



ORDER: GOD'S, MAN'S AND NATURE'S

Did Paley Go Beyond Paley?

Aspects of Natural Theology in Nineteenth-Century Britain

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The peculiarity of my title has its explanation in the context in which an early, unpublished, draft of this paper was presented. A conference held in Oxford in June 2008, organised by Professor Alister McGrath, provided an opportunity to examine many aspects of natural theology and its history in the English-speaking world. A particular focus was the diversification of the genre of natural theology and the respects in which it advanced beyond William Paley's celebrated text of 1802. The conference title was "Beyond Paley" and this subsequently became a chapter heading in McGrath's *Darwinism and the Divine* (2011). Because Paley has so often been caricatured, I made it my goal to give him a fairer hearing than he routinely enjoys as the archetypal, hapless exponent of the argument from design, doomed to *complete* refutation by Darwin. In this amplified version of the paper, I return to Paley's understanding of order in nature and the theological inferences he drew from it. Selective quotation from his *Natural Theology* can make him a figure of fun, but more sympathetic readings of his apologia are also possible. Page references in the following account are to the Oxford World's Classics Edition (2006) of his *Natural Theology*, edited with an introduction and notes by Matthew Eddy and David Knight.

Aphids and earwigs

It is impossible to deny that many of Paley's remarks invite caricature. In his concluding chapter, he famously constructed an argument for a caring Providence from the wings of an earwig:

The hinges in the wings of an *earwig*, and the joints of its antennae, are as highly wrought, as if the Creator had nothing else to finish. We see no signs of diminution of care by multiplicity of object, or of distraction of thought by

variety. We have no reason to fear, therefore, our being forgotten, or overlooked, or neglected (280).

Aphids, as well as earwigs, carried an important message to humankind, who, we might suppose, would be more inclined to see them as pests. For Paley they help us to appreciate how much pleasure and happiness there is in the world when a utilitarian calculus is brought into play:

Plants are covered with aphids, greedily sucking their juices, and constantly, as it should seem, in the act of sucking. It cannot be doubted but that this is a state of intense gratification. What else should fix them so close to their operation, and so long? Other species are *running about* with an alacrity in their motions which carries with it every mark of pleasure (238).

Paley was no stranger to pain and suffering, but his conjuring a happy world, in which the fry of young fish were “so happy, that they know not what to do with themselves” (238), may elicit displeasure from those worried by his projection of a vicarage garden onto nature. It is indeed difficult not to smile with condescension when we read that the human epiglottis is so exquisitely designed that at city feasts “not two guests are choked in a century” (97). And difficult not to smile again when we learn that there is proof of the goodness of God in the fact that food tastes more delicious than was necessary for it to provide sustenance (251).

Paley has, moreover, suffered from historians and theologians who have depicted his *Natural Theology* as a derivative work, lacking the sparkle and originality characteristic of earlier essays in the genre. For Charles Raven, Paley’s celebration of nature could not hold a candle to that in John Ray’s *The Wisdom of God Manifested in the Works of Creation* (Raven 1942 and 1953). Paley has suffered, too, from philosophers who have chastised him for using arguments already discredited by Hume. Over-riding both the historical and philosophical critiques, he has suffered from the paradigm shift that took place when Darwin showed how nature could counterfeit design through the perfecting process of natural selection. As Darwin himself put it: “The old argument of design in nature, as given by Paley, which formerly seemed to me so conclusive, fails, now that the law of natural selection has been discovered” (Darwin 1958: 87).

I have deliberately used the term paradigm shift here because the switch from the worldview of Paley to seeing the world through Darwin’s eyes has often had the character of a gestalt switch or conversion experience.

Here is the naturalist Alfred Newton on the consequences of reading the papers of Darwin and Wallace that had been presented to the Linnaean Society in 1858: "After reading these papers more than once, I went to bed satisfied that a solution had been found...it came to me like the direct revelation of a higher power; and I awoke next morning with the consciousness that there was an end of all the mystery in the simple phrase, 'Natural Selection'" (Cohen 1985: 595). The appearance of design in the contrivances of nature could now be explained without Paley's Contriver. Moreover, the somewhat tedious practice of accumulating example after example of design, on the supposition that the strength of the argument was cumulative, was shown up not only for its tediousness but also, and primarily, for its misdirection.

Given the sum of these considerations, the prospects for any kind of reprieve for Paley must surely be slim. Even among early nineteenth-century thinkers he became a target for medical reformers and other political radicals eager to pillory Oxford, Cambridge and the Anglican Establishment (Desmond 1989: 152-192; Eddy and Knight 2006: xxv). Other critics called into question the religious efficacy of rational proofs: make a man feel the *need* of Christianity was Coleridge's well-known protest.

Paley beyond the caricatures

In attempting a closer and more sympathetic reading of Paley, I must emphasise that my motivation has nothing to do with the agenda of recent "Intelligent Design" proponents who have resurrected Paley for their cause. From both scientific and theological perspectives their agenda marks a flawed and retrograde step in apologetics. But I do believe there is more to Paley than meets the eye. We need a better historical understanding of Paley – not moves to enlist him for an anachronistic apologia.

Caricature 1: Paley disregarded or wrote in ignorance of Hume

Paley may not have addressed all of Hume's sceptical arguments, but he did address some. His watchmaker God was ineluctably anthropomorphic and in that respect vulnerable to a Humean critique. But in other respects Paley took Hume's analysis into account and his response was often forceful. Three examples deserve comment:

In his posthumous *Dialogues Concerning Natural Religion* (1779), Hume had contested the inference to a Designer on several grounds, one of which was that a

“principle of order” might simply be inherent in nature itself. To this Paley had an explicit rejoinder:

A principle of order is the word: but what is meant by a principle of order, as different from an intelligent Creator, has not been explained either by definition or example (42).

