

Publishing and the Classics:

Paley's *Natural Theology* and other nineteenth-century works of science

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ABSTRACT:

This article seeks a new way to conceptualise the 'classic' work in the history of science, and suggests that the use of publishing history might help avoid the antagonism which surrounded the literary canon wars. It concentrates on the widely acknowledged concept that the key to the classic work is the fact of its being read over a prolonged period of time. Continued reading implies that a work is able to remain relevant to later generations of readers, and, although some of this depends upon the openness of the original text, much more depends on the actions of subsequent publishers and editors in repackaging the work for later audiences.

This is illustrated through an examination of the long publishing history of William Paley's *Natural Theology* (1802). Over the course of the century, *Natural Theology* was read as a work of gentlemanly natural theology, as a work which could be used in a formal or informal education in science, and as a work of Christian apologetic. These transformations occurred because of the actions of the later publishers and editors who had to make the work suit the current interests of the literary marketplace. Comparisons are made to *Constitution of Man*, *Vestiges of the Natural History of Creation* and *Origin of Species*.

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Classic works of science formed the basis of the early library collections in history of science, and are read as integral parts of many undergraduate courses today. Yet the historiography of the sciences has changed since Bern Dibner wrote of 'epochal books' which were 'representative of the most important contributions to the physical and biological sciences'.¹ His listing of two hundred works by Galileo, Kepler, Newton, Darwin and their peers was one which implied a narrative of progress within the sciences, with the important works being those which first articulated a significant truth about the universe.² With the changes in the historiography of the sciences in recent decades, it is time to think again about the classic work. The first important step is to recognise that there are two separate, though related, questions at issue here. The first is the reflexive question about which works we (in the present) regard as classics. The second is an historical question about which works have been regarded as classics in the past. I would suggest that in the early days of the history of science, it was the first question which was regarded as most important, while we are now beginning to think about the second question as well. Furthermore, the answers to the second question may start to feed back into our assessment of our own classics.

The traditional classics of the history of science can be found in library collections, on undergraduate reading lists, and excerpted in anthologies of primary sources. They have in common a claim to make a contribution to our modern understanding of the natural world. Few of them would now be accepted as correct in every detail, but

typically, each articulates for the first time a specific point which is regarded as fundamental to modern science. Such works are crucial to the history of our current understanding of nature, but it is difficult to accept them as telling us about the ways nature has been understood in the past. To deal with this problem, we have already begun to see other works being admitted gradually into the canon of history of science. Works such as George Combe's *Constitution of Man* (1828) or the anonymous *Vestiges of the Natural History of Creation* (1844) have gained classic status for their impact on natural knowledge in their own time, rather than their contribution to our science.

This difference highlights the need to rethink our definitions of the 'classic'. Literary theories of the classic have been transformed since the early twentieth century, and emphasis is now placed on the manner in which a work continues to be relevant to later generations of readers (which may include ourselves). This is best judged after the fact, and need not entail a judgment of literary or scientific merit. I will argue in this paper that publishers and editors are crucial in maintaining this relevance, and therefore that publishing history is essential to understanding the classics. I will focus on William Paley's *Natural Theology* (1802), with comparisons to *Constitution of Man* and *Vestiges of the Natural History of Creation*, as well as to Charles Darwin's *On the Origin of Species* (1859).³ I will show how the work of editors and publishers kept *Natural Theology* relevant to readers throughout the nineteenth century, and thus built its reputation as a classic. Similar mechanisms acted upon the other three works.

If, however, my argument about publishers is convincing, we may have to consider whether it does more than just explain why works such as *Natural Theology* may fairly be regarded as classics. If we take publishing history seriously as a means of

identifying works which are important to historians of science, we have to decide what to do about works like Ebenezer Brewer's *Guide to the Scientific Knowledge of Things Familiar* (c.1841), which sold at least as many copies, and for as long, as the four works discussed in this article.⁴ Recent work has shown that works of popular science are as worthy of our attention as the better known 'great works', and Brewer's was surely one of the classics in that genre.⁵ Publishing history could therefore be used to identify a new canon of historical classics, to stand alongside the traditional classics.

Theories of the classic

At its simplest, the classic is a work 'which continues to be read several generations after it was written'.⁶ Older theories of the classic, including that formulated by T.S. Eliot, took a very limited view in which only the ancient writers (or, in Eliot's case, one ancient writer, Virgil) could be considered classics.⁷ Such works continued to speak to later generations because there was something timeless and unchanging about them. Their themes were thought to have universal relevance, in a way that a work written in a provincial vernacular language could not. Underlying this was what Frank Kermode has called an imperial view of history, in which history was seen as a unity: we are not significantly different from the past; surface appearances have changed, but an unchanging truth lies under the surface.⁸ Thus, an ancient classic can continue to resonate with later generations, as later readers are not living in a fundamentally different world.

This view of the classic maps onto a Whig history of science, for if we assume that science has been attempting to uncover a single true reality underlying nature, then those works which, in the past, managed to articulate a portion of that reality will still

make sense today. This is the sense in which Dibner's 'epochal' books are classic: their writers were able to express a truth which we recognise today as fitting with our understanding of the universe. However, this view does not allow us to consider as classic any work which does not contain at least a grain of 'our' truth, no matter how influential it may have been in the past. It makes no allowance for works that historical actors might have considered as classics.

By the 1970s, scholars had accepted that there could be modern classics, and showed rather more scepticism about the underlying unity of history. Kermode argued that a classic is not an unchanging work, but rather, one with great potential for change. It is a work which can be read in many different ways, so that different readers and different generations of readers can all find relevance in it. Kermode claimed that 'the only works we value enough to call classic are those which, and they demonstrate by surviving, are complex and indeterminate enough to allow us our necessary pluralities'.⁹ The creativity of readers and their ability to find different meanings in the same work is what allows a classic to remain relevant long after its first publication.

Although works of science are usually considered to be more closed to interpretation than literary classics, they are not completely so, as recent research on the literary aspects of science has revealed.¹⁰ The complexity of their language may sustain different interpretations, as was the case with readings of *Origin* which supported either teleological or materialistic evolution.¹¹ Similarly, changing contexts can make a work suddenly relevant again, as the publication of *Origin* revitalised interest in earlier evolutionary works, including *Vestiges*, and yet, at the same time caused them to be read in a different light, as precursors.¹² Thus, works of science, as well as

literary works, can continue to speak to new readers long after their original publication.

