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978-0-521-28668-8 - Science and Religion in the Nineteenth Century

Edited by Tess Cosslett

Excerpt

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Introductory essay

In his *Autobiography* (1889), T. H. Huxley, the Victorian biologist, agnostic (he invented the word), and leading populariser of science, tells us of his ‘untiring opposition to that ecclesiastical spirit, that clericalism, which in England, as everywhere else, and to whatever denomination it may belong, is the deadly enemy of science’¹ – an opposition that was one of the chief motivating forces of his life’s work. Huxley’s image of a necessary conflict between two deadly enemies became the received account of the relations between science and religion in the nineteenth century. In this ‘battle’, the turning-point is supposed to have come when Huxley confronted and routed Bishop Wilberforce, the opponent of evolution, at the British Association meeting in Oxford in 1860. From a twentieth-century perspective, perhaps coloured by the recent ‘Creationist’ controversies in America, it is easy to assume that Wilberforce was a Bible-thumping Fundamentalist totally opposed to scientific methods of investigation. It comes as a surprise to find that Wilberforce’s objections to Darwin’s theory were mainly scientific, that he had many leading scientists on his side, that he skilfully picked out all the weak points in Darwin’s theory, and that his basic assumption was that science and religion were necessarily in harmony, a harmony which Darwin’s theory threatened to disrupt.² His review of Darwin’s *Origin of Species* in the *Quarterly Review* finally comes round to considering the opposition between the theory of evolution and the Creation story in the Bible, but this is not the main ground of his attack on Darwin. Evolution threatens not so much the revealed theology of the Bible, as the *natural theology* taught by science:

To oppose facts in the natural world because they seem to oppose Revelation, or to humour them so as to compel them to speak in its voice, is . . . but another form of the ever-ready feeble-minded dishonesty of lying for God, and trying by fraud or falsehood to do the work of the God of truth. It is with another and a nobler spirit that the true believer walks among the works of nature. The words graven on the everlasting rocks are the words of God, and they are graven by His hand. No more could they contradict His Word written in His book, than could the words of the old covenant graven by His hand on the stony tables contradict the writings of His hand in the volume of the new dispensation.³

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‘Natural theology’ means using the evidence of nature to prove God’s existence and His goodness. Up to about 1860, most scientists and clergymen in England assumed that natural theology guaranteed a productive harmony between science and religion. The discoveries of the scientists provided religion with ever-more complex demonstrations of the design and order of God’s universe; in this light, science was a religious pursuit. Here is an example of this reverent attitude on the part of the geologist Hugh Miller, describing a sea-urchin, in an early article: ‘I am confident that there is not half the ingenuity, or half the mathematical knowledge, displayed in the dome of St Paul’s at London, that we find exhibited in the construction of this simple shell.’⁴

In stark contrast, here is Darwin’s opinion of such ‘evidence’ of God’s ‘design’: ‘We can no longer argue that, for instance, the beautiful hinge of a bivalve shell must have been made by an intelligent being. There seems to be no more design in the variability of organic beings and in the action of natural selection, than in the course which the wind blows.’⁵

It was the random, chance element in Darwin’s theory that seemed to some thinkers to undermine the ordered beauty of the old ‘design’ argument, which had been so conclusively put by William Paley in his classic *Natural Theology* (1802). Because of the importance of natural theology to the Victorian debate, I have included an extract from Paley.⁶

Thus several modern historians have seen the Victorian ‘conflict’ as not between science and religion, but between ‘religious science and irreligious science’;⁷ that is, between a science pursued in the interests of natural theology, that relates its findings to moral and religious values, and a new, professional, ‘value-free’ science. The triumph of this ‘new’ science in the modern world explains why we have been so ready to accept the science-versus-religion myth of its partisans, such as Huxley.

Significantly, natural theology began to be important in England at the same time as the rise of empirical science, in the late seventeenth century. It has been pointed out that both fitted in with the empirical, literal-minded approach of Puritanism.⁸ Important early works on natural theology were John Ray’s *The Wisdom of God as Manifested in the Works of the Creation* (1691), and William Derham’s *Physico-Theology: or, a Demonstration of the Being and Attributes of God, from his Works of Creation* (1713). The scientists Robert Boyle and Isaac Newton were natural theologians. The tradition of natural theology was carried on in the 1830s in the eight *Bridgewater*

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Treatises, in which scientists, four of them clergymen, demonstrated endlessly 'the Power, Wisdom, and Goodness of God, as manifested in the Creation'. Some natural theologians concentrated on evidence of order and design in the planetary system and in the laws of physics, as revealed by Newton. Others favoured the biological evidence of design in the organic world, the many beautiful and intricate adaptations of creatures to their surroundings. This is the type of evidence most favoured by Paley, who was something of an amateur naturalist himself.