It seemed to Paley that Hume had merely substituted words for reasons, names for causes. By “order” Paley understood “only the adaptation of means to an end.” Consequently a “principle of order” could “only signify the mind and intention which so adapts them” (42). To Hume’s suggestion that living systems could have arisen by means of unconscious generation, Paley replied that, in this case, the word “generation” describes a process that is itself problematic in a universe not guided by a cosmic intelligence (Ferré 1963: xxv). Moreover, if there were an inherent principle of order, one would expect the order to be realised universally – whereas it is found discriminately - in eyes, for example, but not in rocks and mountains. This may not be an adequate riposte but it is a riposte. Indeed Paley expatiated on his theme: “where order is wanted, there we find it; where order is not wanted, i.e. where, if it prevailed, it would be useless, there we do not find it.” No useful purpose would have arisen from “moulding rocks and mountains into regular solids, bounding the channel of the ocean by geometrical curves, or from the map of the world resembling a table of diagrams in Euclid’s Elements”(43).

A second example relates to an objection older than Hume, but one that Hume had modified for his purposes. This was the Epicurean argument that nature might have experimented with every possible combination of limbs and organs, only the viable surviving - thereby creating the illusion of design in the structures we see today. Hume had been less prodigal with nature’s products, but his logic was not dissimilar:

It is in vain, therefore, to insist upon the uses of the parts in animals or vegetables and their curious adjustment to each other. I would fain know how an animal could subsist, unless its parts were so adjusted? (Hume 1963 [1779]: 158).

True, Paley read more into the mutual adjustment of parts, but he also had his rejoinders to Epicurean scepticism. He insisted that there was no evidence of nature’s experimentation occurring now. More to the point, “multitudes of conformations, both of vegetables and animals, may be conceived capable of existence and succession, which yet do not exist” (39). On the basis of the Epicurean argument the real surprise is that we do not see mermaids, unicorns and centaurs. If all possible existences had been tried, why were there no humanoids around without

fingernails, or with fewer fingers and toes? This is a pre-Darwinian imagination, to be sure, but it is an explicit engagement with a sceptical argument.

My third example relates to Hume's principle that, when drawing causal inferences, the cause must always be proportioned to the effect it ostensibly causes. The immediate consequence of applying this principle was that, from finite effects in a finite world, it was simply inadmissible to infer the existence of a deity with infinite power. Claims for an omnipotent deity based on appeals to design were therefore doomed. Was Paley oblivious to this problem? Not so, according to Frederick Ferré who observed that there is moderation in what Paley meant by "omnipotent" (Ferré 1963: xix). Ferré cited the following passage:

.... a power which could create such a world as this is must be, beyond all comparison, greater than any which we experience in ourselves, than any which we observe in other visible agents, greater also than any which we can want, for our individual protection and preservation, in the Being upon whom we depend (231).

A greater power, but not necessarily infinitely great. Paley was not claiming proof of an infinite power. Similarly, "omniscience" for Paley stood for very great wisdom, surpassing "all idea we have of wisdom, drawn from the highest intellectual operations of the highest class of intelligent Beings with whom we are acquainted". It was a degree of wisdom that had to be adequate to the conduct of the natural order. "And this", he added, "is enough" (231).

Caricature 2: Paley made the mistake of presenting his proof as if it were a deductive argument in which the conclusion was logically entailed by his reasoning.

This has become a common accusation, especially favoured by contemporary writers seeking to throw into relief their preference for a more modest natural theology. To inflate what Paley claimed for his analogies between the universe and a finely wrought artefact, can be a convenient way of commending natural theologies that do not pretend to be demonstrative (Polkinghorne 1998; McGrath 2011: 117 and 280). The problem is that although the word "proof" was often used in the tradition that Paley represents, it was rarely used in a deductive, Euclidean sense. The design argument was far more frequently understood to generate probabilities rather than certainties. Paley's predecessor Joseph Butler had made a special point of differentiating the probable from the logically demonstrable. Where probable evidence is involved, Butler wrote, "it admits of degrees; and all variety of them, from

the highest moral certainty, to the very lowest presumption”(Eddy and Knight 2006: xx). But this was not a problem because in all practical matters probability was the “very guide to life” (Butler 1961 [1736]: 2). When reflecting on the goodness of the Creator, and this earthly life as a period of probation, Paley had in mind the compatibility between the appearance of design in the contrivances of nature and the “supposition of design on the part of the Deity” (271). The discourse was not one of proof: it was “enough” that the appearances and the supposition were “reconcilable” (271). Paley’s belief is that a state of probation for humankind is part of the divine design. But his rhetoric refers to probability, not deductive proof: “we assert the most probable supposition to be, that [we live in] a state of moral probation” (271).

Even when Paley came closest to claiming that the existence of God was entailed by his proofs, there would still be a note of equivocation. After extolling the fine adjustments involved in the mechanics of muscular action, he did say that here was “nothing short perhaps of logical proofs of design” (81). However, as Eddy and Knight observe in their Oxford edition, one must not overlook the insertion of that crucial word “perhaps” (307). The wisest commentators on Paley are agreed that we should not commit him to claims for entailment. Here again is Ferré:

Paley (like the scientist) claims not to provide absolute deductive logical necessity for his conclusions...but rather to offer inductively reasonable grounds for belief in his assertions – grounds sufficient for complete rational conviction. Paley is aiming, therefore, at building as strong a *probable* case as possible; he will be content if he can show that it would be arbitrary and unreasonable – though not necessarily self-contradictory – to reject it (Ferré 1963: xiv).

Even Alister McGrath, who gives an informed and systematic account of Paley’s deficiencies, carefully distancing himself from articulations of the design argument that were vulnerable to Darwin, concedes that by a “proof” of the existence of God, Paley never meant a logical proof, “but rather a rhetorical demonstration, similar to that then encountered in a court of law” (McGrath 2011: 117). On McGrath’s properly historical reading, it was Paley’s misfortune that, during the first half of the nineteenth century, the criteria for what constituted compelling evidence became more stringent in courts of law as well as in the interpretation of nature.

