, R. 'Towards a History of Human Curiosity: a Prolegomenon to its Medieval Phase', *Deutsche Vierteljahrsschrift für Literaturwissenschaft und Geistesgeschichte* (1982) 56, 559-575.

7 On the rediscovery of Aristotle within broader currents of medieval thought, see Marrone, S.P. 'Medieval Philosophy in Context', in McGrade, A.S. (ed.) *The Cambridge Companion to Medi-*

the writings of the seventh-century Abbot of Malmesbury Abbey in Wiltshire as a good example: 'I looked over the text of your letters and examined them with quick glimpses of my eyes and contemplated them with a certain natural curiosity for hidden things (and this, it seems, is innate in me) and admired the exuberant style and the maiden urbanity of your eloquence.'<sup>8</sup> There is no sense here that just because the Abbot is curious he is therefore immoral. The literary context instead suggests that by the term he intends a 'polite expression of his pleasure in receiving letters and his interest in reading them'.<sup>9</sup>

From at least as early as the second century, Christian authors readily identified desirable forms of curiosity. Tertullian regarded a growing interest in Christianity among non-Christians – with the eventual goal being the conversion of interested persons to the faith – as a laudable manifestation of it. A French Jew who converted to Christianity in the 1120s described himself 'as coming to visit the youth of the church with "friendly curiosity", an attribute for which he was warmly congratulated by the young people of the Christian community'.<sup>10</sup> Admirable curiosity is also visible in the diligence exercised by Christians who sought a better understanding of their faith. The sixth-century writer Cassiodorus commended the monk Dionysius, for example, because 'he had examined and understood the Sacred Scriptures with such *curiositas* that when he was questioned about them he always had a fitting answer and responded without delay'.<sup>11</sup>

The relative ease with which positive or neutral forms could slide into negative, sinful forms led medieval scholars to spend considerable energy inquiring into the intricacies of less edifying kinds of curiosity as well. Newhauser distills one of the most influential views of sinful curiosity, that of Augustine of Hippo, as follows:

[Sinful curiosity is] that disturbance of the human will which led to an intemperate desire for the knowledge of perishing, worldly, temporal things for the mere sake of acquiring such knowledge alone, which treated the divine mysteries as if they fit into these categories, and which, furthermore, replaced even the desire for God.<sup>12</sup>

Augustine's view is instructive in at least three ways. First, the notion of intemperance points to appropriate degrees of curiosity or desire for knowledge, ones that are temperate, moderate, measured. Second, the focus on the will im-

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*eval Philosophy*, Cambridge: Cambridge University Press (2003), pp. 10-50.

8 Quoted in Newhauser *op. cit.*, (6), 568-569.

9 Newhauser *op. cit.*, (6), 569.

10 Newhauser *ibid.*, 570.

11 *ibid.*

12 Quoted in Pappin, G.J. 'Directing Philosophy: Aquinas, Studiousness, and Modern Curiosity', *Review of Metaphysics* (2014) 68, 313-346, 315.

plies a decision to act on desires that are malformed or misdirected. And third, driving the whole concern about intemperate curiosity is the worry that the proper object of human desire – God – might be supplanted by lesser things. In such cases, one desires something creaturely – something created – with an intensity appropriate only for the creator.

Recalling the earlier, laudable, example of non-Christians who expressed an interest in learning more about Christianity, Newhauser notes that a person would be said to have transgressed if they became unduly interested in another religion, or in a non-orthodox version of Christianity. The twelfth-century French Jew referred to earlier – the one who was praised for his ‘friendly curiosity’ toward the faith – was castigated by his rabbi for his ‘illicit curiosity’.<sup>13</sup> Sinful curiosity could also result from an overzealous desire to learn. Medieval scholars identified various traps awaiting the careless in this realm by distinguishing between the attitude of the desiring person, and the object of their desire. Thomas Aquinas, for instance, thought that excessive curiosity might lead one to neglect a duty because one is inordinately interested in something else: for example, one might fail to turn up for court or to hear a sinner’s confession because one is inordinately absorbed by a mathematics problem. Or excessive curiosity might lead one to become so interested in Cicero’s eloquence that one scorns the Bible’s literary straightforwardness in comparison. The objects of curiosity here – mathematics and the Bible – are not the main problems. It is only their participation in a process involving malformed desires that implicates them. In other cases, the object itself is thought to be sinful, as in the cases of magic, demonology, alchemy, and heretical beliefs, each of which was regarded as much riskier than other realms of knowledge. One needed to proceed with greater caution when investigating areas like these compared to other, less explosive ones.<sup>14</sup> Whatever its flavour, sinful curiosity was perceived to be a very real threat, and its consequences were dire: according to Newhauser, medieval figures likened it to poison, which ‘stole away the mind and then plunged the soul into death’.<sup>15</sup>