In the late 1980s and early 1990s, theories of the classic became over-shadowed by the ‘canon wars’. It was not just that literary scholars could not agree which particular features made certain works into classics, but they could not agree which works to focus on.¹³ Should the traditional canon of literary classics, centred around figures such as Shakespeare and Dante, be opened up to include more women, more radicals, more non-Europeans? Supporters of the canon accused their opponents of trying to be too politically correct, and of forgetting to read texts for aesthetic pleasure in their enthusiasm to read them as social documents.¹⁴ Defending the canon, Harold Bloom argued that there was an objective standard, namely aesthetics, by which potential classics should be judged.¹⁵ This use of an allegedly objective standard is akin to the implicit use of truth-value to judge the classics in the history of science. As in literary studies, the history of science has recently seen more scholarly attention focused on recovering the forgotten voices of women and non-Europeans, among others, but we have not (at least yet) suffered the same level of antagonism between canonists and anti-canonists. I agree with Jon Topham that an excessive focus on the traditional canon of great works distorts our understanding of the sciences in history, and what I intend to do here is provide a justification for an increased focus on different works.¹⁶

I wish to make the question of the identification of the classics an historical, rather than aesthetic or political, question. Let’s return to Kermode’s definition of a classic as a work which is repeatedly re-read, and, looking at the historical record, ask: which works *have* been read, and read, and read again over the generations? It might be

comforting to imagine these will be works which are aesthetically superior, or which contain grains of truth about the world, but the desire does not seem to be born out by investigation. We have already recognised this by admitting the importance of works such as *Constitution* and *Vestiges*. Why, then, are some works read and re-read, and others are not? This is where publishing history can help. Reprinting is the main way in which works survive in the literary marketplace, and thus have the opportunity to be read again, by different readers, in different cultural contexts.¹⁷ While the fact that a work was repeatedly reprinted over a long period of time is no guarantee that it was still being read, it does show that the work was still being purchased. Without the availability of all those reprinted copies, far fewer people would have had the chance to read the work. Furthermore, if they had had access only to a first edition, it might seem irrelevant and out-of-date in a way that a revised reprint would not.

The decision to reprint a work is usually taken by the publisher, which leads to a ‘chicken and egg’ situation in which the canny publisher reprints only those works which the market will buy, but the market can buy only those works which are reprinted. Perhaps not all publishers’ decisions will be sound ones (i.e. not every reprinting will represent a desire to read a work), but in the long run they must be generally accurate or face financial ruin. Richard Altick pointed out the way in which publishers’ decisions create the classics as early as 1958, and Barbara Benedict has made a similar point more recently, with regard to the selections which appear in anthologies and which, from the late eighteenth century, help to define the canon.¹⁸ Despite this, book history did not play as great role in the literary canon wars as it perhaps should have done. Studying the long publishing history of works could certainly tell us a great deal about why certain works remained in the literary

marketplace for so long.¹⁹ It can thus justify the inclusion of works such as *Constitution* in the history of science canon. Furthermore, publishing history could also be used to seek out plausible additions to the canon. There would be no guarantee that it would discover a significant number of classics by women or ethnic minorities, but it would certainly give us a better indication of the works which had the most historical impact, regardless of our valuation of their truth content as works of modern science.

Publishing history can also help us to understand how works which ought to have become increasingly dated were actually able to remain relevant and appealing to later generations of readers. For instance, one way in which *Vestiges* was able to stay current for its first few decades was because of the series of revisions made by the writer, in dialogue with criticisms. A work may also change in its physical format, perhaps with the addition of illustrations (as in the 10th and 11th editions of *Vestiges*), or by being printed in a different (often cheaper) format. *Constitution* had created only mild interest in its first edition, but in its People's Edition, it became a work that more and more people wanted to read. Although one group of readers may have grown bored with a work, a cheaper edition could reach a different group, which might, as in the case of *Constitution*, rekindle interest among the first group of readers. Literary historians sometimes talk of a work with a single identity surviving through time, by appearing to change.²⁰ Yet, in fact, books *do* change. As historians, we are usually dealing with works which have been reprinted, perhaps with textual or physical changes. Thus, it is not just that the work appears to change, due to different readers' interpretations, but it may really change, while yet retaining its identity.

Outlines of the publishing histories of our four nineteenth-century classics are shown

in Figure 1. Part of the definition of a classic is that it should continue to be read over several generations, and we can see that all four works meet this criterion. *Natural Theology*'s final reprinting as a complete book (academic reprints excepted) was in 1902. *Origin* would presumably be the only one of the four with substantial non-academic sales in the twentieth century, although I do not have reliable figures for this period.²¹ Historians of science are already familiar with the use of publishing history to identify 'best-sellers', and have noted the success of *Origin* in selling out its first edition as soon as it was offered to the trade, and of *Vestiges* in selling so many more copies than *Origin*.²² The Figure clearly indicates that *Constitution* was the actually the best-selling work of the four, but it should always be remembered that scientific best-sellers rarely if ever matched the sales of their fictional counterparts. Harriet Beecher Stowe's *Uncle Tom's Cabin* (1852) is often cited as the first modern best-seller; it sold one and a half million copies within a year of being published in Britain.²³ However, selling lots of copies in a short period indicates a different sort of success from the continued sale over a long period of time which marks out the classic. One does not necessarily lead to the other, although it did in the case of *Constitution*.²⁴

Natural Theology offers us the longest publishing history for analysis, and encompassed the whole transformation of the industrialising nineteenth-century book trade. It also makes a particularly good example for studying the influence of editors and publishers in keeping a work relevant to new readers, because it was directly controlled by its author for only a very short time. The other three works were all revised repeatedly by their authors, and, due to changes in copyright legislation, were under authorial control for much longer.²⁵ The influence of *Natural Theology* on the

nineteenth century has long been acknowledged, although rarely defined explicitly, beyond its effects on the thought of Charles Darwin.²⁶ Its reputation is certainly merited: it remained in print for a hundred years, and went through at least 57 editions in Britain alone. In the absence of the publishers' records, it is impossible to put definite figures on the number of copies in existence, but conservative estimates would suggest over 60,000 copies, half of which were within the first twenty years. *Natural Theology's* publishing history will be the subject of the rest of this article, with particular emphasis on the ways in which it remained of current interest for so long. Over the course of the century, *Natural Theology* was transformed from a work of gentlemanly natural theology, to a work which could be used in a formal or informal education in science, to a work of Christian apologetic. It was so often republished because it could represent a work about the sciences for a non-technical readership, and a demonstration that science and religion did not have to be in conflict. Both of these were useful roles to have during the nineteenth century.

Gentlemanly natural theology

Natural Theology, or, evidences of the existence and attributes of the deity collected from the appearances of nature was published by Robert Faulder of New Bond Street, London, in 1802.²⁷ Faulder published a mixture of religious and political works, and some travel books.²⁸ His latest publication was written by the Reverend William Paley (1743-1805), a clergyman from the north of England, and prebend of St Paul's. Paley had previously published three other books, as well as sermons and pamphlets, with Faulder, and the books had gained him a reputation as a sound theological writer, and preferment in the Church of England. The new work was derived from sermons Paley had delivered in the 1780s or 1790s, and was intended to complete a trilogy of

works on ‘the evidences of Natural Religion, the evidences of Revealed Religion, and an account of the duties that result from both’.²⁹

Very few nineteenth-century books broke-even, let alone went into second or subsequent editions. Publishers typically printed small editions, often only 500 or 750 copies, and sold them at high prices, around 10s. a volume, as this was thought to be the easiest way of getting a return on their investment.³⁰ Lower prices would have needed much higher sales to break-even, and it was not until the middle of the century that publishers gradually became confident of reaching sufficiently large audiences. However, *Natural Theology* went through ten editions in its first four years, and remained in print for the entire period of its copyright protection.³¹ Given Paley’s reputation and the sales of his previous books, this ought not to have been a surprise for Faulder. By the 12th edition in 1809, he was printing runs of 2000 copies, and had presumably been doing so for several years.³² Faulder had presumably bought the copyright from Paley for a fixed sum, as was standard practice.³³ This meant that the writer had no further pecuniary interest in his work, and the publisher was free to wring as much profit from it as he could.