Caricature 3: By making his Natural Theology a stand-alone book, Paley effectively presented the genre as independent of revelation and therefore of little or no consequence for Christian theology.

The issue here is complex. Before Paley, arguments drawn from natural theology were sometimes commended precisely because they did purport to be independent of revelation. They could be seen as giving additional, rational and unprejudiced support to claims for a wise and powerful Deity. There were, however, problems if one stressed the independence. One could easily encourage the deists who were happy to dispense with revelation altogether or to do so wherever its tenets failed to pass the test of reason. Another complication had been identified by Hume. Inferences from nature to the attributes of God might pretend to stand alone, but in reality their proponents were presupposing the very attributes they wished to establish. As Hume famously insisted, all that design arguments can deliver is that there might be a designer bearing some remote resemblance to human intelligence. If one claimed, as Paley certainly did, that the designer had attributes of a Christian God, these, from a Humean perspective, were being smuggled surreptitiously into the argument.

Unsurprisingly, Paley was criticised for deistic tendencies and was maligned as a closet Unitarian. A real Unitarian, Joseph Priestley, who actually invented the label, illustrates another complication. Priestley had been a stalwart defender of natural theology and a hostile critic of Hume. But he also expressed the opinion that there had been very little spiritual progress in those societies where the truths of revelation had not penetrated (Brooke 1990). Natural theology alone was not enough. At the other end of a theological spectrum, John Henry Newman would later dismiss Paley and the enterprise of physico-theology as having no bearing on the fundamental doctrines of Christianity, no bearing on the “Moral Governance, under which we live” (McGrath 2011: 127-30).

Newman’s critique is carefully considered by McGrath and it is sufficiently important to bear repetition here. It is important because it reveals a deeply significant issue that has arisen many times when a conservatively theological understanding of divine Providence confronts an understanding of “order” simply premised on the *laws* of nature and the divine legislation that, historically, has given the law metaphor its substance. This was Newman’s objection:

This so-called science [of natural theology] tends, if it occupies the mind, to dispose it against Christianity. And for this plain reason, because it speaks only of laws; and cannot contemplate their suspension, that is, miracles, which are of the essence of the idea of Revelation. Thus, the God of Physical Theology may very easily become a mere idol; for He comes to the inductive mind in the medium of fixed appointments, so excellent, so skilful, so beneficent, that, when it has for a long time gazed upon them, it will think them too beautiful to be broken, and will at length so contract its notion of Him as to conclude that He never could have the heart ... to undo or mar His own work; and this conclusion will be the first step towards its degrading its idea of God a second time, and identifying Him with His works. (Cited from Newman's *The Idea of a University* by McGrath 2011: 129).

Newman diagnoses the dangers of deism from the standpoint of a strong Christian theism in which Revelation is paramount. It is, however, a question whether Paley entirely deserved the rebuke. Contrary to the caricature, Paley did not see his *Natural Theology* as a stand-alone work. It was one of three substantial texts that he saw as inter-related. In *The Principles of Moral and Political Philosophy* (1785) he had articulated his utilitarian ethics. In the second, his *Evidences of Christianity* (1794), he had defended the gospels as an authentic revelation. This had required a chapter in which he explicitly responded to Hume's attack on reported miracles. *Natural Theology* was published last. In his own words he had offered the public "the evidences of natural religion, the evidences of revealed religion, and an account of the duties that result from both." And then the revealing statement: "they have been published in an order, the very reverse of that in which they ought to be read" (Eddy and Knight 2006: xvii). What Paley hoped to accomplish with his *Natural Theology* was to encourage belief in the existence of a deity whose attributes were such that one could reasonably expect a revelation of greater theological significance than that to be found in nature alone:

It is a step to have it proved, that there must be something in the world more than what we see. It is a further step to know, that amongst the invisible things of nature, there must be an intelligent mind, concerned in its production, order, and support. These points being assured to us by Natural Theology, we may well leave to Revelation the disclosure of many particulars, which our researches cannot reach (280).

An example he gave was of the Resurrection of the Dead. It surely made the belief more credible if one were already persuaded that there was a God with the power and moral governance to effect the dispensation (281). Contrary to Newman's depreciation of physico-theology, Paley had insisted that its primary purpose was to facilitate "the belief of the fundamental articles of *Revelation*" (280). His understanding of an interplay between natural and revealed theology did go beyond the caricature. It is just that the going *beyond* had, chronologically in his output,

already gone *before*. I have already referred to Coleridge's jibe that he was weary of the word *evidences* of Christianity. Make a man feel the *need* of it was his counter-proposal. Yet, if we turn to Paley's sermons, it is a moot question whether the criticism applies. In a sermon entitled "All Stand in Need of a Redeemer", Paley did more or less what Coleridge wanted. He dwelled on feelings of deficiency and imperfection experienced in many different endeavours and especially by those sincerely seeking salvation (Paley 1815: 284-96). And speaking again of evidences, "there is no evidence", writes Ferré, that Paley was hoping to reduce religion to [the] compass [of his *Natural Theology*]" (Ferré 1963: xxvii).

Caricature 4: Paley was so preoccupied with the minutiae of anatomical peculiarities that he was blind to the laws connecting natural phenomena.