Scholars retained a healthy suspicion of curiosity throughout the Reformation and early modern periods as well. John Calvin, for instance, regarded the desire for knowledge as natural to human beings, but worried that it could easily spill over into an excessive form if it were not properly controlled. In the Garden of Eden, Eve ‘erred in not regulating the measure of her knowledge by the will of God’. As Eve’s descendants, we rehearse her original fault: ‘we all daily suffer under the same disease, because we desire to know more than is right, and more than God allows’.<sup>16</sup> The echoes of Augustine are clear. For

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13 Newhauser *op. cit.*, (6), 570.

14 *ibid.*, 574-575.

15 *ibid.*, 572.

16 Harrison, P. ‘Curiosity, Forbidden Knowledge, and the Reformation of Natural Philosophy in

Calvin and his fellow reformers, the Fall's corruption of the desire to know led to a 'vain curiosity' that afflicts the mind with 'superfluous and useless discussions'.<sup>17</sup>

Seventeenth-century figures often shared these concerns, as Peter Harrison has shown. 'Curious speculation of creatures', Thomas Jackson warned, 'divert[s] many minds from the invisible creator unto whom the sight of these by nature not misleveled by inordinate or unyildy appetites would direct all'.<sup>18</sup> Thomas Wright was similarly pessimistic: A 'general defect and imperfection proceeding from Nature corrupted, and tending to corruption, followeth all the Sonnes of Adam, and that is a certaine natural curiosity'.<sup>19</sup> Henry Smith tried to convince members of his congregation that they should not 'bee curious in searching mysteries'. One may 'desire knowledge of God, as Salomon did', suggested Smith, but one may not 'desire knowledge as Eve did'.<sup>20</sup> During this time, curiosity was also associated with a range of vices, such as pride, vanity and ambition. In John Downname's view, for example, 'we must labour to mortifie our spirituall pride, which is the mother and nurse of this idle curiosity'. Curiosity, averred Downname, 'puffeth them up with pride, and maketh them in the overweening conceit of their owne excellencies to contemn all others'.<sup>21</sup>

As these examples suggest, the acquisition of knowledge could at any moment stray from moral neutrality. Specific expressions of curiosity were regarded as good, bad, or indifferent depending on the characteristics they exhibited.

## Curiosity about nature

The range of attitudes described above was on display during much of the history of curiosity. For the purposes of this article there is one moment in this history that stands out. This particular moment matters for two reasons. First, it highlights how scientific activities needed to be regarded as appropriate manifestations of curiosity if they were to succeed. And second, it helped change prevailing attitudes toward curiosity: suspicion of curiosity began to decline, and attitudes generally started becoming more positive.<sup>22</sup>

While theorising about diverse forms of curiosity was a popular pre-modern scholarly activity, in practice, accusations of excessive curiosity were like mud that could be slung in any direction, by anyone, toward any knowledge acquisi-

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Early Modern England', *Isis* (2001) 92, 265-290, 270.

<sup>17</sup> Harrison *op. cit.*, (16), 270.

<sup>18</sup> *ibid.*, 274.

<sup>19</sup> *ibid.*, 271.

<sup>20</sup> *ibid.*

<sup>21</sup> *ibid.*, 272.