The success of *Natural Theology* notwithstanding, Faulder’s business was not in a comfortable condition. Robert Faulder passed the business (he probably died) to J. Faulder around 1809.³⁴ J. Faulder managed to keep it going for only four years before the business was acquired by John Rodwell, by 1813.³⁵ By this time, the firm was no longer in sole control of *Natural Theology*. In an effort to raise capital, in early 1810, J. Faulder had sold shares in all Paley’s works, including *Natural Theology*. Faulder retained half the rights to the works, but sold one quarter to Longmans, with the other quarter divided between four other publishers.³⁶ Selling shares was a well-established

way of spreading the risk of a publication between more parties, and even though it was becoming rare for new publications in the nineteenth century, it continued to be used on existing publications which were selling well.³⁷ In Faulder's case, he was selling shares in future printings of Paley's works, part of his existing stock of Paley's works, and retrospective shares in his recently-printed editions of *Natural Theology* and *Horae Paulinae* (1790). Longmans paid £1,058 for their quarter share, their contribution to the recent printing costs, and their share of the existing stocks (800 volumes), making it clear just how worthwhile it was to sell shares.³⁸ Faulder had sold another quarter of his shares in Paley by 1811, but it was not enough to salvage his business.³⁹ By 1815, all the shares in Paley had been sold.⁴⁰

Publishers would only buy into someone else's publication if they were fairly certain that it would be a good investment. Even though *Natural Theology* was due to come out of copyright protection in 1816, there was still time, in 1810, to produce a couple more editions, and between 1809 and 1815, *Natural Theology* easily sold a thousand copies a year. The editions produced by Faulder and the share-holders (i.e. up to 1815) were all octavo, just short of 600 pages, used good quality paper and a large typeface. Faulder was selling them for 9s. in 1805, but the share-holders increased the price to 10s.6d.⁴¹ Half a guinea was the standard price for that size of volume, and it explains why these early editions are referred to as 'gentlemanly'.⁴² At that price, only the wealthy could afford to be regular book-buyers. Everyone else had to use a library, borrow from a friend, or keep an eye open for second-hand copies.⁴³ Even by mid-century, when publishers had begun to discover the mass market, it was still usual practice to publish a new work in a relatively expensive format first – to recoup as much of the fixed costs as quickly as possible – before issuing cheaper editions.

Thus, *Vestiges* first came out in octavo, priced at 7s.6d., while *Origin* first appeared in octavo at 15s. Though the retail price of *Natural Theology* was 10s.6d., the publisher would only receive about two-thirds of that, due to trade discounts. Thus, a print run of 2,000 copies brought in around £1,167.⁴⁴ Given that it cost about £325 to produce, it should be clear why a firm as established as Longmans was willing to invest in the few remaining editions.

Once *Natural Theology* came out of copyright, in 1816, it was no longer the exclusive property of the share-holders, and could be published by anyone who wished. Some of the publishers who took this opportunity produced relatively expensive editions, as did the group of share-holders, who brought out another five editions (until 1846) despite the end of their monopoly.⁴⁵ Other publishers began to make *Natural Theology* available at cheaper prices, as we shall see in the next section. However, one of the unusual features of *Natural Theology* in its first two decades was the absence of revised editions. The first fifteen editions were all essentially the same, apart from typographical errors.⁴⁶ In contrast, *Constitution* went through eight revised editions in its author's lifetime, while *Vestiges* was heavily revised over the course of its first six editions, as the anonymous author responded to criticisms about his scientific knowledge and credentials.⁴⁷ Darwin revised the six editions of *Origin* which appeared during his lifetime, adding more examples, more religious phrases, and reassessing his stance on other mechanisms for evolution.⁴⁸ Revisions gave the author the chance to correct errors, to respond to critics, and to add in recent discoveries which touched on his argument. In some cases, illustrations might also be introduced to clarify sections of the argument. Making changes of this sort also had the added advantage that the revisions were protected by copyright, so it was

effectively possible to extend copyright protection. None of this happened to *Natural Theology* because Paley was already ill when it was published, and died in 1805.

Thus, by the 1820s, *Natural Theology* had become a well-established fixture in the book trade, but it could no longer be marketed as a new, original work. It was out of copyright and out of date. In 1826, an Oxford general practitioner, James Paxton (1786-1860) produced the first revised edition. As well as an introduction, Paxton added thirty-seven plates of illustrations, mostly of human anatomy.⁴⁹ Many of Paley's examples of contrivance and mechanism had been anatomical, and although Paley had claimed that he intended to use only those 'striking... and best understood' examples which were 'capable of explanation without plates, or figures, or technical language', Paxton felt that it was nevertheless easier to understand 'visible representations'.⁵⁰ Although illustrations could have been added just for decoration, Paxton's preface and the style of illustration he selected suggests that he felt it was important that readers actually understood the anatomy behind the examples, rather than simply accepting them as proof of contrivance and design. This is not surprising coming from a medical doctor, but it also reflects the way in which Paley's work was being used in the University of Oxford, particularly by the Regius Professor of Physic, John Kidd (1775-1851).

According to Kidd, in 1824, 'the natural theology of Dr. Paley is... generally recommended and read in this university'.⁵¹ It also formed the basis for the re-arrangement of natural objects in the Ashmolean Museum, introduced by John Duncan (1769-1844) on his appointment as Keeper of the museum in 1823.⁵² Kidd and Duncan used natural theology to justify the study of the sciences, particularly medicine and anatomy, by presenting them as handmaidens to religion. In such a

guise, they would appear less of a threat to the dominance of the classical subjects at Oxford.⁵³ *Natural Theology*, with the respectability of the Reverend Dr. Paley's name, was to come to the rescue of science teaching in Oxford. To do this, it had to have scientific as well as theological credentials, and Paxton's illustrations (and Duncan's exhibits) helped to achieve this. *Natural Theology* became something from which readers could learn anatomy, and there could be no fears that such students' learning would be tainted with the French materialism which, it was feared, was becoming prevalent in the London medical schools.⁵⁴