In fact, natural history, and later geology, were eminently respectable pursuits for a clergyman to follow. Wilberforce was an amateur ornithologist, and, ironically, Darwin was at one point intended to become a clergyman. When his father opposed his plan to travel as naturalist on the *Beagle*, his uncle supported him, commenting that 'the pursuit of Natural History, though certainly not professional, is very suitable to a clergyman'.⁹ This sort of duplication of roles means it is not easy to separate out individuals into two warring camps of scientists versus theologians, as James Moore has pointed out in his book *The Post-Darwinian Controversies*, which contains an important modern argument against the 'warfare' model of the history of science and religion in the Victorian period. For instance, if we look at some of the immediate reactions to Darwin's *Origin of Species*, from those to whom Darwin sent copies of the book, we find a negative response from the Rev Adam Sedgwick, geologist and clergyman, who chides Darwin for trying to break the essential link between the 'physical' and 'moral or metaphysical' parts of nature. On the other hand, we find a positive response from the Rev Charles Kingsley, clergyman and naturalist, who sees a noble new natural theology in the idea of an original Creation of self-developing forms.¹⁰ Interestingly, both these clergymen/scientists are still taking natural theological ground in their responses to a new scientific theory; and from Kingsley's response we can also see that Darwin's theory did not necessarily strike the death-blow for natural theology.

What was it about Darwin's theory then that did seem, to some, to threaten the existing alliance between science and religion? To understand Sedgwick's response, we must understand the developments in geology in the first half of the nineteenth century, and the ways in which geology had been 'reconciled' with natural *and* revealed theology by scientists like Sedgwick, in a synthesis which evolutionary theory seemed to threaten. Again, the conflict centres on two kinds of science. At first sight, the geological discoveries

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would seem to be disruptive of natural theology as practised by Paley, and contradictory of revealed religion as set forth in Genesis. Geology showed that the earth was vastly older than had been assumed: the chronology of Archbishop Ussher (1581–1656), who dated the Creation at 4004 BC, was still officially accepted by the Church. Fossil evidence revealed that there had not just been one creation: species had been made extinct, and new ones created, over vast ages. Extinction could be seen as evidence of imperfection and wastefulness in God's design. Paley's 'design' argument had assumed a *fixed* creation, a once-and-for-all master plan for a perfectly adjusted machine. Geology revealed that the machine had had a history, during which it had changed, or been changed. The fossils seemed to show a 'progress' from lower to higher species: had species perhaps 'developed' of their own accord, and adapted *themselves* to changing surroundings? The French naturalist Lamarck had already suggested such a theory of development, at the beginning of the century. In that case, adaptation could not be evidence of God's direct workmanship, as it was for Paley, who seems to see God as a sort of Divine Engineer.

None of this was a problem for the Scriptural geologists such as Sedgwick, William Buckland, Thomas Chalmers, and Hugh Miller. The fossil evidence, with the absence of missing links, seemed to argue against Lamarck's theory. Instead, they saw in the rocks the evidence of a *series* of Divine Creations, each perfectly adapted, ascending progressively to the last and final Creation which included man, the culmination of the whole series. Thus they preserved the religious idea of man's recent and special separate creation by God. Miller writes mystically of the fossils of earlier creations as 'geologic prophecies' of man's creation.¹¹ This new scheme actually had advantages over Paley's natural theology: there was evidence not only of God's original creation of the world, but also of his direct and drastic intervention to change and improve His Creation at intervals. This geological theory of several Creations was known as 'catastrophism' – some of its proponents held that the most recent 'catastrophe' was Noah's Flood as described in the Bible. The catastrophists also had various other ingenious methods of 'reconciling' their discoveries with the Biblical narrative. (These are analysed in detail, and dismissed, by Charles Goodwin in extract 5.) For instance, the six 'days' of Creation in Genesis were read as six vast geological eras; or a long interval was held to have elapsed between the original creation of the world, and the 'six days' that followed, during which all the geological changes had occurred.

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The strangest, and the most ingenious of these attempts to ‘reconcile’ Genesis and geology, was *Omphalos* (1857), by Philip Gosse, in which he argues that the fossils in the rocks are false evidence of a history of development, just as Adam’s navel would be false evidence suggesting his previous embryonic development inside a natural mother.¹² But Gosse, a member of the literalist Plymouth Brethren, was outside the main stream of these geological ‘reconcilers’, who were mostly Broad Church Anglicans, apart from Hugh Miller and Thomas Chalmers, who were Scottish Evangelicals.

