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## Darwin's foil: The evolving uses of William Paley's *Natural Theology* 1802–2005

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## ABSTRACT

This essay traces the divergent readings of William Paley's 1802 *Natural Theology* from its initial publication to the recent controversies over intelligent design. It argues that the misinterpretation of the *Natural Theology* as a scientific argument about the origins of complex life—which Darwin's *Origin of Species* refutes—did not develop all at once. Rather this reading evolved gradually, drawing from a variety of uses and appropriations during the course of the nineteenth and twentieth centuries. This study demonstrates the fluidity of “science” and “religion” during these centuries, and highlights the role that genres of science popularization play in altering the meaning of those categories.

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### 1. Introduction

In his influential 1986 book, *The Blind Watchmaker*, Richard Dawkins famously proclaimed that the 1859 publication of Darwin's *Origin of Species* for the first time “made it possible to be an intellectually fulfilled atheist.” The title of Dawkins's book was an explicit reference to the “watchmaker argument” presented in William Paley's 1802 *Natural Theology*, and Dawkins took a swipe at latter-day opponents of evolution through his faint praise of that book: Paley's (purported) inference of an intelligent designer to account for the origins of complex biology was “made with passionate sincerity and is informed by the best biological scholarship of his day.” For Dawkins, Paley presented a scientific argument for the appearances of purpose in nature, the most reasonable way at the time to “explain the organized complexity of the living world.” According to *The Blind Watchmaker*, it was by far the best explanation available—until Darwin came along and showed it to be “wrong, gloriously and utterly wrong.”<sup>1</sup> Thus every plaudit heaped upon the late Archdeacon became another stone cast at those who would claim to be Paley's inheritors in the present Darwinian day.

Dawkins was hardly the first to cite William Paley as a foil to Charles Darwin, but the particular interpretation that he put forward—that Paley was raising scientific questions that Darwin convincingly answered—has only become the dominant view since *The Blind Watchmaker* was published. So much so that Dawkins critic and intelligent design advocate Michael Behe embraced Dawkins's view of Paley his 1996 *Darwin's Black Box*. According to Behe, Paley had the right idea but the wrong examples. “Paley's argument has been sidetracked by attacks on its injudicious examples and off-the-point theological discussions.” The kind of examples that Paley needed, and that Behe claimed to provide in his book, were not available until the advent of molecular biology. Behe has claimed that his version of intelligent design is logically the same as that advocated by Paley, but that ID was just an idea ahead of its time in 1802. Behe also suggested that Paley—in his zeal—went too far in equating this designer with the Christian God. “An enthusiastic servant of his God, Paley brought a wide scientific scholarship to bear in his writings but, ironically, set himself up for refutation by overreaching.”<sup>2</sup> For Behe, Paley's science is fine; the mistake was to extend his argument into religion. Somehow, the *Natural Theology's* theological discussions were “off-the-point.”

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<sup>1</sup> Dawkins (1986, p. 5).

<sup>2</sup> Behe (1996, pp. 213, 211).

So how did the *Natural Theology* come to be seen as a work of science? This question is not meant to imply that Paley's work was ever accepted as true by a scientific community, but that by interpreting Paley as a foil to Darwin several historians and scientists fomented an understanding that the *Natural Theology* was addressing the same sort of questions that Darwin was asking, that is to say, scientific questions.

The transition from reading Paley's book as a work of theology to reading it as a failed attempt at scientific explanation is a crucial part of a broader genealogy of misreading of the *Natural Theology*, (which might also take in the anachronistic claim that he was "refuted" by Hume or the recent use of the term "Paley's Question" among philosophers of biology as a shorthand for questions about the origin of complex or purposive biological structures.)<sup>3</sup> But Paley as a scientific foil to Darwin is an image that evolved gradually over the course of two centuries. In tracing divergent interpretations of the *Natural Theology* there are several distinct questions that arise about what the text means, whose mutated answers lead to further questions. These were also complicated by divergent interpretations of Darwin and his ideas since their publication. There's the question of whether Paley was addressing biological origins as part of his argument for a designer. There's the question of whether Paley rejected evolutionary accounts of biological complexity. And there are the questions of whether Darwin refuted or rejected all forms of a designer and whether or not Darwin—or his inheritors—rejected teleological explanations.

This transition also demonstrates the fluidity of the categories of "science" and "religion" in historical analysis and popular understanding, even as a stricter demarcation between the two categories became a matter of greater public concern and legal scrutiny in the twentieth century. It also illustrates a tendency in science popularization to detach accounts of conclusions from accounts of the reasoning used to reach them.

## 2. Re-creating natural theology

The opening to the *Natural Theology* seems to carefully indicate that Paley does not rest the inference to a designer on the necessity of an initial creation.<sup>4</sup> The first sentence of the book suggests that the idea of a world that has existed eternally cannot be ruled out through an investigation of nature.

In crossing a heath, suppose I pitched my foot against a stone, and were asked how the stone came to be there, I might possibly answer, that for any thing I knew to the contrary it had lain there for ever; nor would it, perhaps, be very easy to show the absurdity of this answer.<sup>5</sup>

Paley's second sentence contrasts the impossibility of inference about the stone with the conclusions one might rightly draw upon discovery of a watch—namely that it shows indication of a designer. But the evidence of the watch's designer does not come from the need to explain its origins. In the start of the second chapter, he considers a watch that "possessed the unexpected property of producing in the course of its movement another watch like itself." Imagining an infinite regress of self-replicating

watches, Paley affirms that "the argument from design remains as it was."<sup>6</sup>

Yet by the 1830s, some readers were already disposed to the view that the origins of the natural world were inherent to natural theology. In their edition of Paley's *Natural Theology*, published in 1836, Henry Brougham and Charles Bell appended a footnote to Paley's opening sentence.

The argument is put here very naturally. But a considerable change has taken place of late years in the knowledge attained by even common readers, and there are few who would be without reflection "how the stone came to be there." The changes which the earth's surface has undergone, and the preparation for its present condition, have become a subject of high interest; and there is hardly any one who now would, for an instant, believe that the stone was formed where it lay.<sup>7</sup>

Even if this footnote, (which continues at length describing geological processes) is not seen as a correction to Paley's argument itself, it suggests to readers that the question of how Paley's exemplars—the stone and the watch—"came to be there" requires an answer accounting for their fabrication. The same interpretation is given in Brougham's *Discourse of Natural Theology*, published a year earlier.