Given Newman's objection that the natural theology epitomised by Paley was too preoccupied with physical *laws* to give due attention to the miraculous, there is irony in the fact another caricature invests him with preoccupations that *diverted* his attention from the laws of nature. As with the other images we have considered, there is an element of truth in the further caricature. Paley *is* drawn to specificity. Not only does he marvel at peculiar provisions, such as the hook on a bat's wing, but he also goes to town on the specifics of what he called "compensation". Take the case of the parrot's beak. Paley is fascinated by it because the hooked beak enables the parrot to climb and to break nuts. But he is even more fascinated by the way in which nature compensates for an associated inconvenience: "The upper bill of the parrot is so much hooked, and so much overlaps the lower, that, if, as in other birds, the lower chap alone had motion, the bird could scarcely gape wide enough to receive its food" (148). And yet, in the parrot the upper chap is moveable as well as the lower. Such attention to specificity is part of Paley's charm. He had a way of making natural history enthralling and he succeeded with the young Darwin. The question, though, is whether his enthusiasm for the great diversity of contrivance prevented him from achieving any unified system of nature. Compared with Darwin, manifestly not. But Paley did reflect on the unity of nature and its internal connections when seeking to establish the unity of the deity. This was also one of the contexts in which he did refer to *laws* of nature and in a manner often repeated by apologists later in the nineteenth century. His aphorism that "a law presupposes an agent"(9) would be repeated by William Whewell, among many others, who inspected nature for indications of their Creator (Brooke 1991).

Nature for Paley was not just a composite of separate clocks and watches. There was a uniformity of plan from which the unity of God could be inferred. The universe, in short, was a “system; each part either depending upon other parts, or being connected with other parts by some common law of motion, or by the presence of some common substance” (234). In this respect, Newtonian science was an attractive resource: “One principle of gravitation causes a stone to drop towards the earth, and the moon to wheel around it. One law of attraction carries all the different planets about the sun” (234). It is true that Paley preferred anatomical to astronomical arguments, but the theme of unity in nature found expression there as well. Large terrestrial animals had a similar skeletal structure. “Digestion, nutrition, circulation, secretion, go on, in a similar manner in all” (235). He even took the unification too far, claiming that “the experiment of transfusion proves, that the blood of one animal will serve for another” (235). Even in fish, we find stomach, liver, spine, and eyes only slightly varied from our own. And that very variation he describes as a continuance of the “same exquisite plan”. The similitude “bespeaks the same creation and the same Creator” (235).

This may not be sophisticated science; but it is important to note for at least two reasons. First, during the nineteenth century philosophies of biology were advanced in which explanations based on unity of type were set up in opposition to explanations based on function and design. This approach emanated, as with so many secularising moves, from France, from Geoffroy St. Hilaire (Brooke 1989). Undoubtedly there was scope for an oppositional stance. Were male nipples really designed for a purpose? Were they not rather an indicator of a more general template? This emphasis on pattern rather than purpose was certainly used to embarrass the simplest form of teleology we find in Paley. But going beyond Paley, British anatomists and palaeontologists, pre-eminently Richard Owen, were able to integrate the two. Design was discernible in the adaptation of a common skeletal archetype to the particular needs of particular species (Rupke 1994: 196-97). I have just said, as McGrath does also, that Owen went beyond Paley (McGrath 2011: 112). In elaborating the details of an idealist anatomy he did. But it must not be overlooked that Paley had already shown the way with his insistence on an identity of plan, duly modified to meet specific needs.

The second reason why Paley's referenceness to the unity, and to the laws, of nature deserve attention has to do with Darwin. In one of the most penetrating studies of

Darwin's intellectual development, David Kohn has argued that Darwin did not set out to destroy natural theology but to reform it (Kohn 1989). The nature of the reform had already been presaged by the astronomer John Herschel. The idea was basically very simple: design should not be sought in the particularities of things but in the laws governing the universe that made such particularities possible. Here it is tempting to set up an antithesis between Paley's love of special contrivances and the quest for laws underlying the patterns in both physical and organic nature. The adaptations at which Paley marvelled were eventually subsumed under what Darwin called the "law of natural selection". But the critical point is that, for some time at least, Darwin used a vocabulary of "designed laws" (Brooke 2009). He did not, as founders of the intelligent design movement tended to do, assert that, if a phenomenon can be explained by law, it cannot be used to infer design (Dembski 1998). In his correspondence with Asa Gray, Darwin would say that he was inclined to see the world as the result of designed laws, with the details left to chance, though even this formula left him dissatisfied (Darwin 1860).

Unequivocally, Darwin went beyond Paley, in his science and in his philosophy of nature. Interestingly, however, the nomological form of the design argument had been there in Paley too. In his astronomical chapter there was a fine-tuning argument designed to show that Newton's law of gravitation lay within a very narrow range of admissible laws. Not only that, but within the narrow range the best possible had been chosen (207). As with Newton himself, Paley saw in the laws of nature the result of choice not chance. Paley spoke of the deity *appointing* laws to matter (204); Darwin would speak of the Creator *impressing* laws on matter (Brooke 2009). For Paley a law presupposed an agent, and one could say the same for Darwin at the time he wrote the *Origin of Species*. In his large, unpublished species book, of which the *Origin* was a hastily written summary, Darwin was still linking discourse about nature to discourse about God: "By nature, I mean the laws ordained by God to govern the universe" (Richards 2009: 61).

The story of how Darwin's "blind watchmaker" superseded Paley's divine watchmaker does not need re-telling, though it is well to remember Holmes Rolston's complaint that neither metaphor works for the processes of evolution: "It is not that there is no 'watchmaker'; there is no 'watch'" (Rolston 1999: 370). There is, however, more to the relations between Darwin's philosophy of nature and that of Paley than the simple antithesis by which Paley's reputation invariably suffers. This is because there is a particularly absorbing respect in which Paley went beyond Paley.

Paley and Darwin

In chapter 2 of his *Natural Theology*, Paley reflected on a problem that still besets those who write on religion and the order of nature today: how are statements about divine activity to be correlated with statements about the efficacy of “natural” causes? Paley’s answer is interesting because of the high profile he gave to the natural causes. It was in them that divine wisdom could be discerned:

Whatever is done, God could have done, without the intervention of instruments or means: but it is in the construction of instruments, in the choice and adaptation of means, that a creative intelligence is seen (27).