<sup>22</sup> For more on this, see Harrison *op. cit.*, (16), 282ff.

tion efforts with which they disagreed. Even the most common approach to knowing and explaining nature in the medieval and early modern periods was not immune to charges of excessive curiosity. Aristotelian natural philosophy had been prominent for a long time when Thomas Goodwin observed in the seventeenth century that 'curiosity [is] a longing and itching to be fed with, and to know ... things that do not at all concern us'. The chief culprits of prideful self-glorification are those 'Schoole-men' – natural philosophers of the Aristotelian variety – who speculate wildly and in doing so construct 'curios webs out of their owne bowels'.<sup>23</sup> Robert Fludd similarly regarded Aristotelianism as 'false and erroneous,' 'vain' and 'founded upon the wisdom of the world'. True philosophy, in Fludd's view, lies 'buried in darkness, through the mysty and ambiguous clouds of that cavilling, brabbling, heathenish Philosophy, which they so adore and follow, with their Master Aristotle, as if he were another Jesus rained down from heaven, to open unto mankind the treasures of ... true wisdom.'<sup>24</sup>

For a well-established natural philosophy like Aristotelianism, isolated criticisms such as those of Goodwin and Flood would be likely have had little impact.<sup>25</sup> But the sixteenth and seventeenth centuries saw Aristotelian natural philosophy criticised on a number of fronts, and alternative approaches to understanding the natural order gradually became more prominent.<sup>26</sup> Given how easily accusations of improper curiosity could be thrown around, what any new approach to nature required was a capable and vocal defender who could deflect criticism and persuasively position the approach as an appropriate form of curiosity.<sup>27</sup>

Among the more successful early modern figures in this regard was Francis Bacon. Bacon is a significant figure in the history of science because he developed a new approach to studying nature, the emergence of which is widely recognised as a critical step along the path to modern science. As he developed his new approach, Bacon had to position it as immune to those criticisms typically levelled against novel ways of knowing nature. What made this more challenging for Bacon, however, was the fact that his new approach drew upon elements that had previously been criticised as misguided manifestations of curiosity.

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23 Harrison *op. cit.*, (16), 277

24 *ibid.*

25 For one account of why Aristotle's views persisted for so long, see Grant, E. 'Aristotelianism and the Longevity of the Medieval World View', *History of Science* (1978) 16, 93-106.

26 For helpful introductions to this period, see Dear, P. *Revolutionizing the Sciences: European Knowledge and Its Ambitions, 1500-1700*, Princeton: Princeton University Press (2009); Osler, M.J. *Reconfiguring the World: Nature, God, and Human Understanding from the Middle Ages to Early Modern Europe*, Baltimore: Johns Hopkins University Press (2010); and Henry, J. *A Short History of Scientific Thought*, London: Palgrave (2011).

27 This is one of the central arguments made by Harrison.

Harrison has identified three issues that new knowledge projects in Bacon's time generally needed to address. First, they needed to position themselves as morally upright pursuits. Second, they needed to deal with scriptural objections to the promotion of learning by offering a different account of Adam and Eve's temptation in the Garden of Eden from that which was commonly put forward at the time. And third, they needed to produce knowledge that was useful.

Bacon put forward a variety of arguments about the moral uprightness of his new scheme. For example, he asserted that 'knowledge of the world is neither forbidden nor exceeds our capacities,' because 'God has fitted the world to human capacities'.<sup>28</sup> He also claimed that 'whatsoever is not God but parcel of the world, he [i.e., God] hath fitted it for the comprehension of man's mind, if man will open and dilate the powers of understanding as he may'.<sup>29</sup> Elsewhere he wrote: 'God hath framed the mind of man as a mirror or glass, capable of the image of the universal world'.<sup>30</sup> Human capabilities match perfectly the capabilities needed to know nature, so knowledge of nature is neither beyond our reach nor inherently problematic.

Regarding the Garden of Eden, in Bacon's time it was regularly assumed that the Fall resulted from giving in to the temptation to know more than one should. Bacon conceded that the pursuit of knowledge could in some circumstances corrupt the knower, but argued that this only happened when knowledge was pursued for the wrong reasons. The human race fell not because Adam sought knowledge, but because he did so out of pride. For Bacon, knowledge that is obtained pridefully 'hath in it some venom' and 'something of the serpent'.<sup>31</sup> Prideful knowledge projects are inherently problematic, but the pursuit of knowledge about nature is not *necessarily* sinful. Only if we seek personal glory shall we follow Adam's lead. Bacon thus neutralises criticisms from those who see Adam's progeny as necessarily sinning no matter how their knowledge is obtained.