In his first edition, Paxton had been defensive of his decision to attempt to 'render the work more intelligible to the general reader', but by the third edition he had become more confident that his illustrations were indeed a benefit.⁵⁵ He now wrote that it was, in fact, 'a matter of surprise, that so popular an author had not before received the aid of plates'.⁵⁶ Paxton now stated confidently that, 'To comprehend the subject thoroughly [in Paley's original...] required a somewhat deeper acquaintance with the several sciences of anatomy, entomology, and botany, than most persons can be supposed to possess.'⁵⁷ In its new form, *Natural Theology* provided that basic introductory knowledge that some readers needed, and it thus became more accessible to the non-expert reader. However, the inclusion of the metal-engraved plates of illustrations had turned *Natural Theology* into a two-volume work, and increased the price to 24s. Readers may have been less expert, but they were still wealthy. Despite this, by its third edition Paxton's illustrated version of *Natural Theology* had clearly moved beyond the specific context of Oxford, as the involvement of London publishers Whittaker & Co. and Simpkin, Marshall & Co. indicates.⁵⁸ It also proved incredibly successful in America, being reprinted, with further revisions by John

Ware, MD (1795-1864), in Boston almost every year from 1829 until 1872.⁵⁹ Although the Oxford example suggests that *Natural Theology* may have been used within the formal education system, this was probably unusual.⁶⁰ It was more likely to be used in the same way as the Bridgewater Treatises – usually in self-improvement for the semi-educated reader, but also in some contexts where specially-written textbooks were unavailable.⁶¹

Illustrations can undoubtedly help the educational potential of a work, but there was also the issue of the text itself, which Paxton had left unchanged. By the 1830s, this was becoming a problem, and another revised edition appeared. It was not just that Henry Brougham (1778-1868) and Charles Bell (1774-1842) found Paley's language 'somewhat quaint'.⁶² By this point his information was out-of-date. Even Paley's famous opening paragraph could be undermined by the new discoveries in geology, which challenged the assumption that a stone 'for anything I knew to the contrary...., had lain there for ever'.⁶³ This new edition contained so many editorial notes and supplementary treatises, as well as woodcut illustrations, that it was twice the length of the original, appearing in two duodecimo volumes, priced at 21s.⁶⁴

Although Brougham and Bell, as well as their publisher Charles Knight, were actively involved with the Society for the Diffusion of Useful Knowledge (1826-46), that society had refused to publish *Natural Theology* for fear of controversy among its members, who had agreed to avoid issues of politics and religion.⁶⁵ For Brougham and Bell, the religious and political implications of *Natural Theology* were crucial to their decision to revise the work. Just as Kidd in Oxford used the work to show that anatomy need not be tainted with a French materialist brush, so Brougham and Bell brought it up to date in all its subject matters to show that modern science was not

infidel. As an anatomist, Bell was familiar with the ways in which new discoveries in the sciences were being used by political radicals. For instance, he explicitly insisted that geological discoveries ‘give us no room to conjecture that there has been anything like a progressive improvement in the species of animals. They have been created with all the characters in which they are now propagated.’⁶⁶ Bell used the notes to his edition of *Natural Theology*, as he had his Bridgewater Treatise, to show that radical, progressive politics were not the inevitable consequences of new scientific discoveries.⁶⁷ In both the Paxton and the Brougham and Bell editions, *Natural Theology* was being portrayed as a work of science which happened to have sound political and religious credentials. It was, as Jon Topham has said of the Bridgewater Treatises, a source of ‘safe science’.⁶⁸

The classic reprint

In the early 1810s, the share-holders had been willing to buy into *Natural Theology* because it was still selling well, and looked likely to continue to do so. Once it came out of copyright, other publishers noted this success in the gentlemanly market, and decided that there was every chance it would be repeated in the middle-class market. These publishers were often based in Glasgow or Edinburgh, or were smaller publishers in London who had not been involved with the copyright editions. Between 1816 and 1822, these publishers issued twelve editions, while the share-holders brought out just one more edition. With no copyright fees, and by using less paper, the new publishers of *Natural Theology* could produce it for around five or six shillings. This made it possible to take *Natural Theology* to a new audience, whose members could not afford the cost of gentlemanly editions, and who might live at such a distance from London that book-buying was difficult. Cheaper editions would

make a big difference to audiences. Richard Altick suggests that, even by mid-century, only 27,000 families were likely to be able to afford to buy books on a regular basis, while another 83,000 families could have afforded periodicals regularly, and books occasionally.⁶⁹ Thus, if book prices could be brought down, the market for books might at least quadruple in size.

Provincial publishers had the clear advantage over London publishers of being nearer to their customers, thus reducing transport costs. But the main way in which price was reduced was by cutting production costs. Since Robert Faulder's records do not survive, we do not know what he paid Paley for *Natural Theology*. It would be unlikely to have been less than £100, and, given Paley's reputation as an author, might have been several times that. *Natural Theology* sold so well during its copyright period that Faulder would have had no trouble recouping that fee. But for publishers aiming to sell books more cheaply, a copyright fee of several hundred pounds could more than double production costs. Thus, many provincial publishers made their entry into business issuing reprints of other publishers' out-of-copyright works. The other significant cost of book production was paper, as prices were kept high, even after mechanisation, by taxation and the relative scarcity of raw materials.⁷⁰ Using smaller pages (duodecimo format, rather than octavo) and fewer pages (by using smaller print and smaller margins) enabled publishers to reduce the amount they spent on paper. At least half of the editions published between 1816-22 were in the duodecimo format and/or had fewer than 400 pages, compared with the 580 octavo pages of the original *Natural Theology*.

The significance of the cost of paper can be seen in a comparison between the production costs of a copyright, gentlemanly edition of *Natural Theology*, and the

production costs of the 7s. edition that the share-holders produced in 1830.⁷¹ The competition from other publishers had forced the share-holders to produce cheaper editions, and by 1838, their edition sold at 5s., typical of the mid-priced reprints.⁷² In 1815, the share-holders produced 2000 copies of *Natural Theology* for £325. Of this, £93.12s. was for printing, and £224 for paper.⁷³ In 1830, the share-holders spent £87.10s. producing 750 copies. Of this, printing was £32.10s., and paper was £46.11s.⁷⁴ Thus, the cost of printing remained almost constant, at 11d. per copy in 1815, and 10 ½ d. in 1830. But the cost of paper was reduced by 40%, from 2s.3d. per copy in 1815 to 1s.3d. in 1830. That reduction was due to the decreased use of paper in the later edition. Most of the remaining price decrease was due to the impact of competition on profit margins.

In the 1770s, reprint publishers had done much to create the concept of the ‘classics’ in poetry, by packaging newly out-of-copyright works in series labelled ‘classic’, and excerpting them into anthologies.⁷⁵ This announced to readers that they ought to have read these works, and, along with the lower prices, helped to ensure that many people *did* read them. Thus, there was a sense in which those works became regarded as classics by a reading public because the publishers decided they were classics. Poetry was the first genre to be treated in this way, followed by the dramatists, and by the 1820s, it was happening to non-fiction as well. *Natural Theology* was among those non-fiction works labelled ‘classic’. John Fowler Dove, a London publisher, included it in his ‘English Classics’ series in the mid-twenties, where it was available both in an 8s. octavo format and in a 4s.6d. duodecimo format. Dove’s definition of ‘classic’ also included Paley’s *Evidences of Christianity*, works by John Bunyan, Edmund Burke, Fanny Burney, Robert Burns, Philip Doddridge, John Locke, Hannah More

and Izaak Walton.⁷⁶ There was a slight predilection for philosophical or religious works, but the main thing these writers had in common was that their works were out-of-copyright and thus available for printing in a cheap series. They were also well-known writers, either stalwarts of the reprint trade, such as Bunyan, or alive recently enough to be still selling well, such as Burns and Paley. Thus, Dove's classics were those works which were available for reprinting, and which, in Dove's judgement, were likely to sell well. His series of 'English Classics', including *Natural Theology*, was reissued by his successors Scott, Webster & Geary in the 1830s. In the 1840s, William Milner of Halifax also issued *Natural Theology* in his 'English Classics' series, by which time its status as a continuing seller for four decades surely merited its inclusion in the series.⁷⁷

Popular science or Christian apologetic?