If, to take Dr. Paley's example, we pass over a common and strike the foot against a stone, we do not stop to ask who placed it there; but if we find that our foot has struck on a watch, we at once conclude that some mechanic made it, and that some one dropt it on the ground. Why do we draw this inference? Because all our former experience had told us that such machinery is the result of human skill and labour, and that nowhere grows wild about, or is found in the earth.<sup>8</sup>

The inclusion of this footnote after the very first sentence of Paley's text also suggests that, for Brougham and Bell, the debate over whether the world was eternal as opposed to being created at some initial point was no longer crucial to Paley's discussion. As the footnote goes on to cite John Herschel from his *Preliminary Discourse on the Study of Natural Philosophy*, that text might be seen as an immediate influence on this interpretation.<sup>9</sup> Herschel claimed that scientific discoveries "effectually destroy the idea of an *eternal self-existent matter*" but also declared that "to ascend to the origin of things, and speculate on the creation, is not the business of the natural philosopher."<sup>10</sup> If speculation on the creation is not the natural philosopher's business, then it must be the proper domain of the natural theologian. With an appendix on horology and a lengthy footnote explaining the origin of the stone, creation also became the proper domain of the Paley of Brougham and Bell.

Herschel's demarcation of the role of the natural philosopher might also be seen as an early step in the explicit separation of theology and natural science as separate "businesses" (to use Herschel's own term.) But as Bernard Lightman has demonstrated, the mid and late nineteenth century was also a period of growing distinction between the scientific practitioner and the scientific popularizer. As Lightman has argued, "the success of the Bridgewater Treatises, may have encouraged popularizers to incorporate natural theology themes in their works," but that like those treatises, "they did not adopt the demonstrative natural theology of

<sup>3</sup> Brunlander (2013) and Razeto-Barry (2013).

<sup>4</sup> Shapiro (2009).

<sup>5</sup> Brougham & Bell (1836, p. 1).

<sup>6</sup> Brougham & Bell (1836, pp. 11, 13).

<sup>7</sup> Brougham & Bell (1836, pp. 1–2).

<sup>8</sup> Brougham (1835, p. 43).

<sup>9</sup> Herschel quoted in Brougham & Bell (1836, p. 3), is at Herschel (1831, p. 14).

<sup>10</sup> Herschel (1831, p. 38).

Paley as their model.”<sup>11</sup> Science popularizers wrote books that were about nature, but incorporated theological reflections, not works that made use of nature to support theological arguments. Yet some of them did draw from examples taken directly from Paley, even if they were applied to different ends. From the perspective of the practitioner of science, the separation from theology was part of the separation from popularization, and the differences between natural theology and religious popular science were minimal.

### 3. Natural theology as religious popular science

Charles Bell was the author of one of the eight Bridgewater Treatises, which were collectively more representative of natural theology in the 1830s than the annotated Paley. As Aileen Fyfe has noted in her study of the reception of Paley’s *Natural Theology* at Cambridge, despite concern that Paley’s descriptions of nature were out of date, Paley nonetheless “was still regarded as the classic of the genre.” But the treatment of Paley *as genre* allowed for later writers to invoke him, and yet provide different arguments under the rubric of natural theology. As Fyfe writes, one strategy for this “was to ‘extend’ Paley by dealing with subjects not mentioned by him—such as chemistry, geology, astronomy and the physical sciences in general.”<sup>12</sup> Geology, Astronomy, and Chemistry, served as the primary subjects for three of the eight Bridgewater Treatises.<sup>13</sup> This extension into the physical sciences, at a time when those disciplines were no longer seriously entertaining an eternal world and were instead disputing the question of *how* (not whether) the creation occurred, helped to further entrench the question of creation into the genre of natural theology.

Perhaps there is no better illustration of the shift in the aims of natural theology from Paley to the Bridgewater Treatises than the behest of the Earl of Bridgewater itself, providing for works “On the Power, Wisdom, and Goodness of God, as manifested in the Creation.”<sup>14</sup> God’s *existence*, (or for that matter the unity of the deity) was considered a settled matter and was treated as such.

The Bridgewater Treatises not only helped to redefine natural theology as an inquiry into God from the origins of creation, (which was certainly not a new mode of natural theology, but was just as certainly not Paley’s), they also helped to present the genre of natural theology as a religiously-inflected popular science. As Jonathan Topham has argued, “one overriding reason for the extraordinary success of the Bridgewater Treatises was that they presented the pious middle classes with a largely non-technical and religiously conservative compendium of contemporary science.”<sup>15</sup> Topham has also argued that the Bridgewater Treatises themselves exemplify the problem of discussing “popular science” because of the diversity of reading communities and the utilization of the same texts in a variety of reading practices.<sup>16</sup> This is persuasive, but it is nonetheless significant that the established category that the Bridgewater Treatises complicate is “popular science” not “popular religion.”

While Topham is quite right that the authors of the Bridgewater Treatises had little control over the communication circuit that gave rise to the diverse experiences of readers, the eight Bridgewater authors were themselves also readers—of William Paley. Their

interpretations of his text—and their senses of what could be retained, updated, discarded, or presumed in composing works of natural theology that claimed to be extensions of Paley—added a second order of uncertainty in the way that Paley’s argument was understood. But their claims to extend Paley were so successful that Robert Chambers, author of the 1844 *Vestiges of the Natural History of Creation*, could write of “The Natural Theology of Paley, and the Bridgewater Treatises,” as if they were all one thing (or for that matter that the eight Bridgewater Treatises themselves speak with one voice.)<sup>17</sup>

As it was with natural theology, so it was with Paley’s moral philosophy. Laura J. Snyder writes that in the 1830s, John Stuart Mill was “annoyed that Paley’s views were being presented to the public as *the* utilitarian position.”<sup>18</sup> But the reduction of the diverse visions of utilitarianism to the singular personage of Paley motivated a simultaneous expansion of a mythical “Paley” into a character who could somehow encompass a broad range of views. The Bridgewater Treatises and other works of natural theology could similarly be seen as extensions of Paley, but only at the expense of expanding Paley into the natural theological position. The readings of Paley that blossomed in the nineteenth century were diverse, divergent, and perhaps uncontrolled, but at least some of those readings, inflected by the Bridgewater Treatises, facilitated an interpretation that Paley’s aim in writing natural theology was to illustrate nature, more than to argue for the *existence* of God.