The catastrophists are not to be laughed at. They were eminent and productive scientists, whose theories were in line with the available facts. They attacked any theories of species ‘evolution’ on religious *and* on scientific grounds. The first nineteenth-century expression of an evolutionary theory in English, Robert Chambers’ anonymous *Vestiges of the Natural History of Creation*,¹³ played into their hands by being crude and unscientific in the extreme. It was easy for Sedgwick and Miller to shoot it down on scientific grounds, as well as expressing their moral and religious outrage. In particular, Chambers’ theory of an animal ancestry for man shocked them: it degraded man from his special status as a rational, moral and spiritual creature.¹⁴ Miller especially points out the difficulties for a belief in man’s immortal soul entailed by a belief in his gradual evolution from lower species.¹⁵ Chambers’ theory of evolution also removes the direct creative intervention in which the catastrophists believed – God becomes a remote Creator, who ages ago impressed his evolutionary laws on matter,¹⁶ and now leaves the whole development to proceed on its own, perhaps towards ‘higher races’ than mankind.

This Creator, as envisaged by Chambers, in fact resembles the Creator that Kingsley still finds implied by Darwin’s theory. It is interesting that the reviled theories of earlier evolutionists were later taken up by the Church in the post-Darwinian effort to reconcile evolution and religion. Thus we will find Frederick Temple, later to become Archbishop of Canterbury, arguing in 1885 for just such a Creator, who ‘impressed’ the original laws on matter, as part of an attempt to show that Darwinism is not inconsistent with natural theology.¹⁷ Similarly, earlier ‘vitalist’ theories of evolution were taken up by religious opponents of Darwin, such as the Catholic biologist St George Mivart,¹⁸ who could accept ‘guided’ evolution, but not the random process of natural selection. Once again, it is necessary to point out that Mivart also had good scientific reasons for discounting natural selection as an adequate mechanism for bringing about evolution.

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Chambers' evolutionary theory was to some extent 'vitalist', in that it is caused by a mysterious 'law of development', which could almost be just another name for God's original plan. *Vestiges* is not in fact an irreligious book: it too is conceived in the spirit of natural theology, and aims first to show the universality of Law in God's Creation – the Law of Development is seen as a parallel to Newton's Law of Gravitation. Unity and plan are thus found everywhere. Like Paley's *Natural Theology*, the book ends by demonstrating the goodness of God, shown in the over-balance of pleasure as against pain in the Creation. Unavoidable individual pain will be compensated for by a scheme of 'mercy and redress' in the next world. *Vestiges* is the work of an old-fashioned amateur scientist, concerned to place his findings in a moral and religious perspective. 'Evolution' appears more as a philosophical notion than as a scientific theory.

The catastrophists were, however, under attack from a different, more scientifically respectable direction. From 1830 to 1833, Charles Lyell was publishing his *Principles of Geology*, in which he put forward his rival 'uniformitarian' theory. According to Lyell, all the past geological changes in the earth's surface could be explained by the gradual action of ordinary causes, such as erosion and deposition, which were still acting now. There was no need to invoke miraculous catastrophes: all had been accomplished by natural causes. Lyell was in fact developing an approach originally put forward by James Hutton, in his *Theory of the Earth* (1795). Hutton had said that, in the evidence of geology, 'We find no vestige of a beginning, – no prospect of an end',¹⁹ and he had refused to speculate about questions of *origin*. This sounds dangerously like the atheistical 'infinity' theory that Paley and later Miller are at pains to refute:²⁰ if the world is infinite in duration, there is no need for an original Creator. But, as Hutton's defender Playfair pointed out, he had only meant that there was no evidence in *Nature* of a beginning:²¹ for this we must go to Revelation. Nevertheless, this approach totally undercuts natural theology. Lyell too insists that he will keep away from all questions about 'cosmology'. Though he could be natural-theological on occasion, the *Principles* are dependent on an entirely different preconception from that which underlies the work of the catastrophists. Lyell assumes gradualism and natural causation,²² and then amasses facts that fit his preconception. The catastrophists assumed divine intervention and design, and found the facts that fitted their preconception. Lyell is trying, as much as possible, to pursue science without regard to religious considerations – this is what makes him more modern, though not