Once print was made available at prices the middle classes could afford, the working classes were the next obvious target for publishers. This began to happen from the late 1830s, and especially from the 1840s, and was largely dependent on changes in the use of printing technologies. In the mid-1830s, W.&R. Chambers of Edinburgh used their steam printing machines to print People's Editions. *Constitution of Man* was one of the first, in 1835. It cost only 1s.6d., and sold an incredible 40,000 copies within two years. It was this edition which was responsible for the steep growth visible in Figure 1. Chambers had been encouraged by the high sales of subsidised copies of *Constitution*, and realised that they could produce it at similar prices without a subsidy if they applied the industrial mass technologies of periodical printing to book printing.⁷⁸ They went on to publish People's Editions of other works, including *Natural Theology* (1837, 1s.6d.). By the late 1840s, the steam-printing of books had

become almost routine, bringing with it larger print runs and lower prices. It became usual for publishers to bring out a cheap edition of a work only a few years after the original publication, in an effort to make as much profit out of the copyright as possible, by reaching as many customers as possible.

These changes, along with the increased period of copyright protection after 1842, meant that *Natural Theology* now belonged to an earlier era, and few later books followed the trajectory of its early publishing history. While Faulder held the copyright, it had not occurred to him to do anything other than publish standard-priced editions in small runs. By the 1820s, mid-priced reprints were becoming more common, and *Natural Theology* now appeared in that form, but from other publishers. By the 1830s and 1840s, it was also available in People's Editions. In contrast, the various versions of *Vestiges*, including the original edition, the 2s.6d. People's Edition (1847) and the revised editions, were all published by John Churchill. It did not become available for other publishers to reprint until 1886, and even then, it was only the texts of the first two editions which were out of copyright. It was the text of the second edition which appeared for one shilling in Routledge's Universal Library in 1887.⁷⁹ *Origin* followed the same pattern as *Vestiges*, although its People's Edition (6th edition) did not appear until 1872.⁸⁰ But *Natural Theology* had been typical of its time in having so many different publishers involved at different stages of its publishing history.

Compared with *Constitution of Man*, *Natural Theology* might seem a conservative choice for the liberal, reform-minded Chambers brothers, but it served their purpose well. They were convinced that the sciences were a crucial part of working-class education, and thus tried to publish books on the sciences which were very cheap, and

easy to understand. The need for cheapness initially mitigated against commissioning works specially for such a purpose.⁸¹ As the provincial publishers of the 1820s had shown, reprinting out-of-copyright books was the easiest way to publish cheap books. Chambers used even smaller type, needing double-columns, and the might of the steam press to bring the price down even further. The advantage of *Natural Theology* for this plan was its general non-technical manner of discussing a range of subjects from anatomy to astronomy. As the Chambers's editor, Thomas Smibert (1810-54), wrote in his preface, it would not 'be easy to point out any other work, professing to handle scientific subjects in a popular manner that has at once been so satisfactory to the mere man of science, and intelligible to the common reader'.⁸² Although Smibert did not quite use the phrase 'popular science', this is what *Natural Theology* became in the Chambers's edition.⁸³ Due to the growing complexity of the sciences, the works of men of science were increasingly difficult for lay-people to understand. W.&R. Chambers were in the vanguard of publishers who tried to make the sciences more widely accessible by creating the genre we know as 'popular science'. Their *Chambers's Edinburgh Journal*, as well as Robert Chambers's own best-selling *Vestiges*, are indicative of the brothers' interests in this area.

The Chambers edition of *Natural Theology* included a brief memoir of the author which, along with the explicit acknowledgement that the work had 'stood the test of time', made it clear that the work was not new.⁸⁴ The Chamberses did not want to teach 'quaint' science any more than Brougham and Bell had done, so they too had to revise the work. Smibert had trained as a surgeon, but became a journalist, doing freelance work for Chambers before becoming their full-time literary assistant in 1840-42.⁸⁵ He was a far less critical editor than Brougham and Bell, as his task was

to update the work enough for it to pass as a general introduction to contemporary science, whereas Brougham and Bell were writing for elites, and had a more explicit political agenda. Smibert included a spirited defence of the argument from design at the end of Paley's second chapter, but most of his notes and additions to the text were extra examples, or news of things discovered 'since our author's time'.⁸⁶ He did point out some controversial issues, such as the question of extinction, but such references were much shorter and less polemical than in Brougham and Bell's edition. If Smibert had made the sort of revisions they had made, the work would have become too technical for its intended readers, and, since it would have been twice the length, would also have been too expensive for them.

Chambers had been more concerned with publishing *Natural Theology* as popular science, than as 'safe science'. But once *Natural Theology* appeared as a work of popular science, conservative publishers recognised that they could use it as safe, popular science. The cheap educational literature pioneered by Chambers and the SDUK became a significant commercial phenomenon in the 1840s, but many commentators were concerned about the amount of speculative, erroneous, immoral and/or corrupting works which were being published alongside the more wholesome educational works.⁸⁷ Or, as the evangelical minister, Thomas Pearson put it, 'the misfortune is, that so large a proportion of these sentiments and interests, thus spread abroad [by the press], are adverse to that interest which is the most noble and precious of all'.⁸⁸ For publishers concerned about the moral effect of these corrupting works, one possible response was retaliation in kind: the publication of equally cheap works on similar subjects, but with sound religious and political sentiments. The sudden burst of reprints of *Natural Theology*, as well as new works of Christian popular

science in the period 1844-46 can thus be seen as part of the reaction to the threat of *Vestiges*.⁸⁹

Brougham and Bell's edition was reissued several times post-*Vestiges*, once as a shilling a time part-issue by Charles Knight, who wanted to produce works with more Christian tone than the recently-defunct SDUK had published.⁹⁰ Chambers also reissued their cheap edition of *Natural Theology*, although presumably more by way of benefiting from the enthusiasm for such works, than an attempt to show the errors of *Vestiges*. The other publishers who released editions of *Natural Theology* in the mid-1840s were Rivingtons, Longmans, and Milner, all of whom could be described as fairly traditional, conservative publishers. Longmans were known for their educational publishing, Rivingtons for their religious (mostly High Church) publishing, and Milner for his cheap editions of standard, often theological, works. All three of these publishers had to reprint the first edition, as all the revised editions were still protected by copyright.