### 4. Paley, Darwin, and evolution

So even though some people in the 1830s saw books of natural theology as a kind of popular science with a middle-class god-fearing sensibility, they didn’t yet see the argument of Paley as something that would be overthrown by an evolutionary account of biological origins. Paley was not an evolutionist. He flatly rejected the idea of the generation of new species as formulated by Buffon and, less categorically rejected the transmutational theory of Erasmus Darwin. But in the *Natural Theology* he did not rule out the possibility of species change on principle.<sup>19</sup> Moreover, he did not suggest that an evolutionary account of the origins of complex biological structures would threaten his theological conclusions. By the 1830s, at least some representations of Paley have shifted. William Prout (in his Bridgewater Treatise) claimed that “the excellent Paley sanctions” his explanation of organic operations that renders evolution impossible. “Thus we consider it impossible that by any accidental concurrence of circumstances, a dog can, in the progress of time, be gradually converted into an ape, or an ape into a man.”<sup>20</sup> This is not the same as saying that Paley’s theology fails if an evolutionary account can be sustained, but it does imply that Paley (via Prout) was committed to a stricter antievolutionism than the *Natural Theology* itself suggests.

Of course the most obvious place to look for justification of the claim that Paley was a foil to Darwin is in the writings of Darwin himself. After all, didn’t Darwin see Paley as an obstacle to overcome? In his autobiography, Darwin mentions having read Paley with “delight” when a student, but later wrote, when discussing his struggles with faith: “The old argument of design in nature,

<sup>12</sup> Fyfe (1997, p. 330).

<sup>13</sup> Prout (1834), Buckland (1834) and Whewell (1833).

<sup>14</sup> Prout (1834, p. vii).

<sup>15</sup> Topham (1992, p. 398).

<sup>16</sup> Topham (1998).

<sup>17</sup> Chalmers (1844, p. 324).

<sup>18</sup> Snyder (2006, p. 229).

<sup>19</sup> Shapiro (2008, p. 74).

<sup>20</sup> Prout (1834, pp. 437–438).

as given by Paley, which formerly seemed to me so conclusive, fails, now that the law of natural selection has been discovered.”<sup>21</sup>

Yet the only time that Paley’s name is mentioned in the *Origin of Species*, it is done so approvingly, enlisting the *Natural Theology* against the utilitarian objections to Darwin’s theory. “Natural selection will never produce in a being anything injurious to itself, for natural selection acts solely by and for the good of each. No organ will be formed, as Paley has remarked, for the purpose of causing pain or for doing an injury to its possessor.”<sup>22</sup>

Perhaps something changed for Darwin between 1859 and the end of his life, although the favorable citation of Paley is preserved through all editions of the *Origin*. The extent to which he saw Paley committed to an antievolutionary position is not apparent. From the autobiography passage alone, it’s possible that Darwin did not see his own position as any more amenable to final causes than his grandfather’s, and so Darwin and Paley’s (religious) views were incompatible even if Paley could have accepted a teleological evolution consistent with design. Or it’s possible that Darwin was convinced that Paley’s arguments relied on the special creation of species. The *Origin* also begins with a quotation from William Whewell’s *Bridgewater Treatise* that discusses precisely the question of the origins of the material world. Without engaging the entirety of the voluminous scholarship on the thought and influences on Darwin, it may suffice to say that—regardless of whether Darwin’s perception of his theory’s conflict with “the old argument of design, as given by Paley” comes from a version of Paley refracted through Whewell’s account of natural theology, or through another transmission—that Darwin did not say that he saw Paley’s argument as giving a scientific account of origins.

## 5. Paley within the science-religion trope

No matter what Darwin himself understood of Paley, the decades immediately following publication of the *Origin* was not when Darwin-religion discussants raised Paley up as a religious foil to natural selection, let alone a *scientific* one. Not all discussants of evolution and religion mentioned Paley, but those who did typically saw his argument as religious regardless of whether they supported Darwinism. If Darwin’s natural selection and Paley’s argument had any interaction at all, it was in the realm of theology. Charles Hodge’s 1874 *What is Darwinism?* mentioned Brougham, Whewell, and Paley. But Hodge did not use natural theology to show that Darwin’s science was wrong, nor did he claim that Darwinism was false because it contradicted natural theology. He invoked natural theology to show the centrality of final causes to a theistic worldview, and to reason from there that Darwinism was inherently atheistic.<sup>23</sup> Hodge had also drawn a distinction between evolution in general and Darwinism specifically, suggesting that an evolution doctrine with final causes did not incur the same religious problems as Darwinism. “A man, therefore, may be an evolutionist, without being a Darwinian.”<sup>24</sup>

Hodge’s criticism of Darwinism is usually taken as a prime example of an argument against the compatibility of science and religion. But an advocate for positive science–religion relations, Anglican Archbishop Frederick Temple, also saw the question of

Paley–evolution engagement as a religious one, arguing in his 1884 Bampton lectures at Oxford:

The fact is that the doctrine of evolution does not affect the substance of Paley’s argument at all. The marks of design which he has pointed out remain marks of design still even if we accept the doctrine of evolution to the full. What is touched by this doctrine is not the evidence of design, but the mode in which the design was executed. Paley, no doubt, wrote on the supposition (and at that time it was hardly possible to admit any other supposition) that we must take animals to have come into existence very nearly such as we now know them: and his language, on the whole, was adapted to that supposition.<sup>25</sup>

In this passage, Temple not only explains that—in his interpretation—Paley’s argument does not rely upon the falsity of evolution, he also makes it clear that Paley’s argument is a religious one. At the same time, he concedes without concern the fact that Paley’s scientific understanding is obsolete.