Rather than seeking knowledge of nature because one wanted recognition, Bacon advocated pursuing such knowledge for a very different reason:

[Knowledge of nature] must be subject to that use for which God hath granted it; which is the benefit and relief of the state and society of man; for other wise all manner of knowledge becometh malign and serpentine, and therefore as carrying the quality of the serpent's sting and malice it maketh the mind of man to swell; as the Scripture saith excellently, *knowledge bloweth up, but charity buildeth up*.<sup>32</sup>

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28 Harrison *op. cit.*, (16), 279

29 *ibid.*

30 *ibid.*

31 *ibid.*

32 *ibid.*

On this view, one exhibits the theological virtue of charity when one uses knowledge to benefit others. Along similar lines Bacon elsewhere asked his readers to 'consider what are the true ends of knowledge,' and he encouraged them to seek it 'not either for pleasure of the mind, or for contention or for superiority to others, or for profit, or fame, or power, or any of these inferior things; but for the benefit and use of life; and that they perfect and govern it in charity'.<sup>33</sup> If charity is one's motivation, one cannot really put a foot wrong.

Through these arguments Bacon sought to address some of the common complaints against new efforts to obtain knowledge arising from the discourse of curiosity in his day. Although these were issues everyone would have felt some need to address, they would have mattered especially to Bacon, given that his new approach contained features derived from a tradition that had long been criticised by the intellectual elite.

That tradition was the natural magic tradition.<sup>34</sup> According to the magical view, bodies possess occult qualities which render them capable of acting upon other bodies in a variety of ways. These occult or hidden interactions were usually described in terms of sympathies and antipathies. According to historian John Henry, magical knowledge allowed one 'to bring together a body known to have a specific action and the body upon which it is known to act, or else to separate such reactants for a negative effect'.<sup>35</sup> To know magic was to know which pairs of bodies go together to predictably bring about effects in nature. The best magicians knew which bodies generated particularly marvellous effects.

Because it was concerned with events that occurred through insensible causes, natural magic differed from the prevailing Aristotelian natural philosophy of Bacon's day. For followers of Aristotle, *scientia* meant 'demonstrable knowledge of the universal and necessary causes of normal, quotidian natural phenomena'.<sup>36</sup> Natural philosophy, that is, sought to identify the causes of ordinary occurrences. Because of this focus on regularities in nature, the scholastic vantage point regarded unusual events as lying outside the domain of science. The phenomena on which magicians focused were not demonstrable in the way Aristotelians expected, so they did not regard them as objects of scientific knowledge.<sup>37</sup>

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33 *ibid.*, 280.

34 Henry, J. *Knowledge is Power: How Magic, the Government and an Apocalyptic Vision Inspired Francis Bacon to Create Modern Science*, Icon Books (2002), pp. 42-67; Henry, J. *op. cit.*, (26), pp. 76-87.

35 Henry, J. 'The Fragmentation of Renaissance Occultism and the Decline of Magic', *History of Science* (2008) 46, 1-48, 9.

36 Eamon, W. *Science and the Secrets of Nature: Books of Secrets in Medieval and Early Modern Culture*, Princeton: Princeton University Press (1994), p. 54.

37 Eamon *op. cit.*, (36), p. 54.

Medieval scholars did more than merely separate magical and scientific knowledge. Intellectual elites in the centuries before Bacon disdained magic as a paradigmatic example of forbidden knowledge.<sup>38</sup> Rather than constituting a legitimate form of intellectual enquiry, magic was viewed as a kind of 'aimless' erudition or manifestation of curiosity.<sup>39</sup> Many medieval figures believed that God had intended nature to be mysterious, and that God had fashioned the world in such a way as to make many of its secrets occult and unintelligible. Those who sought knowledge of these things were therefore highly suspicious: as historian William Eamon has put it, 'To pry into mysteries of nature that God chose not to reveal, as the brazen magi attempted to do, was to trespass the boundary of legitimate intellectual inquiry, to challenge God's majesty, and to enter into the territory of forbidden knowledge.'<sup>40</sup>

Magic was denounced for other reasons too. Because it was not possible to clearly identify the causes of an occult phenomenon, religious authorities worried that demons or the devil might be involved. The boundary between natural and demonic magic was ambiguous, and magic worried many people because it had the potential to lure those who practised it into making deals with demons so that they might uncover the 'secrets of creation.'<sup>41</sup> Magic was also frequently thought to involve that great danger of curiosity in any form: pride. Magicians not only pried into nature's hidden recesses and stole its secrets, they used this illicitly won knowledge to glorify themselves and to impress the world with their marvels. Furthermore, magic was regarded as a perversion of legitimate science, because it prodded nature out of its usual modes of operation and forced it to do things it would not do if left on its own.<sup>42</sup>