Since *Natural Theology* could play the role of both 'popular science' and 'safe science', publishers continued to re-issue it until the late nineteenth century, whenever there was a need to oppose secular or infidel works of popular science. The reaction to *Vestiges* was the most pronounced, but *Natural Theology* was also re-issued after the publication of *Origin of Species* (1859) and of the People's Edition of *Origin* (1872). The publication of *Origin* produced a spate of evolutionary works, as well as rekindling interest in works such as *Natural Theology* and, especially, *Vestiges*. One of the consequences of this was that both older books came to be read in the light of *Origin*.⁹¹ *Vestiges* could now be read as an evolutionary precursor, while *Natural Theology* could be read either in opposition to natural selection, or, if revised, as

supporting teleological evolution.

By the 1860s and 1870s, it would have been difficult to seriously offer *Natural Theology* as a work of popular science. There was now a well-established genre of popular science publishing, containing works specially written for the purpose. It was no longer necessary to have recourse to an existing older work. And *Natural Theology* would have been showing its age, not just in the details of its science, but in its style of writing, its terminology and its very explicit reconciling of the sciences and faith. The editions of the 1860s and 1870s were reprints of the revised editions of the 1830s, but even these were getting old, while the mere fact that they were identifiably revisions (footnotes, editorial comments) accentuated the age, and inaccuracies, of the original text which was still visible beneath the alterations.

Despite this, *Natural Theology* remained in print until the early twentieth century. By this time, it had become an undeniable classic, and publishers presented it as such. Its age gave it a certain authority, and allowed it to be used as an exemplar of the harmony between science and faith. It was still an accessible work on the sciences, but, in contrast to the 1840s, this was no longer its main role. The harmony between science and faith which had been so obvious in Paley's day was coming under threat. This was particularly obvious during the mid-1870s, when prominent works such as John Tyndall's 'Belfast Address' (1874), John Draper's *History of the Conflict between Religion and Science* (1875) and Andrew White's *The Warfare of Science with Theology in Christendom* (1876) all presented an image of conflict between science and religion.⁹² Two of the three editions of *Natural Theology* published in the 1870s were produced by publishers who wished to persuade the reading public that the apparent conflict was illusory. Ward, Lock & Co. published it in their 'Christian

Knowledge' Series of standard theological works, while the Christian Evidence Committee of the Society for Promoting Christian Knowledge brought out the first newly revised edition since 1837.⁹³

The SPCK was an Anglican, predominantly High Church, organisation, and it had published *Natural Theology* once before, in 1837, the same year as Chambers's People's Edition. That edition had contained the text of the first edition and thirty-seven large, attractive wood-engravings. Unlike the anatomical plates in Paxton's edition, or the woodcut diagrams in Brougham and Bell's edition, these illustrations were purely decorative. They were retained for the new 1875 edition, but were joined by eighteen diagrams. However, far more dramatic changes were made to the text. Where previous revised editions had taken care to distinguish between the author's words and the editor's revisions, the 1875 editor acted completely invisibly, and rewrote Paley's work almost entirely. The effect was the removal of all traces of the age of the work, except, of course, for the title page, which still announced 'Paley's *Natural Theology*'.

The editor of the 1875 edition was Frederick Le Gros Clark (1811-92), a surgeon and Fellow of the Royal Society. The involvement of an FRS in the revision of *Natural Theology* is, of course, indicative of the fact that not all expert men of science were as keen on secularisation as the members of the X-club. In his introduction, Clark explicitly stated that Darwin's theory of evolution by natural selection did not undermine the arguments originally set forward by Paley. It did not destroy the argument for design, but could only 'put back the stage at which the Designer's hand exerted its fashioning energy'.⁹⁴ Although a significant polemical point, this was not elaborated upon in the rest of the work, and could, in fact, have been accompanying a

reissue of the original edition. Most of the editor's efforts went into rewriting the text, seamlessly interweaving Paley's choice of subject-matter and examples with up-to-date terminology, revising his details where necessary, and conveying the impression of a modern work of popular science rather than a seventy-year old work of natural theology.

For instance, in Chapter 21, Paley had written about the manner in which a 'sprig of mint, corked up with a small portion of foul air, placed in the light, renders it again capable of supporting life or flame... The plant purifies, what the animal has poisoned; in return, the contaminated air is more than ordinarily nutritious to the plant.'⁹⁵ In 1875, Clark expressed this exchange as a chemical one, writing that 'Plants require that which is deleterious to animals: the former absorb carbonic acid, and, after decomposing it, yield oxygen for the use of the latter: other injurious gases are likewise resolved into their elements in various ways, to be again rendered available for new combinations.'⁹⁶ Both writers point to the gas exchange between plants and animals as an illustration of divine planning, but Clark explains it in the modern terminology of carbonic acid and oxygen, elements, and decomposition. These terms make it obvious that the words are not Paley's, but, in contrast to earlier revised editions, this is not flagged in the work itself. In 1875, *Natural Theology* was again presented in the guise of up-to-date science, in an effort to show that that science did not undermine religious faith. The difference was, that the publishers taking that stance were now explicitly Christian organisations, rather than mainstream publishers. These publishers had to play off the authority of Paley's classic status, with the need to update his work to make it appear relevant to modern debates. *Origin* has recently undergone a comparable rewriting, in Steve Jones's *Almost Like a*

Whale (1999), where Jones, like Clark, follows the arguments and examples of his original, while modernising the language, and addressing issues raised by new science (in this case, genetics). Thus revised, *Origin*, like Clark's *Natural Theology* can be read as a contribution to modern debates, and not just as an interesting but dated historical work.

Clark's revisions could be seen as distorting Paley's original to make it fit the changed conditions of the 1870s. But, as Huxley himself pointed out, Paley 'saw no difficulty in admitting' that adaptation could result from a long train of events controlled by an intelligence, and thus had 'proleptically accepted the modern doctrine of Evolution'.⁹⁷ This was the reading of Paley which Clark's introduction emphasised. It was not, perhaps, the most obvious interpretation, but it was nevertheless there *in potentia*. The editor's role was to help readers to see the continuing relevance of Paley. In the transition from the 1802 edition to the 1875 edition, we can clearly see how a single work can change while retaining its identity, and by changing, remains able to continue to play a role in contemporary debates.

Conclusions

Natural Theology was already being regarded as a classic, at least by some publishers, in the 1820s. From the 1840s onwards, the use which was made of *Natural Theology* was predicated on its status as a work combining science and religion which had stood the test of time, and which therefore had authority. In turn, the continued reprintings and readings of the work helped to consolidate this authoritative and, indeed, classic status. However, in the 1830s and 1840s, the theological credentials were being used to make science non-threatening, while at the end of the century, the scientific contents were being used as apologetic for Christianity, in a world where science and

society were increasingly secularised. It was because *Natural Theology* could be used in these different ways that it remained topical, and could thus become consolidated as a classic. Without the changes made by generations of editors and publishers, it would have been unlikely to have remained in the public consciousness for such a substantial period of time.