Peter B. Hinchliff has argued that Temple was trying to reconcile the tensions between “Paley’s argument from design and his general devotion to Coleridge’s thought,” and more importantly, that “the evolution that [Temple] was considering was Spencer’s, not Darwin’s.”<sup>26</sup> The primacy of Spencerian interpretations of evolution over Darwinian ones was entirely unobjectionable to the editors of *Popular Science Monthly*, which reprinted excerpts from Temple’s address under the title “Religion and the Doctrine of Evolution.”<sup>27</sup> A few years earlier, the magazine’s editor-in-chief Edward L. Youmans had claimed “the doctrine of Evolution, as it now stands, was thus, in universality, and in its chief outlines, announced by [Spencer] two years before the appearance of Mr. Darwin’s ‘Origin of Species.’”<sup>28</sup>

Yet Temple did address the relation of Paley to Darwin in his lecture, and suggests that even though Darwin’s account of natural selection must be regarded as incomplete from a religious perspective, it does offer teleology. “The very phrase we commonly use to sum up Darwin’s teaching, the survival of the fittest, implies a perpetual diminution of pain and increase of enjoyment for all creatures can feel.”<sup>29</sup> And so even Darwin can inform and even validate a religious optimism, by showing the ultimate goodness in nature. But Temple was not immune from seeing a need to update the old Paley, albeit for him the obsolescence is not found in Paley’s examples, but in his theology.

If the *Natural Theology* were now to be written, the stress of the argument would be put on a different place. Instead of insisting wholly or mainly on the wonderful adaptation of means to ends in the structure of living animals and plants, we should look rather to the original properties impressed on matter from the beginning.<sup>30</sup>

Temple recognized that Paley did not argue from the origins of matter and its properties itself, but in claiming that after Darwin, natural theology ought to make such arguments, he represents Paley’s nondiscussion of origins as an omission, rather than as a carefully positioned aspect of his argument. Thus even discussions of Paley that accurately reflected his theological conclusions and the arguments for them neglected some of the context that justified why he appealed to specific arguments for design and not others.

<sup>21</sup> F. Darwin (1887, pp. 47, 309).

<sup>22</sup> C. Darwin (1859, p. 201).

<sup>23</sup> Hodge (1874, p. 45).

<sup>24</sup> Hodge (1874, p. 9).

<sup>25</sup> Temple (1884-1, p. 110).

<sup>26</sup> Hinchliff (1998, pp. 184, 185).

<sup>27</sup> Temple (1884-b).

<sup>28</sup> Youmans (1874, p. 36).

<sup>29</sup> Temple (1884-a, pp. 117–118).

<sup>30</sup> Temple (1884-a, pp. 118–119).

As Jon Roberts has rightly noted, “prior to about the middle of the nineteenth century, the trope ‘science and religion’ was virtually nonexistent.” That trope could not have developed “until the definition of both terms attained recognizably modern form.”<sup>31</sup> As Roberts, Peter Harrison, and John Hedley Brooke have all observed, “science” and religion” in their differentiated and modern senses begin to develop as categories around the seventeenth and eighteenth centuries.<sup>32</sup> But it is a mistake to think that these categories were completely settled even into the twentieth century, and their boundaries were certainly still fluid at the time of Paley’s *Natural Theology*. The emergence of trope did not settle the boundaries internal to the double-faced chimera named “science and religion.”<sup>33</sup> The relation of natural theology to evolution was firmly settled as a question concerning the “relations between religion and science” (as Temple had titled his Bampton lectures); the extent to which Paley’s arguments were scientific, or made use of scientific facts and theories—or were an argument about religion as opposed to a religious argument about science—remained unsettled. Moreover, the development of “science and religion” as a familiar subject for sermons, lectures and books accelerated the process by which individuals could be rendered as metonyms for ideas, and shorthand for arguments. Antecedent names like Darwin, Spencer and Paley could be cited as authorities, but the central aim of arguments within the trope was not historical faithfulness, but present-day relationship building.

Compounding the difficulties arising from an emerging trope of “science and religion,” the contested presentations of the relation of Darwin to the “doctrine of evolution,” and a broadened sense of natural theology; the publication and reading of Paley’s *Natural Theology* was also influenced by its changing role as a textbook in the nineteenth century. Textbooks differ substantially from works typically regarded as popular science—even when they are directed at non-experts—because of the ways in which formal schools enforce certain practices of reading and text consumption.<sup>34</sup> Yet even the prescriptive nature of an assigned textbook can be subjected to the variability of its use and reading.

The tendency towards seeing the *Natural Theology*’s primary value in its presentation of the natural world, not as an elaborate argument for the existence of God, was further reinforced in the 1830s–1850s United States by the adaptation of the text for school use. Versions of the *Natural Theology*, one edited by Unitarian Harvard physician John Ware and another by Episcopalian bishop Alonzo Potter (whose edition further annotated the Brougham and Bell version of Paley,) both contained annotations updating the natural examples with new discoveries and theories.<sup>35</sup> Even when they commented on the more explicitly religious aspects of Paley’s arguments, their theological aims were not the same as Paley’s and the political context they were addressing in antebellum America was markedly different than Britain in 1802. It also seems clear that many American universities that used one of these editions of the *Natural Theology* did so in a way contrary to Paley’s original recommendation. While Paley suggested that the *Natural Theology* be read first, followed by his *Evidences of Christianity* and his *Moral and Political Philosophy*, many schools taught it after teaching moral philosophy.<sup>36</sup> This may have contributed to using the text

as a series of *illustrations* of the moral order of nature, rather than an *argument* for such a moral order.