Paley’s message was that God “prescribes limits to his own power” in conferring agency on mediating instruments, on what we would call causal powers. Critically, the laws of nature describe the regular patterns that are discernible in natural phenomena, but it is not the laws that have causal efficacy. Paley is adamant that it is a “perversion of language to assign any law, as the efficient, operative cause of any thing” (9). Nature, “with great steadiness adheres to, and supports” general laws, but causal efficacy in the ordering of nature lies with other agencies of which there may be “many ranks” (27).

Paley’s discussion becomes important at this point because his theistic naturalism could easily become a Trojan horse. It could facilitate the entry of a more secular scientific naturalism in which his theological motifs were marginalised or erased. There was a sense in which “Paley unwittingly transformed his defence of theism into a model of naturalistic explanation” (Durant 1977: 57). Paley went beyond Paley by paving the way for disciples who would further extend the domain of naturalism. One of those “disciples” was Darwin (Eddy and Knight: xxviii).

The point may be developed further through two examples that show more precisely how, through Darwin, Paley transcended himself:

Whereas Paley had attacked the evolutionary hypotheses of his day, notably that of Darwin’s grandfather Erasmus Darwin, the grandson, by 1837, was speculating on the means by which new species emerged from their progenitors. One of his earliest theories, following the *Beagle* voyage, but before his reading of Malthus, grew from a question he was asking about the time of his marriage to his cousin Emma Wedgwood: what is the point of sex? Or rather: what advantages are there in bi-sexual reproduction that might explain its prevalence in nature? His answer was

almost Paleyesque. It was through bisexual reproduction that offspring differed from their parents, thus creating the possibility of slight changes that might enable a species to adapt better to a changing environment. This “sexual theory”, as it has been called, made an ephemeral appearance in his transmutation notebooks (Kohn 1980). But it is indicative of how he was thinking before his insights into natural selection. He was effectively proposing that evolution – the transmutation of species – was nature’s way of preserving perfect adaptation. It was Paley’s naturalism but with a time-dimension added.

Even after Darwin had hit upon natural selection as a perfecting mechanism, he was still thinking in ways reminiscent of Paley. To appreciate this we need to take a closer look at the consequences Paley had in mind when he said that, through the mediation of powers inscribed in nature, God prescribes limits to his own power.

What he had to say can be arresting:

...such laws and limitations being laid down, it is as though one Being should have fixed certain rules; and, if we may so speak, provided certain materials; and afterwards have committed to another Being, out of these materials, and in subordination to these rules, the task of drawing forth a creation: a supposition which evidently leaves room, and induces a necessity for contrivance. Nay there may be many such agents, and many ranks of these (27).

In one respect Paley did not go beyond Paley here. He drew back and said he was not advancing this as a doctrine either of philosophy or of religion. But in another respect he did go beyond when he allowed that “the subject may be safely represented under this view, because the Deity, acting himself by general laws, will have the same consequences upon our reasoning, as if he had prescribed these laws to another” (27).

What has this to do with Darwin? Not merely that he explored the agency of natural laws that, until 1859 at least, he was willing to ascribe ultimately to a deity. More saliently, Darwin repeatedly personified natural selection, turning it into a Being, which strangely resembles that second Being to which Paley allocated (or at least permitted) the task of drawing forth a creation. There was no simple “descent with modification” from Paley to Darwin. But there is a structural congruence when the Paley who went beyond Paley is compared with the Darwin who also had recourse to another Being when explicating what he *meant* by natural selection. Here is Darwin, in his unpublished *Essay* of 1844, offering his Being as a heuristic device:

Let us now suppose a Being, with penetration sufficient to perceive differences in the outer and innermost organization quite imperceptible to

man, and with forethought extending over future centuries to watch with unerring care and select for any object the offspring of an organism produced under the foregoing circumstances; I can see no conceivable reason why he could not form a new race...adapted to new ends (Brooke 1985: 55).

Paley had written that no arguments in his possession excluded the ministry of subordinate agents (236). Darwin's achievement was to describe what those agents were in the historical production of species.

This perspective is, of course, only partial. The comparison might even smack of contrivance – to use a favourite word of Paley. But there is more to the congruence than that. For a witness I turn to an improbable source – to one of Darwin's most zealous advocates, Thomas Henry Huxley. Far from denouncing Paley as “gloriously wrong” in the modern manner of Richard Dawkins, Huxley had this to say:

The acute champion of Teleology, Paley, saw no difficulty in admitting that the “production of things” may be the result of trains of mechanical dispositions fixed beforehand by intelligent appointment and kept in action by a power at the centre, that is to say, he proleptically accepted the modern doctrine of Evolution; and his successors might do well to follow their leader, or at any rate to attend to his weighty reasonings, before rushing into an antagonism which has no reasonable foundation (Huxley 1887: 202).

This is why Huxley could declare that Darwin's theory had no more to do with theism than had the first book of Euclid. Even in a post-Darwinian era, Huxley saw insight in Paley that went beyond Paley. It is an interesting counterpoise to those who today make Paley their champion for an anti-Darwinian rhetoric.

Where Paley had considered it safe to entertain a model in which the Creator delegated the creation of a world to subordinate agency, a pressing issue in the post-Darwinian debates was whether the combination of random variation with natural selection was not too bleak and chilling, its consequences too tortuous and bloodstained, to have been a mechanism of divine choice. That was the dilemma poignantly expressed by Darwin's disciple George Romanes. To infer the attributes of a Creator from the world of nature, as nature now appeared to be, led one to a view of the deity at odds with the noblest conceptions of traditional religion (Romanes 1896: 83). New science did make a difference and, in my closing section, I want briefly to indicate how natural theology had already diversified even before Darwin. It did so in response to scientific innovations that Paley could not have anticipated.