Natural Theology changed from being an expensive gentlemanly edition, to mid-priced reprint, to cheap reprint, and all the while it was revised and repackaged to keep it relevant enough to appeal to the new audiences of readers. In these changes, it exemplifies the early nineteenth-century classic. *Constitution of Man* was the first of a new style of classic, which was part of the age of industrial mass publishing. The extension of copyright gave authors the exclusive right to revise their work for almost half a century, while the application of steam-printing to books made cheap editions a standard part of the publisher's operations. Thus, both *Vestiges* and *Origin* had publishing histories which were much more controlled by the authors and their nominated publishers. It was not until very late in their careers that they became out-of-copyright works that could be exploited by numerous publishers, in the way that *Natural Theology* had been from the 1820s. Nevertheless, *Constitution*, *Vestiges* and *Origin* were able to remain in print, and selling, for so long for the same basic reasons as *Natural Theology*. Revisions kept the works topical. The addition of illustrations made them accessible to different audiences. And the production of editions in different price brackets brought them to wider audiences than their first editions could possibly have reached. I would argue that it is this ability to keep selling to an audience, and to find new audiences, that makes a work into a classic. Thus, although the process is dependent on the initial creation by the author, it is the subsequent

exploitation by later editors and publishers which turns a work into a classic.

Captions

Figure 1. The publishing histories of four nineteenth-century classics, shown as cumulative numbers of copies sold.

Print run data for *Vestiges* and *Origin* are complete, and are taken from Secord (2000), 131; and Peckham (1959), 24. The figures for *Constitution* are taken from van Wyhe (2001), appendix C, but the print run data are incomplete, so print runs for the remaining editions have been estimated (conservatively) at 1,000, except for People's Editions (2,000). The figures for *Natural Theology* editions published by the share-holders come from the Longmans' archives, details of which can be found in Ingram (1981). Those for the earlier Faulder editions have been estimated, starting with a conservative 750 for the first edition, and rising to the known 2,000 by 1809. Later editions have all been estimated at 1,000, except for the People's Edition (2,000).

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Notes

¹ Dibner (1969), [5].

² David Knight has pointed out the historiographical pitfalls which can underlie the collecting of Great Books, in Knight (1989), 1-2.

³ In what follows, research on *Natural Theology* is my own; for the publishing history of *Constitution*, I have drawn upon van Wyhe (2001), especially Appendix C; for that of *Vestiges*, I have drawn upon Secord (2000), especially 126-50; and for *Origin*, I have drawn upon Peckham (1959), 11-25.

⁴ Topham (2000), 566-7. Brewer's work was still in print in 1905, and had sold over 300,000 copies.

⁵ For examples of work on popular science, see Myers (1989); Topham (1992); Secord (1985); Secord (2000); Lightman (1999); Lightman (2000).

⁶ Kermode (1975), 117. See also Calvino (1999), 3-5. 'Classic' can also mean 'typical', but, in common with other writers on the subject, I am going to ignore this meaning as being the one in common usage, although it is probably related to the more technical meaning in interesting ways.

⁷ Eliot (1944).

⁸ Kermode (1975), Ch. 1

⁹ Kermode (1975), 121.

¹⁰ For examples of the literary approach to scientific works, historical and modern, see Beer (1983); Myers (1990); Lenoir (1998).

¹¹ For theistic readings, see Moore (1979), Chs. 10-11.

¹² Secord (2000), 525.

¹³ On the nightmare of internecine strife that resulted, see McGann (1994). One potential outcome is to consider the canon as a purely subjective choice, made

independently by every individual, as implied in one of Italo Calvino's definitions of the classic: "your" classic is a book to which you cannot remain indifferent, and which helps you define yourself in relation or even in opposition to it', Calvino (1999), 7. Yet, such a subjective approach would not be helpful for researchers and teachers.

¹⁴ For an extended defence of the traditional canon, see the 'Elegy for the Canon' which introduces Bloom (1994).

¹⁵ Bloom (1994), 17-18.

¹⁶ Topham (2000), 566.

¹⁷ The survival of individual copies also allows for later readings, but from what we know of survival rates and their correlation with later readings (which is not very much), it seems clear that reprinting must be the more effective way of ensuring later readings. On survival, see Adams and Barker (1993).

¹⁸ Altick (1958); Benedict (2001).

¹⁹ Relatively little attention has yet been paid to the 'long history of books'. Book historians have thus far concentrated more on the circumstances surrounding the first edition of a work. However, on 'long histories of the book', see Fyfe (1999).

²⁰ Kermode (1975), 43, 80.

²¹ The last non-scholarly British edition of *Constitution* was in 1897; that of *Vestiges* was in the 1930s. Sales to the academic market (including scholarly reprints, facsimiles, and selections in anthologies for teaching) are indicative of a different sort of reading, an 'enforced' or 'institutional' reading, Calvino (1999), 6; Kermode (1975), 117.

²² Peckham (1959), 17; Secord (2000), 525.

²³ Altick (1957), 301. For an attempt to compile a list of best-sellers (including those

from the period before the term was in common use), see Appendix B to Altick (1957); Altick (1969); and Altick (1986).

²⁴ On the difference between a best-seller and a classic, see Thornton and Tully (1954), 132.

²⁵ This was due to changes in the copyright law in 1814 and 1842, which extended the period of protection to (in 1842) forty-two years, or the writer's life plus seven years, whichever was longer.

²⁶ Knight (1989); Young (1985); Fyfe (1997).

²⁷ Paley (1802). To avoid unnecessarily extending the list of references, I shall not give full references for all the editions I mention. Editions will be identified in the notes by their publisher and place and date of publication.

²⁸ See advertisement, 'BOOKS printed for R. FAULDER', at the end of *Natural Theology* (London: Faulder, 1802).

²⁹ *Natural Theology* (London: Faulder, 1809), dedication. The sermons were, 'The being of God demonstrated in the works of creation,' 'Unity of God,' 'The goodness of God proved from the light of nature and revelation,' 'The ills of life do not contradict the goodness of God.' Reprinted in Paley (1825), 405-52.

³⁰ This was at a time when a curate earned about £50 to £100 a year, and an agricultural labourer earned from 8s. to 12s. a week.

³¹ Copyright in 1802 was still the fourteen years fixed in 1710 and confirmed in 1774. If Paley had lived till 1816, he could have appealed for an extension of a further fourteen years.

³² Faulder's business records do not survive. Details of post-1809 editions printed by a group of share-holders can be found in the Longman Archives, see Ingram (1981).

³³ Virtually none of Paley's correspondence with Faulder survives, although a letter of

August 1802 indicates that Paley was preparing corrections (presumably for *Natural Theology*), see Bodleian MS.Montagu.d.9, f.77. My thanks to Neil Hitchin for this reference.

³⁴ According to imprints of Faulder's works. See also entries in Brown (1982); and Maxted (1977).

³⁵ Sale catalogue of 1813 in British Library (S.C.760(4)) refers to Rodwell as successor to Faulder.

³⁶ Longman Archives, H7, 36.

³⁷ On share-books, see Feather (1988), 69-75; on the continuation of share-books in the nineteenth century, see Fyfe (1999).

³⁸ Longman Archives, H7, 36.