In addition to this, several books and magazines printed excerpts from the *Natural Theology* that contained passages describing nature, but with no explicit theology. The classic schoolbook *McGuffey’s Reader* included a lesson on “The Mechanical Wonders of a Feather,” in one of its 1844 editions.<sup>37</sup> In 1889, P. T. Barnum plagiarized Paley’s description of the wing cases of beetles in a book of natural history intended for the audiences of his “Greatest Show on Earth.”<sup>38</sup> This equation of natural theology with a component of natural history for nonprofessionals was further developed in the rise of nature study curricula for school children in the late nineteenth century. As Sally Gregory Kohlstedt states, “themes of natural theology, stated casually, were common in nature study textbooks which referenced an undefined God and his creation, a formulation that most Christian denominations could readily accept.”<sup>39</sup>

That natural theology could be used in these ways—and Paley could be published in these ways—in the late nineteenth century shows the range of reactions natural theology provoked, many of them having nothing to do with Darwin. On one hand, where Paley was brought into conversation with Darwin, that conversation tended to be driven by those who saw the question of their compatibility to be a religious matter. On the other, those who took the *Natural Theology*, or fragments of it, or works derived from it, as a device for teaching about natural history—even as an illustration of divine providence in natural history—did so with little concern for its broader theological argument.

## 6. The eclipse of Paley

By the dawn of the twentieth century, discussion of Paley had largely dwindled, especially in the United States. In Britain, mention of Paley persisted longer, but appears to have focused almost wholly on his *Evidences of Christianity*, or his *Principles of Moral and Political Philosophy*. Paley and his works were considered to be of more historical or literary interest than relevant to contemporary philosophy, science, or theology.

This decline cannot be attributed to a simple triumph of Darwinism over natural theology. John Brooke has argued that “by the middle of the nineteenth century, Charles Darwin’s concept of natural selection would evacuate the design argument as Paley presented it. But by then natural theology in Britain had already transformed—in the process of rebutting secular forms of science emanating from France.”<sup>40</sup> Though the claim that Paley’s argument was “evacuated” deserves reconsideration, it is undeniable that natural theology, in a revised form, continued well after Darwin. Obviously, Paley himself no longer contributed new words to that persistence, but his inheritors and self-proclaimed defenders clearly carried his *Natural Theology* forward into the late nineteenth century (even if they only carried up the bones hence with them.)

The eclipse of Paley in the decades around 1900 was the result of several factors, intellectual, cultural, and economic. Changes in American textbook publishing after the U.S. Civil War led to the production of new works for the teaching of natural history. At roughly the same time, changes to higher education in many

<sup>31</sup> Roberts (2011, p. 254).

<sup>32</sup> Harrison (2006) and Brooke (2001).

<sup>33</sup> Shapiro (2013, p. 88).

<sup>34</sup> Shapiro (2012).

<sup>35</sup> Paley (1829) and Potter (1840).

<sup>36</sup> Paley (1829, pp. v–vi).

<sup>37</sup> McGuffey (1844, pp. 216–217).

<sup>38</sup> Barnum (1889, p. 511).

<sup>39</sup> Kohlstedt (2010, p. 41).

<sup>40</sup> Brooke (1991, p. 197).

American universities and liberal arts colleges (including the development of Bachelors of Science degrees) led to the gradual removal of Paley's natural theology from curricula. By 1885, Yale College was one of the only major American schools to still have Paley's *Natural Theology* listed in its catalogue as a set text.<sup>41</sup> By the start of the twentieth century, it had gone. At primary and high school levels, new developments in science pedagogy in the 1910s and 1920s were influenced by a philosophy of education that drew a distinction between morals and religion, and incorporated that philosophy into the new subjects of biology and general science.<sup>42</sup>

Those new developments in high school science education helped instigate the school antievolution movement in the United States.<sup>43</sup> In this era, there is probably no stronger evidence for the fact that Paley was not considered a meaningful foil to Darwin than the complete lack of reference to him at the 1925 Scopes trial. In the defining moment of conflict between science and religion (at least, as the trial's participants would have it) no one thinks that the question of Paley's arguments matter at all. Religious antievolutionism in the first half of the twentieth century wasn't vested in natural theology. The argument most compelling to William Jennings Bryan, for example, was that the claim that evolution was a sufficient explanation for nature ruled out, a priori, the possibility of miracles, and thus called into question the possibility of revelation, and salvation and the morality that relied on those doctrines.<sup>44</sup> Others either satirized or denied the possibility of human descent from nonhumans, which is the only thing that Tennessee's antievolution law actually prohibited being taught. Although the caricature of Fundamentalists embracing a 6000-year-old earth permeates the received view of antievolutionism, conflict with a so-called literal interpretation of Genesis did not become a widespread view until *after* the Scopes trial. Even self-described scientific arguments against evolution did not invoke Paley or design, but rather focused on the claimed insufficiency of evolution, on missing links, even on a lack of an inherent progressive tendency at the chemical level.<sup>45</sup>

This period in the early twentieth century roughly corresponds with the period that Julian Huxley referred to as "the eclipse of Darwinism," in his 1942 history of "the modern synthesis." By the 1890s, Huxley wrote, "Late nineteenth-century Darwinism came to resemble the early nineteenth century school of Natural Theology. Paley *ridivivus*, one might say, but philosophically upside down, with Natural Selection instead of a Divine Artificer as the *Deus ex machina*." This, Huxley argues, prompted a revolt from several quarters in experimental biology.<sup>46</sup>

Despite Huxley's claims, it's not evident that any scientists in the 1880s and 90s actually saw Darwinism as an inversion of Paley's *Natural Theology* (or of some concept vaguely branded either as Paley or as natural theology.) It's also not clear that (if any of them even did give Paley thought) they saw him as an Artificer *ex machina*. One possible exception to this may have been Henry Fairfield Osborn, who wrote in a 1909 *Popular Science Monthly* article on the "Life and Works of Darwin":

The masterly works of Paley and Whewell had appeared; the great series of Bridgewater Treatises to demonstrate the wisdom and goodness of God in the special creation of adaptations

had just been closed; Cuvier, Owen, Lyell and Agassiz, were on the side of special creation; yet at the same time this whole system of natural philosophy was rotten at the foundation because [it was] not the work of free observation.<sup>47</sup>

And yet, when Osborn became one of the most outspoken critics of Bryan and 1920s-era antievolutionism, he did not invoke Paley, nor did he equate Bryan's views to a belief in the "wisdom and goodness of God" but to a dogmatic insistence in the literal truth of Scripture.<sup>48</sup> This claim that religious anti-evolutionism was guided by Scripture is hinted at in the Osborn's interpretation of natural theology as inherently rooted in a doctrine of special creation. But Osborn also makes room for natural theology on the scientific (natural philosophy) side of the science–religion dichotomy.