Natural theology beyond Paley

It is not always appreciated that one of the reasons why a discourse of natural theology flourished in Britain during the eighteenth and early nineteenth centuries was that it could be used in the promotion of science. It helped to avert religious suspicion if one could show that, far from threatening religious belief, the sciences actually gave support (Brooke 1997). It was spiritually edifying to contemplate the craftsmanship of the Creator. This explains why Paley's text and the *Bridgewater Treatises* of the 1830s were often read not so much as a logically safe form of Christian apologetics as a politically safe form of science popularisation (Brooke and Cantor 1998: 153-61; Topham 1998 and 2010). The consequence was that exponents of the genre had to be sensitive to changes in science. This could be a tall order when a potentially subversive science, such as geology, was revealing what Martin Rudwick has called scenes from deep time – scenes long before humans had appeared and during which countless species had become extinct (Rudwick 1992 and 2005). Paley wrote when it was still possible to say that "Nature's species never fail" (249). He wrote before Georges Cuvier established the extinction of giant quadrupeds, before the Genesis flood subsided as an explanation for the fossil record, before Charles Lyell eliminated the geological catastrophes that had been suggestive of a God active in nature. Paley wrote before Darwin emancipated himself from the concept of perfect adaptation, replacing it with competition between forms and their variants that were differentially adapted to the conditions of their existence (Ospovat 1981). Under such pressures, natural theology diversified (Brooke 1994; Brooke and Cantor 1998; McGrath 2011: 108-42).

That science could advance at all, according to William Whewell, provided compelling evidence for design – for the design of a mind capable of discovering truths about nature. Among commentators on Paley, the need for a natural theology of mind, and not merely of matter, was forcefully expressed by Henry Brougham (McGrath 2011: 112-15). Whewell took up the challenge, stressing the role of "fundamental ideas" that had regulated theory construction in the various branches of science – ideas such as polarity in chemistry, symmetry in crystallography, final cause in physiology. Writing an elaborate philosophy of science to prove his point, Whewell grounded his mature natural theology in an epistemological argument that is not to be found in Paley. Whewell's argument may have been too metaphysical for his scientific friends, but it shifted attention from anatomical designs to the design of the human mind itself (Yeo 1979; Snyder 2006: 92). As far as Whewell was

concerned, the existence of an intelligent deity provided the best explanation for the ordering of nature, the ordering of the human mind, and for the very possibility of unfolding truths about nature through dialogue between the fundamental ideas and empirical data.

The adaptability of natural theology to scientific innovation deserves special emphasis. Oxford's first Reader in Geology, William Buckland, had an engaging response to the problem of extinction. In keeping with earlier assumptions about the plenitude of creation, he still believed that the divine design had been to create all possible creatures. The fact of extinction merely showed that in the real world all possible creatures could not co-exist. Some had had to be removed to make way for others, but this did not mean that the extinguished forms had been maladapted when they had been first introduced:

The course of nature has not been a series of experiments each successively improving on that which preceded it, but that from the beginning every organized being was created perfect with relation to the functions which it was destined to perform in the then existing state of the world. The fitness of the world for animal life appears to have been progressive (Rupke 1983: 159).

A concept of *progressive* creation, in harmony with progressive changes in the Earth's physical development, allowed Buckland a greater space in which to affirm a God who was not only Creator but also providential Superintendent of nature. In this respect, the fossil record became a resource for more sharply differentiating a theistic from a potentially deistic natural theology.

Buckland's opposite number in Cambridge, Adam Sedgwick, provides a vivid illustration of the same point. Sedgwick focussed on the successive appearance of new forms in the fossil record. Far from being subversive of religion, geology was a science with the power to refute the atheist. No longer was it possible to argue that the forms of living things were eternal and uncreated. The new science of palaeontology disclosed a succession of creatures that had formerly *not* existed. This is, of course, a pre-Darwinian rhetoric. Sedgwick was willing to proclaim "ten thousand creative acts" recorded on stony tablets (Brooke 1997: 54). But it means that, even as Paley's essential static model of creation gave way to a more developmental understanding, natural theology could still show resilience, as it did in Whewell, Buckland and Sedgwick.

A similar resilience is visible in the works of another geological popularizer, the Scottish evangelical Hugh Miller. Following the Disruption of the Scottish Church in

1843, Miller was appointed editor of *The Witness*, organ of the new Free Church of Scotland. Among the torrent of articles that poured from his pen, many were devoted to the bearings of science on both natural and revealed theology. Displeased by the timidity and reactionary stance of English evangelicals he was keen to show that their Scottish brothers were capable of appreciating the fruits of scientific learning. Miller, like Buckland and Sedgwick, saw evidence of progression in the fossil record: at the beginning of each new geological epoch the freshly created species showed greater complexity than those that had preceded them. Cleverly integrating natural and revealed theology, Miller also saw a recurring pattern of degeneration *within* each epoch – a pattern that precluded facile, secular models of species transmutation premised on the linear ascent of a ladder of increasing complexity. His palaeontology bore an imprint of the Fall. Geology, he argued, was not to be feared. It could even furnish a refutation of Hume, who had objected that inferences to design were vitiated by the fact that we have no experience of the creation of worlds (plural). Miller triumphantly replied that the fossil record remedied the deficiency (Miller 1857). Successive and distinctive geological epochs were, in a sense, successive discrete worlds. Comparisons could be made between them, mitigating the force of Hume's contention that, with only one world from which to argue, it was impossible to privilege one analogue for it (for example a watch) over another (for example a living organism). Miller also had far more to say than Paley about the perception of beauty in nature. Fossil forms were themselves objects of beauty, the ammonite providing a striking example. Structures embodied in organic nature reminded Miller of human architecture, of the buttresses and vaults of Gothic cathedrals. This was not mere sentimentality, for Miller did have an argument. The fact that the architectural structures we find beautiful were long ago presaged in the rocks, testifies to a shared aesthetic sensibility in humans and their Maker (Brooke 1996: 176-85). Beyond Paley, nature would often be transposed from machinery into a work of art.