Such criticisms were common in Bacon's time. According to James I's *Daemonologie*, those who climb 'from degree to degree, upon the slippery slope and uncertain scale of curiositie' are 'at last entised ... where lawful artes or sciences fails, to satisfie their restlesse mindes, even to seeke to that black and unlawful science of Magick'. In doing so they follow Adam in his desire for forbidden knowledge: 'their knowledge, for all that they presume thereof, is nothing increased, except in knowing evil ... as Adam's was by eating of the forbidden tree'. Theologian William Perkins similarly viewed the 'cursed art of Magick and witchcraft' as a means to 'get further knowledge in matters secret and not revealed'.<sup>43</sup>

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38 *ibid.*, p. 61.

39 *ibid.*, p. 59.

40 *ibid.*, p. 60.

41 *ibid.*, p. 61. See also Clark, S. 'The Scientific Status of Demonology', in Vickers, B. (ed.) *Occult and Scientific Mentalities in the Renaissance*, Cambridge: Cambridge University Press (1984), pp. 351-374; Daston, L. 'Marvelous Facts and Miraculous Evidence in Early Modern Europe', *Critical Inquiry* (1991) 18, 93-124.

42 Eamon *op. cit.*, (36), p. 62.

43 Harrison *op. cit.*, (16), 275.

None of this seems to have worried Bacon, who saw two things of great value in the natural magic tradition. The first was its focus on empirical knowledge. The causes of many things in nature are occult or hidden, so one cannot easily deduce their effects in advance. Rather, one comes to know which bodies go together to produce which effects only through long experience of trial and error. The second was a consequence of this empiricism. Magicians attended both to regular phenomena – those which had been of interest to Aristotelian natural philosophy – and to unusual occurrences that Aristotelians believed to lie outside the bounds of science. Put another way, natural magic was interested in everything. As prominent magician Giambattista della Porta put it, ‘magick is nothing else but the survey of the whole course of nature’, while Cornelius Agrippa identified magicians as those who ‘contemplated the virtues of all natural and celestial things’.<sup>44</sup>

Bacon’s deployment of these aspects of the magical tradition within natural philosophy transformed the latter from a mostly speculative and contemplative pursuit into a comprehensive, experimental and utilitarian one. Given the perceived association between magic and pride, and the view that magicians followed in the footsteps of Adam, favourable reception of his new approach depended upon Bacon’s ability to fend off these criticisms. His portrayal of the new natural philosophy as charitable in its aims was a crucial part of Bacon’s strategy for countering those who denigrated it as an excessive form of curiosity.

It should be noted that Bacon did not defend the magical tradition in its entirety, and in fact he shared many of the criticisms his contemporaries had levelled at it. Those criticisms, however, were primarily aimed at those frauds and charlatans who tried to deceive a gullible public through displays of amazing and unexpected effects. What might appear to be inconsistencies in this regard – criticising magic with one hand, while happily taking from it with the other – should instead be seen as a desire to separate wheat from chaff. As one commentator has put it,

[B]y welding magic’s experimental attitude to the reason of natural philosophy, [Bacon] hoped to delineate a true and useful approach to the study of nature. While he accused astrology, natural magic and alchemy of ‘sway[ing] the imagination more than reason,’ he felt that they needed to be reformed rather than abandoned.<sup>45</sup>

## Conclusion

It would obviously be going too far to say that we have unduly curious Chinese

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44 Henry *op. cit.*, (34), p. 56.

45 Ball, *P. Curiosity: How Science Became Interested in Everything*, London (2012), p.81.

tourists gawking at their North Korean neighbours because Francis Bacon singlehandedly made curiosity an admirable quality. Bacon did, however, contribute to the development of a generally more positive attitude towards curiosity, and to the rise of recognisably modern science. Had his contemporaries regarded his theological views as completely wrongheaded, Bacon's scientific efforts would be likely to have gone nowhere. But if the preceding analysis is correct, getting the theological picture 'right' would not have been sufficient. Given typical pre-modern attitudes toward curiosity, only when concerns about misplaced curiosity had been adequately addressed would science of any kind – Baconian or otherwise – have had the opportunity to flourish.

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