Huxley concluded his description of the eclipse of Darwinism by proclaiming that a "reborn Darwinism, this mutated phoenix risen from the ashes of the pyre kindled by men so unlike as Bateson and Bergson" had supplanted the too-abstract Paley-inversus "Darwinism" of the nineteenth century.<sup>49</sup> But this soot-birthing new Darwinism was not only different from the one that Huxley had seen immolated, it also bore little resemblance to the Darwinism that faced religious opposition in 1920s America. If Paley had become multifarious even before Darwin, and "Darwinism" became so by the early twentieth century, then any attempts to relate Paley and Darwin to one another in the early twentieth century would have been meaningless without some explanation as to what both of those individuals meant.

There's been quite a lot of historical discussion about the idea of an "eclipse of Darwinism" and the phrase Huxley coined to describe it.<sup>50</sup> Mark Largent has claimed that "scientists of the synthesis era and historians who have been unduly influenced by them" have had an outsized influence in how the history of biology of this era has been understood, allowing them to "work around the social baggage introduced by the previous generations."<sup>51</sup> From the perspective of the history of Paley, it is unnecessary to determine the full extent to which the "eclipse-then-synthesis" historiography has merit; but this narrative (what we might term the Huxley narrative) did influence the reception of Paley in the synthesis era and afterwards. But the ways in which Paley was used—and the more glaring instances in which he wasn't—both by scientists and historians of science the first half of the twentieth century—raises questions for the historiography of Anglo–American biology. Was it less the case that Darwin had to overcome Paley and more the case that nineteenth century "Darwinism" had to overcome its use of natural theology as a religious foil? As popular religious anti-Darwinism became interpreted as a broader mandate against any evolutionary narrative after the Scopes trial, how much did scientists' perception of the public fate of their work influence the formation of conceptual unity (or perhaps more accurate, proclamations of a synthetic unity)? If the idea of a biological conceptual unity relied upon an underlying positivist philosophy of the unity of science, did biological views that accommodated teleological interpretations need to be expunged to save the discipline?

Vassiliki Betty Smocovitis has argued that this was part of Huxley's aim in reconstructing the history of the evolutionary

<sup>41</sup> Yale College (1885).

<sup>42</sup> Shapiro (2013, pp. 69–75).

<sup>43</sup> Shapiro (2008).

<sup>44</sup> Bryan (1922).

<sup>45</sup> Numbers (2006).

<sup>46</sup> Huxley (1942, p. 23).

<sup>47</sup> Osborn (1909, p. 319).

<sup>48</sup> Osborn (1922, 1925).

<sup>49</sup> Huxley (1942), p. 28.

<sup>50</sup> Bowler (1992) and Richmond (2006).

<sup>51</sup> Largent (2009, pp. 3, 4).

synthesis in *Evolution: The Modern Synthesis*. “Articulating as nonteleological a version of natural selection that could still somehow give direction and make possible progressive evolution, and at the same time adhering to selection as a mechanistic—and therefore legitimate—scientific principle, was the challenge that Huxley faced.”<sup>52</sup> Mark Borrello has claimed that “the eclipse was apparently not visible from the environs of Oxford University,” which counted Julian Huxley among its biological community.<sup>53</sup> It may not necessarily be the case that the changes in biology and its popular perception that gave rise to the Darwinian eclipse also created the conditions for the eclipse of Paley. However, Julian Huxley was one of the few people in this era to bring Paley into conversation with Darwin, which he did in several essays and books. It does seem that it was Huxley who kept the memory of Paley (with respect to Darwin) alive through these otherwise lean years. Peter Bowler has shown that Huxley’s books of essays did not sell very well.<sup>54</sup> Nonetheless, Huxley’s interpretation of the Paley–Darwin relation appears to have prevailed, a pinhole camera projecting Paley’s beads around the edges of the eclipsed Darwinism. When the Paley–Darwin narrative became more fully throated around the time of the Darwin centennial, it was a very Huxleyan Paley who was presented as a foil to a Huxleyan Darwin. And it was Huxley himself who was at the center of the most prominent event to mark the centennial, the Darwin Conference at Chicago.

## 7. Darwin-industrial complexity

From the 1920s through the early 1950s, it appears that Julian Huxley was one of the few writers to mention William Paley. His references to the *Natural Theology* all seem to exemplify a narrative about the obsolescence of teleology in science that culminated in his forging of the modern synthesis. In 1923, Huxley pointed to Paley as the exemplar of “a common fallacy—the ascription of personality to God on the ground that a purpose exists in nature.” “Modern theologians,” Huxley then asserted, were “driven from this position by Darwin.” Yet Huxley’s aim in this essay was not to heap scorn upon the late Archdeacon, but rather to attack Henri Bergson for providing theologians with a post-Darwinian “refuge.”<sup>55</sup> It was Bergson, after all, whom Huxley saw as contributing to the immolation of late nineteenth-century Darwinism. Huxley castigated Bergson and associated him with Paley (who was unquestionably a writer of religion, but whose theology was invalidated by his use of self-evidently obsolete science.) In doing so, Huxley portrayed Bergson as an inappropriate model for biology. Huxley also reshaped the conversation of religion and science in a way that legitimated his evolutionary synthesis by making it explicitly nonteleological.

As part of Huxley’s attempt to present evolutionary science as Darwinism, as nonteleological, and as the correct explanation for nature; he framed a history of Darwin’s antecedents that shifted the question of teleology into the scientific realm, albeit with religious implications. In a 1939 essay he referred to “Paley and other naturalists” who had given a design-based account of “the coadaptation of the various organs and parts.” This was refuted—Huxley claimed—by Darwin’s observation of structures that were

not well-adapted, “notably vestigial structures are quite useless. So that they are no compliment to a Divine designer, and in fact quite destroy the argument.”<sup>56</sup> In 1945, Huxley claimed that “it was Paley who started Darwin on his intellectual career,” although he then referred to Paley as a theologian.<sup>57</sup> In effect, Huxley rendered the question of whether nature has a purpose as one scientists sought to answer as well as theologians. This depiction left Paley as a theologian, but one who asked a question that had also been asked by scientists.