It would be possible to explore many other examples of diversification. The naturalist Philip Gosse, for example, saw in nature the instantiation of biblical archetypes. The rockpools he brought into vogue in the early Victorian age were, for him, microcosms of an Edenic paradise (Smith 2001). After Darwin, apologists sympathetic to his science would celebrate the potential locked into nature and its actualisation in the production of what Darwin himself described as the highest good we can conceive – the creation of the higher animals. It is certainly a myth that Darwin dealt a deathblow to natural theology (Lightman 2009; Roberts 2009). As Darwin's Harvard

correspondent Asa Gray exemplifies, there are perspectives from which a Darwinian natural theology could address the age-old theodicy problem in engagingly new ways (Gray 1963: 293-320). The problem of suffering, on which Darwin's science threw a spotlight, could be apprehended differently if the struggle and strife of his evolutionary mechanism could be conceived as a *sine qua non* of the very possibility of a creative process that could engender intelligent life (Southgate 2008; Martin and Watkins 2012).

Conclusion

Because the worldview in which Paley operated did become obsolete in the nineteenth century, any attempt to reinstate the design argument as he presented it would be misconceived. All that I have attempted in this paper is to rescue him from caricatures that require correction. The real Paley did go beyond the caricatures. His articulation of a concept of order that embraced both laws of nature and the causal powers by which God had adapted means to ends facilitated rather than obstructed the expansion of scientific naturalism –albeit within limits that Darwin would transcend. I have also suggested that the relationship between Darwin's intellectual development and his debt to Paley is subtler than first meets the eye. And there are other parallels. When Darwin said that he was inclined to see the history of life on Earth as the result of designed laws with the details left to chance, was this insistence on chance so very radical? Commentators often imagine so. And yet here is Paley many years earlier: "There must be *chance* in the midst of design: by which we mean, that events which are not designed, necessarily arise from the pursuit of events which are designed"(265). His example was of a chance encounter between two men, one travelling to York, another to London. There would be design in each journey but it was legitimate to speak of chance in the meeting because of the intersection of two independent causal chains. One of the meanings Darwin gave to chance at the time his theory was conceived was no different (Brooke 1985: 60). His eventual insistence, against Asa Gray, that variations appeared randomly without reference to any prospective use did present a new challenge, but not by suggesting that events in nature were undetermined.

When Hume, through the mouthpiece of Cleanthes, had set up a defence of the design argument that, through the figure of Philo, he could attack, he had cleverly made Cleanthes say that it was by this *a posteriori* argument, and by this argument *alone*, that the existence of a deity could be proved and "his similarity to human mind

and intelligence" (Hume 1963: 116). Through reinforcing his argument by investing it with such exclusive, unique potency, Cleanthes falls into a trap of Hume's devising. If this argument should fail, there would be nothing left on which to ground inferences to a Creator. It has to be said that Paley's rhetoric would prove self-defeating through similar exaggeration. "It is", he wrote, "only by the display of contrivance, that the existence, the agency, the wisdom of the Deity, *could* be testified to his rational creatures" (27). This is just one respect in which natural theology could be said to have dug its own grave. It always created problems for itself if it tried to exploit gaps in current scientific knowledge, though most of its advocates, as with Paley, built their case on scientific knowledge rather than on a state of ignorance that could only be perceived to be such retrospectively. Conversely, natural theology suffered when it depended too heavily on transient scientific theories. Paley's argument from anatomical contrivance to a caring Providence did run into the ground, weighed down by its anthropomorphism. But, in so far as there was a demise of physico-theology during the nineteenth century, the explanation has to look beyond inherent shortcomings to wider social and political forces. As Frank Turner among others has emphasised, one has to look to the demise of the parson naturalist, the clerical amateur, displaced from an incipient scientific culture by a rising generation of professionalizing scientists (Turner 1993: 171-200). It was still possible in 1860 for the Revd. Samuel Wilberforce to stand up in the Oxford Museum and presume to correct Darwin's science. But his treatment at the hands of Huxley, however misconstrued in popular mythology (James 2005; Livingstone 2009), would come to symbolise that shift in cultural authority.

BIBLIOGRAPHY

- Brooke, J. H. 1985. "The Relations between Darwin's Science and his Religion", in J. Durant (ed.), *Darwinism and Divinity*. Oxford: Blackwell, 40-75.
- Brooke, J. H. 1989. "Scientific Thought and its Meaning for Religion: The Impact of French Science on British Natural Theology, 1827-1859." *Revue de Synthèse* 4: 33-59.
- Brooke, J. H. 1990. " 'A Sower went Forth': Joseph Priestley and the Ministry of Reform", in A. T. Schwartz and J. McEvoy (eds.). *Motion Toward Perfection: The Achievement of Joseph Priestley*. Boston: Skinner House, 21-56.
- Brooke, J. H. 1991. "Indications of a Creator: Whewell as Apologist and Priest", in M. Fisch and S. Schaffer (eds.), *William Whewell: A Composite Portrait*. Oxford: Clarendon Press, 149-73.
- Brooke, J. H. 1994. "Between Science and Theology: The Defence of Teleology in the Interpretation of Nature, 1820-1876." *Journal for the History of Modern Theology* 1: 47-65.