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necessarily more correct, than the catastrophists. In this he anticipates Darwin, even though he demolishes Lamarck's theory of development in the *Principles*, and even though his 'uniformitarian' approach hardly allows for the 'evolution' of anything *new*.²³

From the point of view of the catastrophists, Darwin's *Origin of Species* (1859) must have seemed to unite the most dangerous elements of evolutionary and uniformitarian thought. Like Chambers, Darwin proposed an evolutionary origin for species, but unlike Chambers he provided a causal mechanism, natural selection, to bring it about. Unlike Chambers too, his main aim was not a religious or philosophical one: like Lyell, he largely avoided dealing with the religious implications of his theory – to some extent, his nervousness about these implications had delayed his publication of his theory for twenty years.²⁴ Darwin's aim, like Lyell's, is to explain what was previously thought to be miraculous, in terms of gradualism and natural causation. Natural selection, or the survival of the fittest, was the ordinary cause now in operation that could account for the whole of evolution, given a sufficiently long time-span. While it might be possible for Kingsley and Temple to argue that Darwin's theory still presupposed an original Creator who set the whole process off, the effect of Darwin's argument is to push the Creator out of areas which He had previously occupied, and substitute self-sufficient natural causes for Divine power. The eighteenth-century geologist Hutton might refuse to discuss ultimate questions about 'origins' – but the very title of Darwin's book, *The Origin of Species*, suggests that he will have to deal with such questions, and sensitive areas so far assigned to the Divine Creator. By definition, his theory of evolution of course disposes of the 'interventionist' theory of the catastrophists: it also disposes of Chambers' idea of a Creator who had planned and pre-programmed the whole development from the start, because of the *random* element in natural selection, by which any chance variation that happens to be useful to its possessor in the environment where it happens to be, is preserved.²⁵ Darwin's theory also highlighted the enormous amount of necessary waste and suffering in Nature, in the ruthless struggle for existence through which the 'fittest' are selected. At the end of the *Origin*, Darwin does try to argue, briefly, that the results of all this suffering are in the end 'good' – all the variations selected work for the good of their possessors, and further evolutionary 'progress' is certain.²⁶ But this has none of the conviction of Paley's belief in the predominant 'happiness' of Nature, and Darwin's private belief was that the evidence of imperfection, waste

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and suffering in Nature made against any belief in a benevolent Creator: 'I cannot persuade myself that a beneficent and omnipotent God would have designedly created the Ichneumonidae with the express intention of their feeding within the live bodies of Caterpillars, or that a cat should play with mice'.²⁷ Darwin's theory seems to stress *undesign* rather than *design*: adaptations, by no means perfect, slowly and painfully built up by a process of trial and error.

It is thus clear why Sedgwick felt that Darwin was trying to break the necessary 'link' between the 'physical' and 'moral or metaphysical' parts of Nature. The essence of the conflict was between the old, religious, natural-theological science, and the new, irreligious, purely naturalistic science. In many ways, the factual evidence for Darwin's theory was not very strong: as Tyndall points out in the Belfast Address,²⁸ 'evolution' is hardly susceptible of proof – it is an imaginative reconstruction of past history from slender evidence – but its strength as a theory lies in its general 'harmony' with 'the method of nature'. That is, it depends on a faith in natural causation, and in 'the continuity of nature' – the same faith that in the Address leads Tyndall to extend Darwin's theory and cross 'the boundary of the experimental evidence' to imagine that life itself has originated naturally from unliving matter. Here Tyndall is using Darwin's theory as part of a near-complete 'materialistic' explanation of all phenomena, which is designed to take over from religion in the area of 'cosmogony'. It is this scientific frame of mind, this attitude to the external world, that constitutes the real threat to natural theology, rather than any particular factual evidence. Religion is being aggressively driven out of areas where it was previously in secure possession.

Darwin himself had not pushed his theory so far as to include the ultimate origin of life itself; and in the *Origin* he had also cautiously not pursued it so far in the other direction as to include the origin of *man*.²⁹ This was obviously another sensitive religious issue, and Darwin, unlike Tyndall or Huxley, had no interest in attacking religion directly. But popularly Darwin was immediately assumed to be suggesting that man was descended from the apes – this is what the exchange between Huxley and Wilberforce turned on at Oxford.³⁰ Obviously, such a descent made difficulties for the Christian conception of man as the only creature endowed with rationality, with moral responsibility, and with spiritual immortality. Darwin did eventually extend his theory to include man in *The Descent of Man* in 1871; and his attempts to explain the evolution of man's 'higher' faculties, including even his religious propen-