While Huxley was presenting the purging of teleology as a way to distinguish evolutionary science from its religious influences (and thus save a theory that Darwin’s name could be attached to,) the American antievolutionists were increasingly depicted as adherents to a biblical literalism that focused on the separate creation species as outlined in Genesis. Huxley’s framing of evolution as Darwinian coincided with the equation of Darwinism with evolution that American antievolutionists made in the 1920s and 30s. Huxley was not reframing the history of Darwinism for the purpose of addressing the American antievolution controversies, but his doing so helped align conversations about evolution, science and religion as the conversation shifted from Darwin as a metonym for evolution to Darwin the historical figure, and from Darwinism’s relation to religion to Darwin’s personal relation to religion.

1959 was the centennial of the *Origin of Species*, and Darwin’s own sesquicentennial. The year saw a series of celebrations and publications that celebrated Darwin both as an individual and as the standard bearer for a scientific theory.<sup>58</sup> Julian Huxley was central to the organization of one of the most famous events to mark the anniversaries, the Darwin Centennial Celebration at the University of Chicago. He delivered a Thanksgiving Day convocation that shocked many for its brazen pronouncement that humanity had evolved beyond need for “Divine Authority” much as it had abandoned “the doctrine of the Four Elements.”<sup>59</sup>

But it was another address that was perhaps most significant for discovering the reemergence of William Paley as a person of historical interest. Jaroslav Pelikan’s address on the subject of “Creation and Causality in the History of Christian Thought” contains the only direct references to Paley in the published proceedings. “Faith in the direction of divine Providence over nature, as formulated by writers like William Paley in his *Natural Theology*, could not stand if Darwin was right.”<sup>60</sup> This depiction of Paley’s ideas and their relation to Darwin is perhaps not very different from those of the late nineteenth century, and it clearly treats Paley as a theologian. However, Pelikan’s primary concern was the historical interpretation of “creation” and the gradual evolution from its understanding as the formation of things from (possibly preexisting) matter to an insistence (in at least some versions of Christianity) on creation as creation ex nihilo. Arguably, Paley’s presentation in the *Natural Theology* speaks directly to this issue, and yet he was only mentioned as an introductory connection to the conference’s Darwinian theme. It was not new to say that Paley was negated by Darwin, but when the Chicago Divinity School’s Professor of Historical Theology could look right past the details of the *Natural Theology*, it highlights the extent to which the text’s meanings had drifted in over 150 years.

The end of the 1950s and the early 1960s was also the beginning of what has come to be called the “Darwin Industry.”<sup>61</sup> The

<sup>52</sup> Smocovitis (1996, p. 144).

<sup>53</sup> Borrello (2010, pp. 38–39).

<sup>54</sup> Bowler (2009, p. 222).

<sup>55</sup> Huxley (1923, p. 215).

<sup>56</sup> Huxley (1939, p. 58).

<sup>57</sup> Huxley (1945, p. 183).

<sup>58</sup> Smocovitis (1999).

<sup>59</sup> Huxley (1960, p. 253).

<sup>60</sup> Pelikan (1960, pp. 29–30).

<sup>61</sup> Ruse (1974, 1996) and Lenoir (1987).

publication of Darwin's unexpurgated autobiography by Nora Barlow in 1958 and several other publications timed to coincide with the *Origin's* centenary helped direct historical focus onto Darwin's personal life. Many of these texts also expanded on Darwin's apparent struggle with Paley. In Barlow's version of the *Autobiography*, a longer description of Darwin's loss of faith that had been cut from the earlier published edition was restored.<sup>62</sup> This passage immediately precedes Darwin's claim that Paley's argument fails in the light of natural selection, enabling an interpretation that the failure of Paley's argument was what led Darwin to abandon his religion. James R. Moore argues that this interpretation "takes the *Autobiography* too seriously as a statement of causality" and suggests that more personal factors played a greater role in Darwin's personal faith experience.<sup>63</sup> Nonetheless, this passage in the autobiography prompted others to frame a narrative of Darwin's overcoming of the Paley he had looked up to in his youth, almost as an Oedipal victory.

Focus on Darwin's personal development as the author of a scientific theory and his personal relationship to religion as a way to discuss the evolution–religion question in general restored to view a William Paley who had mostly been ignored by everyone but Julian Huxley. And this increased biographical attention to Darwin helped facilitate the repositioning of Paley as a scientific precursor, not only as a theologian whose religious views were made obsolete by science. In his introduction to Darwin's notebooks, which were published in 1960, Gavin de Beer (who studied with Huxley at Oxford) claimed that Darwin was "certainly indebted" to Paley, mentioning him along with a variety of other influences, most of whom would typically be considered as scientists or naturalists, rather than as clerics or theologians.<sup>64</sup> In *Darwin's Century*, published in 1959, Loren Eiseley described Paley's design hypothesis as "the reigning biological doctrine" at the time Darwin was a student, even though, Eiseley claimed, "the whole idea [of natural theology] had to be propped up by a scaffolding of tendentious theory which rapidly became unwieldy."<sup>65</sup> Remarkably, Paley received no mention at all in John C. Greene's influential 1959 book on the history of evolution, *The Death of Adam*. Greene traces his study from Ray to Darwin without mentioning Paley, and, as implied by the title of his book, devotes much more attention to the Scriptural rationale for the fixity of species.<sup>66</sup> Paley was acknowledged in Greene's 1959 article on "Darwin and Religion," which cites the Paley passage from the autobiography and associates Paley with John Ray and a longer natural theology tradition that set forth "the static version of the doctrine of creation." This portrayal further emphasized both Paley's historical "influence" on Darwin and the interpretation that the primary point of difference between Darwin and Paley was the scientific question of the fixity of species.<sup>67</sup> In the published proceedings of another centenary conference—at Johns Hopkins University—Francis C. Haber focused on Paley's response to Erasmus Darwin's *Zoonomia*, also taking Paley's rejection of evolution to be a scientific argument.<sup>68</sup>

## 8. Paley at court

Among biologists and consumers of works written as popular presentations of evolution, the centenary-era focus on Darwin the man appears to have restored to view design arguments and

Paley specifically as the archetype of pre-evolutionary naturalistic thought. The blurring of distinctions between different kinds of natural theology, the assumption that natural theology was concerned with biological origins, the association of this generalized natural theology with "Paley," and the subsequent equation of natural theology with antievolutionism, all served to make something called "Paley's *Natural Theology*" an available point of reference. Meanwhile, the repositioning of evolutionary biology as explicitly nonteleological and the apotheosis of Darwin's *Origin* as the distinct moment when modern evolutionary theory began created a second point of reference. Through historical focus on Darwin's personal intellectual and religious journey, these two were brought into contact and created a narrative of Paley-as-foil-to-Darwin.