- Brooke, J. H. 1996. "Like Minds: The God of Hugh Miller", in M. Shortland (ed.), *Hugh Miller and the Controversies of Victorian Science*. Oxford: Oxford University Press, 171-86.
- Brooke, J. H. 1997. "The Natural Theology of the Geologists: Some Theological Strata", in L. Jordanova and R. Porter (eds.), *Images of the Earth*, 2nd edition. Oxford: Alden Press, 53-74.
- Brooke, J. H. 2009. "'Laws impressed on matter by the Creator'? The *Origin* and the Question of Religion", in M. Ruse and R. Richards (eds.), *The Cambridge Companion to the 'Origin of Species'*. Cambridge: Cambridge University Press, 256-74.
- Brooke, J. H. and G. Cantor. 1998. *Reconstructing Nature*. Edinburgh: T & T Clark.
- Butler, J. 1961 [1736]. *The Analogy of Religion*, with an Introduction by E. Mossner. New York: Frederick Ungar.
- Cohen, I. B. 1985. "Three Notes on the Reception of Darwin's Ideas on Natural Selection (Henry Baker Tristram, Alfred Newton, Samuel Wilberforce)", in D. Kohn (ed.), *The Darwinian Heritage*. Princeton: Princeton University Press, 589-607.
- Darwin, C. 1860. Letter to Asa Gray, 22 May 1860, in R. Burkhardt (ed.), *The Correspondence of Charles Darwin*, vol.8. Cambridge: Cambridge University Press, 224.
- Darwin, C. 1958. *The Autobiography of Charles Darwin*, ed. N. Barlow. London: Collins.
- Dembski, W. 1998. *The Design Inference*. Cambridge: Cambridge University Press.
- Desmond, A. 1989. *The Politics of Evolution*. Chicago: Chicago University Press.
- Durant, J. 1977. "The Meaning of Evolution: Post-Darwinian Debates on the Significance for Man of the Theory of Evolution, 1858-1908." University of Cambridge PhD Dissertation.
- Eddy, M. and D. Knight. 2006. "Introduction" to W. Paley, *Natural Theology*. Oxford: Oxford University Press.
- Ferré, F. 1963. "Introduction" to Paley. *Natural Theology Selections*. New York: Bobbs Merrill.
- Gray, A. 1963. *Darwiniana*, ed. A. H. Dupree. Cambridge MA: Harvard University Press.
- Hume, D. 1963 [1779]. *Hume on Religion*, Selected and Introduced by Richard Wollheim. London: Collins.
- Huxley, T. 1887. "On the Reception of the 'Origin of Species'", in F. Darwin (ed.), *The Life and Letters of Charles Darwin*. London: Murray, vol. 2, 179-204.
- James, F. 2005. "An 'Open Clash between Science and the Church'?": Wilberforce, Huxley and Hooker on Darwin at the British Association, Oxford, 1860", in D. Knight and M. Eddy (eds.), *Science and Beliefs: From Natural Philosophy to Natural Science, 1700-1900*. Aldershot: Ashgate, 171-93.
- Kohn, D. 1980. "Theories to Work by: Rejected Theories, Reproduction and Darwin's Path to Natural Selection." *Studies in the History of Biology* 4: 67-170.

- Kohn, D. 1989. "Darwin's Ambiguity: The Secularization of Biological Meaning." *British Journal for the History of Science* 22: 215-39.
- Lightman, B. 2009. *Evolutionary Naturalism in Victorian Britain*. Farnham : Ashgate, Variorum Collected Studies Series.
- Livingstone, D. 2009. "[The Myth] that Huxley Defeated Wilberforce in their Debate over Evolution and Religion", in R. L. Numbers (ed.), *Galileo Goes to Jail and Other Myths about Science and Religion*. Cambridge MA: Harvard University Press, 152-60.
- Martin, E. and E. Watkins 2012. "Evil and Natural Science". Unpublished discussion paper for the Order Project.
- McGrath, A. 2011. *Darwinism and the Divine*. Chichester: Wiley-Blackwell.
- Miller, H. 1857. *The Testimony of the Rocks*. Edinburgh: Thomas Constable.
- Ospovat, D. 1981. *The Development of Darwin's Theory*. Cambridge: Cambridge University Press.
- Paley, W. 1815. *Sermons on Several Subjects*. London: Longman.
- Paley, W. 2006. *Natural Theology*, ed. with an Introduction and Notes by M. Eddy and D. Knight. Oxford: Oxford University Press.
- Polkinghorne, J. 1998. *Belief in God in an Age of Science*. New Haven: Yale University Press.
- Raven, C. 1942. *John Ray Naturalist*. Cambridge: Cambridge University Press.
- Raven, C. 1953. *Natural Religion and Christian Theology*. Cambridge: Cambridge University Press.
- Richards, R. 2009. "Darwin's Theory of Natural Selection and its Moral Purpose", in Ruse and Richards, *Cambridge Companion to the 'Origin of Species'*, 47-66.
- Roberts, J. 2009. "[The Myth] that Darwin Destroyed Natural Theology", in Numbers, *Galileo Goes to Jail*, 161-69.
- Rolston, H. 1999. *Genes, Genesis and God*. Cambridge: Cambridge University Press.
- Romanes, G. 1896. *Thoughts on Religion*. London: Longmans, Green and Co.
- Rudwick, M. 1992. *Scenes from Deep Time*. Chicago: Chicago University Press.
- Rudwick, M. 2005. *Bursting the Limits of Time*. Chicago: Chicago University Press.
- Rupke, N. 1983. *The Great Chain of History*. Oxford: Oxford University Press.
- Rupke, N. 1994. *Richard Owen: Victorian Naturalist*. New Haven: Yale University Press.
- Smith, J. 2001. "Philip Gosse and the Varieties of Natural Theology", in L. Woodhead (ed.), *Reinventing Christianity*. Aldershot: Ashgate, 251-62.
- Southgate, C. 2008. *The Groaning of Creation*. London: Westminster John Knox Press.

- Snyder, L. 2006. *Reforming Philosophy*. Chicago: Chicago University Press.
- Topham, J. 1998. "Beyond the Common Context: The Production and Reading of the Bridgewater Treatises". *Isis* 89: 233-62.
- Topham, J. 2010. "Biology in the Service of Natural Theology: Paley, Darwin, and the *Bridgewater Treatises*", in D. Alexander and R. Numbers (eds.), *Biology and Ideology from Descartes to Dawkins*. Chicago: Chicago University Press, 88-113.
- Turner, F. 1993. *Contesting Cultural Authority*. Cambridge: Cambridge University Press.
- Yeo, R. 1979. "William Whewell, Natural Theology and the Philosophy of Science in Mid-nineteenth-century Britain." *Annals of Science* 36: 493-512.