³⁹ Longman Archives, H7, 158.

⁴⁰ Longman Archives, H8, 237.

⁴¹ Faulder's prices can be found on the advertisements bound inside his books, at least in the period 1802-1805.

⁴² The standard three-volume novel cost one and a half guineas until the 1890s, but prices for most other genres fell over the course of the nineteenth century.

⁴³ Inscription on end-paper of the Bodleian copy of *Natural Theology* (London: Faulder, 1811) indicates a second-hand sale price of 5s. 6d. in 1821.

⁴⁴ Longman Archives, H8, 102 gives both costs and price of individual copies. Trade discounts were typically between 25% and 33% in the early nineteenth century.

⁴⁵ By 1846, the list of share-holders had grown considerably. Longmans still had the largest share, although the production was actually organised by Rivingtons. The other publishers involved were: Bickens, HG Bohn, Coomes, Deightons, Fellowes, Hamilton, Hatchard, Hodgson, Mackie, JW Parker, G&J Robinson, Routledge,

Simpkin, Smith & Elder, Snow, Washbourne, Whittaker.

⁴⁶ I have not done a detailed collation, but there are no major changes.

⁴⁷ van Wyhe (2001), Ch. 5; Secord (2000), 146-150.

⁴⁸ Peckham (1959), 18-25.

⁴⁹ These plates were also available as a separate publication, James Paxton, *Illustrations of Paley's Natural Theology with Descriptive Letter Press* (Oxford: Vincent, 1826). I am grateful to Matthew Eddy for bringing this to my attention.

⁵⁰ *Natural Theology* (London: Faulder, 1809), 92; *Natural Theology* (Oxford: Vincent, 1826), vi.

⁵¹ Kidd (1824), 1.

⁵² Ovenell (1986), 189-92.

⁵³ Kidd (1824). See also Buckland (1820), for a similar approach to geology, also at Oxford.

⁵⁴ Desmond (1989), 117-21.

⁵⁵ *Natural Theology* (Oxford: Vincent, 1826), vi.

⁵⁶ *Natural Theology* (Oxford: Vincent, 1836), vii.

⁵⁷ *Natural Theology* (Oxford: Vincent, 1836) vii-viii.

⁵⁸ See publishers' imprints on copies.

⁵⁹ *Natural Theology, or Evidences of the existence and attributes of the Deity, collected from the appearance of nature... illustrated by the plates, and by a selection from the notes of J Paxton... with additional notes, original and selected, for this edition. And a vocabulary of scientific terms. By JW.* (Boston: Lincoln & Edwards, 1829). For the regular reprintings of this edition, see the National Union Catalogue. In the absence of Anglo-American copyright until 1891, American publishers were free to reprint *Natural Theology* or its revised editions. That the NUC includes only

eight editions of the original British edition up to 1830, but lists 28 editions of Paxton/Ware's edition after 1829, indicates the great success of the latter edition.

⁶⁰ *Natural Theology* was not used in formal education at Cambridge, see Fyfe (1997).

I would argue that David Knight was over-enthusiastic about its potential in formal education, see Knight (1989), 55-6.

⁶¹ Topham (1992).

⁶² *Natural Theology* (London: Knight, 1836-39), 107, n.23.

⁶³ *Natural Theology* (London: Faulder, 1809), 1. Compare *Natural Theology* (London: Knight, 1836-39), 1-2, n.2.

⁶⁴ This edition was reprinted in America by Harper Brothers of New York (1839, 1845, 1865) and by Marsh, Capen, Lyon & Webb of Boston (1839), but it seems to have been unable to effectively compete with John Ware's edition, which had become 'the American edition'.

⁶⁵ Brougham (1845), i, 8.

⁶⁶ *Natural Theology* (London: Knight, 1836-39), 334, n.64.

⁶⁷ Topham (1993), 87-95; Desmond (1989); Jacyna (1983).

⁶⁸ Topham (1992), get ref.

⁶⁹ Altick (1954), 12. A similar argument would hold for the earlier nineteenth century, although the actual figures would be smaller.

⁷⁰ Although more cotton and linen rags were available after the end of the Napoleonic Wars, supply did not keep up with the demand for paper. This was not fully resolved until the development of esparto grass, and then wood pulp paper in the 1860s. On the technologies of the book trade, see Gaskell (1972) and Twyman (1999).

⁷¹ 1830 price from Low (1864-1914).

⁷² Nonetheless, I have used the 1830 figures for comparison to keep the time between

my two sets of figures to a minimum. Production costs changed over time, and especially towards mid-century.

⁷³ Longman Archives, H8, 237.

⁷⁴ Longman Archives, H12, 52.

⁷⁵ Altick (1958). Benedict (2001). A House of Lords decision in 1774 suddenly released many older works from copyright protection.

⁷⁶ At least, he published titles by these authors around the same time as *Natural Theology*. I cannot be certain that they were all in the English Classics series.

⁷⁷ On the little-known Milner, see Neuburg (1977), 177-184, and the entry in *DLB* Vol.106.

⁷⁸ van Wyhe (2001), Ch.5.

⁷⁹ Secord (2000), 525.

⁸⁰ Peckham (1959), 23-24.

⁸¹ However, the success of their own Educational Series, begun in 1835, soon illustrated that it was possible to commission new cheap works. See Cooney (1970), Ch.4.

⁸² *Natural Theology* (Edinburgh: Chambers, 1837), i.

⁸³ According to the *Oxford English Dictionary*, ‘popular science’ was first used in the 1840s, while the related usage of ‘popularisation’ had first appeared in 1833.

⁸⁴ *Natural Theology* (Edinburgh: Chambers, 1849), vii-viii. The memoir fitted on a single page in the 1837 edition.

⁸⁵ Cooney (1970), 67-8; and DNB entry.

⁸⁶ *Natural Theology* (Edinburgh: Chambers, 1849), 18, 27.

⁸⁷ On the threat to the authority of men of science, see Yeo (1984), 12-20; on the threat to religion, see Secord (2000), 320-30; and Fyfe (2000), 2-5, 80-82, passim.

⁸⁸ Pearson (1853), 479.

⁸⁹ On the spate of popular works in the mid-1840s, see Fyfe (2000), 80-83.

⁹⁰ For Knight on Christian tone, see Knight (1873), ii, 189-92.

⁹¹ Secord (2000), 527-8.

⁹² White's book was later expanded into the more well-known *History of the Warfare of Science with Theology in Christendom* (1896, 2 vols). On the origins of the conflict thesis, see Moore (1979), Chs. 1-2; Russell (1989); Turner (1978).

⁹³ On the 'Christian Knowledge' Series, see advert at the end of *Natural Theology* (London: Ward, Lock, 1879).

⁹⁴ *Natural Theology* (London: SPCK, 1875), 7. See also 1-8.

⁹⁵ *Natural Theology* (London: Faulder, 1809), 372.

⁹⁶ *Natural Theology* (London: SPCK, 1875), 397.

⁹⁷ Darwin (1887), ii, 202. Huxley refers to Ch. 23 of *Natural Theology*.