Whether Paley was a *scientific* foil or a *religious* one was a question still without obvious consensus at the centenary. To some extent both of these interpretations continue to the present day, but the transition to the primacy of Paley as scientific foil to Darwin came about because of a development that shifted the internal boundaries of "science" and "religion" within the science–religion trope. This came as biological scientists, including many of those who were involved in some of the Darwin centenary events, took more direct aim at the mostly American antievolution movement. Religious antievolutionism in twentieth century America was widely perceived as being rooted in apparent conflict with the Bible, as it was depicted in the 1955 play and 1960 film *Inherit the Wind*, which presented opponents to "Darwin" as believers in a strictly literal interpretation of the Bible.<sup>69</sup> Even though creationists invoked several different reasons for antievolutionism, the caricature of biblical literalism drew the most attention from those arguing against creationism.<sup>70</sup> Much of the discussion of Darwinism and religion around the centenary focused on questions of whether Darwin could be reconciled with Genesis, not with questions of natural theology. Paley became the exemplar of non-biblical antievolution, invoked by opponents of creationism.

The transition from Paley as non-Biblical argument to scientific argument was completed by the changing nature of antievolution as a legal and philosophical strategy from the time of the *Origin* centenary to the publication of *Blind Watchmaker*. Not long after the U.S. Supreme Court ruled in 1968 that antievolution laws (like the one that had led to John Scopes's trial) were unconstitutional, antievolutionists began to devote greater attention to "creation science" as a basis for "balanced treatment" laws that would effectively restore the antievolutionary status quo.<sup>71</sup> The ruling in the 1982 court case that challenged balance treatment, *McLean v. Arkansas Board of Education*, effectively raised a legal question—is creation science inherently religious (and therefore unconstitutional)? And answered it in part by judging that it was not, in fact, scientific.<sup>72</sup> The conclusion that creation science was unscientific rested on its coincidence with a Biblical account of creation (interpreted as a young earth.)

In effect, the ruling set forth two precedents that have continued to be use in both the courtroom and contemporary debate over science and religion: That if something is religious it is not scientific (also if something is "science" it is not religious); and that science is non-Biblical. Thus, Paley's non-Biblical argument against evolution could be seen as a scientific argument. Only a few years

<sup>62</sup> Barlow (1958, p. 87).

<sup>63</sup> Moore (1989, p. 197).

<sup>64</sup> De Beer (1960, p. 35).

<sup>65</sup> Eiseley (1959, p. 178).

<sup>66</sup> Greene (1959b).

<sup>67</sup> Greene (1959a, p. 718).

<sup>68</sup> Haber (1959, pp. 251–252).

<sup>69</sup> Lawrence & Lee (1955).

<sup>70</sup> Numbers (2006) and Shapiro (2013).

<sup>71</sup> Numbers (2006) and Larson (2003).

<sup>72</sup> *McLean v. Arkansas Board of Education* (1982).

after *McLean*, Dawkins could say that Paley's was the best explanation possible until Darwin surpassed it and proved it false, and the "intelligent design" movement that came to prominence in the 1990s could claim to be both scientific and inheritors of Paley.

The claim that ideas about biological origins were scientific by virtue of being non-Biblical took a legal hit when a U.S. Federal Court ruled that intelligent design is not science in the Dover, Pennsylvania intelligent design trial of 2005.<sup>73</sup> But unlike in either the *Scopes* or *McLean* cases, Paley was discussed frequently in the *Kitzmiller v. Dover* trial. As he did in *Darwin's Black Box*, Michael Behe (as an expert witness) described Paley's watchmaker argument as "a scientific argument based on physical facts and logic." John F. Haught, testifying for the other side in the Dover case, also likened modern ID to Paley's arguments, but claimed that both were theology.<sup>74</sup> Haught's view of Paley as religious was echoed by the judge who ruled that the modern ID argument was not scientific but was "merely a restatement of the Reverend William Paley's argument applied at the cell level."<sup>75</sup>

## 9. Conclusion

Although the *Natural Theology* has been excerpted, annotated and paraphrased in many instances, it was mostly not changes to the text itself that enabled the diversity of reader interpretations over two centuries. The read *Natural Theology*, and by extension the character of William Paley as its author, have been expressions of the evolving question of science and religion. Understanding of how science and religion are defined individually—and how the science–religion trope is itself defined—has evolved symbiotically with the understanding of what audiences can read and interpret science–religion texts. As the *Natural Theology* came to different audiences: to the business of religion, to the business of natural philosophy, to popularizers, to the classroom, and to the courtroom, the book itself was bound up with the issue of which audiences could proclaim the meaning of its contents, and how those audiences saw themselves in relation to one another.

This process was repeated in *Kitzmiller v. Dover*. Even though Haught and Judge Jones firmly relegated Paley's *Natural Theology* to the religion side of a court-defined dichotomy, they reinforced a claim made by Behe (and Dawkins) about the essential similarity of Paley's arguments to those of the modern ID movement. Even though intelligent design's supporters lost the legal case (as creation science had in the *McLean* verdict), they tacitly won the right to proclaim themselves Paley's true inheritors, and by extension assert their own standing as the legitimate foils to Darwin.

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<sup>73</sup> *Kitzmiller et al. v. Dover Area School District et al.* (2005).

<sup>74</sup> Behe (2005) and (Haught, 2005).

<sup>75</sup> *Kitzmiller et al. v. Dover Area School District et al.* (2005).

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