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ERIC SYMES ABBOTT

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RELIGIOUS AND SCIENTIFIC FAITH:

The Case of Charles Darwin's 'Origin of Species'



**Dean Eric Symes Abbott
(1906 – 1983)**

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RELIGIOUS AND SCIENTIFIC FAITH: The Case of Charles Darwin's 'Origin of Species'

It is a great pleasure to be able to give this annual lecture, established in memory of a former Dean of Westminster Abbey and Warden of Keble College, Oxford, who did much to encourage the engagement of Christianity with public and academic life. It seemed entirely appropriate to consider the complex yet fascinating legacy of Charles Darwin for both science and religion, during this year in which we mark both the 200th anniversary of his birth, and the 150th anniversary of the publication of his landmark work *The Origin of Species*. In this lecture, I want to explore the understanding of the scientific method which we find in Darwin's work, and offer some reflections on its relevance for belief in God. This may seem a curious, even provocative, thing to do. Yet I hope that you will see the points of convergence and illumination as our discussion proceeds.

This year has already seen much attention to Darwin in the media, as well as the appearance of a plethora of new works, aiming to cast new light on Darwin's times, his ideas, and their broader impact. As we all hoped, some new ideas have emerged, one of the most interesting of which is that Darwin's reflections on human evolution – set out in the *Descent of Man* (1871) – may have been shaped to some extent by revulsion against slavery. In their book *Darwin's Sacred Cause*, Adrian Desmond and James Moore, both highly respected Darwin scholars, develop a view that they originally set forward in 2004, to the effect that Darwin saw the common descent of humanity from apes as an important weapon for an argument that all human races were equal, thus challenging those who continued to maintain that certain races were superior to others. While this theory needs further investigation, it shows how the marking of anniversaries can trigger off fruitful new lines of scholarly inquiry.¹

Yet at a more popular level, the Darwin anniversary has often led to old stereotypes being dusted off, dressed up, and given a new lease of life through uncritical repetition. For example, the myth of the Galápagos finches still seems to be taken seriously in some quarters. Darwin, according to this still influential but historically discredited narrative, is supposed to have discovered evolution while on the Galápagos Islands in a “eureka moment” when he observed the beaks of the finches. In fact, of course, it was Darwin's subsequent reflections on his observations, after his return to England, that gradually moved him towards a theory of natural selection.² Darwin did not at first appreciate the significance of these finches until John Gould, an ornithologist at the Zoological Society of London pointed out to him that, despite many superficial resemblances, the species were all distinctly different.

Sadly, other myths still linger, despite the vast scholarly advances in our understanding of Darwin and his times. Most of these concern the impact of Darwin upon religion, and of religion upon Darwin. Some continue to represent Darwin as having caused the “Victorian crisis of faith”, thus overlooking the impact of biblical criticism

¹ Adrian J., Desmond and James R. Moore. *Darwin's Sacred Cause : How a Hatred of Slavery Shaped Darwin's Views on Human Evolution*. London: Allen Lane, 2009. For an earlier statement of this position, see their introduction to Charles Darwin, *The descent of man, and selection in relation to sex*, edited and with an introduction by James Moore and Adrian Desmond. London: Penguin Books. 2004.

² Frank J. Sulloway, “Darwin and His Finches: The Evolution of a Legend.” *Journal of the History of Biology* 15 (1982): 1-53; idem, “Darwin and the Galápagos: three myths.” *Oceanus* 30 (1987): 79-85.

and geology upon contemporary religious convictions. On this view, the settled Victorian age of faith was plunged into profound religious crisis by the publication of the *Origin of Species*, which inaugurated yet another great battle in the endless war between science and religion. An interesting subplot that is sometimes woven into this account is that Darwin's theory faced implacable opposition from the Church of England. The reality may be somewhat more nuanced and complex than these familiar myths, but it is much more interesting and intellectually satisfying. For example, the nineteenth-century Anglican theologian Aubrey Moore famously argued that, under the guise of a foe Darwin had done Christianity the work of a friend. How? By liberating it from a defective vision of God.³ Historical truth is not something that can be reduced to a neat procession of soundbites.

In this lecture, I want both to honour Darwin, and explore his approach to the natural world, and its broader implications. It is impossible to read Darwin without being impressed by his deep commitment to finding the truth through the accumulation of observation, and the development of the "best explanation" of what is observed. Yet it is perhaps the style, as much as the contents, of the *Origin of Species*, that merits close attention. Darwin's graciousness and generosity have often been noted, as have his concern to correct himself where necessary. He is in many ways a role model for the natural scientist, not least in remaining as close to the observational evidence as possible, and avoiding flights of metaphysical speculation.

More specifically, however, I want to pay tribute to Darwin by exploring a theme that will be evident to all who have read the various editions of the *Origin of Species*⁴ – namely, the role of faith in and in relation to science. The title I have chosen for this lecture will, I suspect, cause concern to some of my audience here tonight. Few would dispute that it is either legitimate or interesting to consider Charles Darwin's religious faith, and especially to reflect on its relationship with his understanding of evolution. Yet in using the phrase "scientific faith", some will feel that I have lost my way intellectually. The phrase is surely a self-contradiction? Since science proves its beliefs, how can one in any way speaking meaningfully about faith?