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sities, from simple animal instincts, seemed to many to be reductive, insulting and irreligious. Darwin's explanations of the origin of man were also not very scientifically convincing – and he was attacked on both scientific and religious grounds by the Catholic biologist, St George Mivart.³¹ Mivart is cited by James Moore as another example of an individual hard to categorise on the assumption of a 'battle' between theologians on one side, and scientists on the other.³² Though the issue between Darwin and Mivart was not centred on natural theology, it was still a dispute between two kinds of science – that which relates its findings to moral and religious issues, and that which does not. In fact, Darwin's approach tended to explain away moral and religious attitudes themselves as being only evolved animal instincts, with no universal validity. The psychological theories of Herbert Spencer, cited by Tyndall,³³ also tended to reduce human mental processes to the level of other organic and inorganic processes, from which they had evolved.

It has been pointed out that if there was a 'conflict' between science and religion after the publication of the *Origin of Species*, it was scientists like Huxley and Tyndall, rather than theologians, who were the aggressors.³⁴ We have seen how Tyndall claimed ground from religion, and how Huxley imaged his life's work as a battle against clericalism. In their retrospective historical accounts of the progress of science, they stressed examples of scientific martyrs, such as Bruno or Galileo, and of ecclesiastical bigotry and repression. For this version of history they were partly indebted to John William Draper's *History of the Intellectual Development of Europe*,³⁵ a book which is one of the sources of the influential 'warfare' model of the relations between religion and science. Huxley and Tyndall were not only concerned to 'free' science from the shackles of religion, they were also keen to extend scientific ways of thinking into other areas of life. Another of Huxley's aims in life was

to promote the increase of natural knowledge and to forward the application of scientific methods of investigation to all the problems of life, in the conviction . . . that there is no alleviation for the sufferings of mankind except veracity of thought and of action, and the resolute facing of the world as it is, when the garment of makebelieve, by which pious hands have hidden its uglier features is stripped off.³⁶

Here Huxley sees his scientific mission as the removal of the outdated 'supernaturalist' approach of religion to life's problems. Similarly, Tyndall was involved in a campaign against the custom of 'special prayers' that were said in the churches at times of national emergency or disaster – again, he sees this custom as an outdated and

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even wicked application of ineffectual ‘supernatural’ remedies to natural disasters.³⁷ Both Huxley and Tyndall were engaged in conflicts and controversies about the necessity for scientific education.³⁸

But why were Huxley and Tyndall so aggressively anti-clerical? It has been suggested that the real question here involves the professionalisation of science, and their social and political status as the new professional scientists.³⁹ Both of them were ‘outsiders’, self-made men who had not been educated through traditional English establishment channels. Huxley pursued a medical education in London, and Tyndall gained his scientific education in Germany. The cultural and educational establishment in England was dominated by the clergy, so it was natural for these scientific outsiders to see the Church as their enemy. In their bid to take over the cultural leadership of the country, they constructed a complete ‘scientific’ world-view to rival and supplant the world-view of Christianity; and also, presumably, in order to meet their own personal religious, moral and philosophical needs. Frank M. Turner has named this world-view, or set of attitudes, ‘scientific naturalism’; we could also call it ‘scientific agnosticism’ or ‘scientific humanism’. Among other leading exponents of variants of this creed are Herbert Spencer,⁴⁰ the mathematician W. K. Clifford, and, in a later generation, Leslie Stephen and John Morley. It is hard to tell whether such people adopted a science-based world-view for political reasons, as Turner suggests, or whether they genuinely felt it to be a consolation for the loss of their Christian faith. We could include in this category the novelist George Eliot, who clearly did not have any ‘professional’ reasons for her scientific agnosticism. ‘Agnosticism’ was quite different from atheism, which had French and/or destructively anti-establishment connotations. Agnostics held that certain ultimate questions of origin and destiny, which religion had always claimed to be able to answer, were ‘unknowable’ mysteries, that it is futile to inquire into.⁴¹ But all other problems, including those of morality, were to be investigated and solved by the application of scientific thinking. Morality, like Nature, operates according to laws of cause and effect: as Huxley puts it, ‘the safety of morality’ lies ‘in a real and living belief in that fixed order of Nature which sends social disorganisation upon the track of immorality, as surely as it sends physical disease after physical trespasses’.⁴² A morality based on a theory of unavoidable consequences is also central to many of George Eliot’s novels. Tyndall sees the actual pursuit of science as encouraging morality:

the earnest prosecutor of science, who does not work with the idea of producing a sensation in the world, who loves the truth better than the transitory blaze of today’s