These themes are developed in a somewhat pointed manner in William K. Clifford's influential essay *The Ethics of Belief* (1877). Clifford here argued that "it is wrong always, everywhere, and for anyone, to believe anything upon insufficient evidence."⁵ This was, he argued, not simply an intellectual responsibility; it was a fundamentally *moral* duty. Nobody should be allowed to believe something which was argumentatively or evidentially underdetermined. I would, of course, agree with Clifford, although I think it is fair to point out that Clifford's use of the phrase "insufficient evidence" is more than a little vague, not least when he comes to deal with that cornerstone of the scientific explanation – the question of justified inference. Happily, Clifford – who was a mathematician – knew enough about the more empirical sciences to be aware that the scientific method relies upon inference. Yet, even so, his account of the scientific method is clearly deeply problematic. It seems quite incapable, for example, for

³ For further discussion, see Richard England, "Natural Selection, Teleology, and the Logos : From Darwin to the Oxford Neo-Darwinists, 1859-1909." *Osiris* 16 (2001): 270-87. England argues that some Oxford neo-Darwinists saw Darwin's revision of Paley's teleology as emphasizing aspects of adaptation which confirmed their Christian belief, thus reinforcing rather than undermining their scientific commitment to the theory of natural selection.

⁴ All six editions are now easily accessed online: <http://darwin-online.org.uk/>. For those preferring to use printed sources, see Morse Peckham, ed. *The Origin of Species: A Variorum Text*. Philadelphia: University of Pennsylvania Press, 1959.

⁵ William Kingdon Clifford, *The Ethics of Belief and Other Essays*. Amherst, NY: Prometheus Books, 1999, 70-96.

dealing with the troublesome issue of the “underdetermination of theory by evidence”,⁶ one of the persistent difficulties that cloud the horizons of those who prefer to keep their science simple and untroubled by philosophical and historical inconveniences. If Clifford’s unrealistic account of the scientific method were to be applied to Darwin’s *Origin of Species*, we should have to reject either Darwin’s work as unscientific and even unethical, or Clifford’s account of the place of belief in science. Happily, this matter is easily resolved, and it is Clifford who is to be judged as unsatisfactory.

The inadequacies of Clifford’s approach are the subject of the famous 1897 essay “The Will to Believe”, in which the psychologist William James (1842-1910) argued that human beings find themselves in a position where they have to choose between intellectual options which are, in James’ words, “forced, living, and momentous”.⁷ We all, James argues, need what he terms “working hypotheses” to make sense of our experience of the world. These “working hypotheses” often lie beyond total proof, yet are accepted and acted upon because they are found to offer reliable and satisfying standpoints from which to engage the real world. For James, faith is a particular form of belief, which is pervasive in everyday life. James defined faith as follows: “Faith means belief in something concerning which doubt is still theoretically possible”. This leads James to declare that: “Faith is synonymous with working hypothesis.” Although James is sometimes accused of lending intellectual weight to what is merely wishful thinking – a charge, for example, made by the pragmatist philosopher Charles Peirce – James himself did not see things this way. As Gerald E. Myers observed in his study of James: “He always advocated a faith sensitive to reason, experimental in nature, and therefore susceptible to revision.”⁸ Indeed, since he emphasized the status of faith as a “working hypothesis,” James rejected the very notion of dogmatic faith as essentially a contradiction in terms.

With these points in mind, let us turn to consider Darwin’s analysis of his scientific observations across the six editions of the *Origin of Species*. Philosophers of science draw an important distinction between a “logic of discovery” and a “logic of confirmation”. To simplify what is rather a complex discussion, we might suggest that a “logic of discovery” is about how someone arrives at a scientific hypothesis, and a “logic of confirmation” is about how that hypothesis is shown to be reliable and realistic.⁹ Sometimes hypotheses arise from a long period of reflection on observation; sometimes they come about in a flash of inspiration. Yet if the “logic of discovery” can often be more inspirational than rational, the same is clearly not true of the “logic of justification”. Here, any hypothesis – however it is derived – is rigorously and thoroughly checked against what may be observed, to determine the degree of “empirical fit” between theory and observation. There is no reason to suggest that Darwin’s notion of “natural selection” came about in a moment of inspiration, on the Galápagos or anywhere else. His theory began taking shape in 1837 and 1838. In Darwin’s case, the logics of discovery and justification both seem to have

⁶ See, for example, Laurie Calhoun, “The Underdetermination of Theory by Data, ‘Inference to the Best Explanation’, and the Impotence of Argumentation.” *Philosophical Forum* 27 (1996): 146-60.

⁷ William James, “The Will to Believe.” In *The Will to Believe and Other Essays in Popular Philosophy*. New York: Longmans, Green, and Co., 1897, 1-31.

⁸ Gerald E. Myers, *William James, His Life and Thought*. New Haven, CT: Yale University Press, 1986, 460.

⁹ For a good account, see Christiane Chauviré, “Peirce, Popper, Abduction, and the Idea of Logic of Discovery.” *Semiotica* 153 (2005): 209-21.

been based primarily on extensive reflection on often puzzling observations.¹⁰

Darwin's own account of how he developed his theory of natural selection makes it clear that it was later reflection on observations that brought about his insight. When he boarded the *Beagle* in 1831, he tells us, he was inclined to the view that the flora and fauna of a given region would be determined by their physical environment. His observations caused him to question this belief, and to search for alternative explanations – one of which gradually came to dominate his thinking. Let us listen to Darwin's own account of things:

During the voyage of the *Beagle* I had been deeply impressed by discovering in the Pampean formation great fossil animals covered with armor like that on the existing Armadillos; secondly, by the manner in which closely allied animals replace one another in proceeding southwards over the Continent; and thirdly, by the South American character of most of the productions of the Galápagos archipelago, and more especially by the manner in which they differ slightly on each island of the group; none of these islands appearing to be very ancient in the geological sense. It was evident that facts such as these, as well as many others, could be explained on the supposition that species gradually become modified; and the subject haunted me.¹¹

As Darwin reflected on his own observations, and supplemented them with those of others, a number of points emerged as being of particular significance. For Darwin, four features of the natural world in particular seemed to require particularly close attention, in the light of problems and shortcomings with existing explanations, especially the idea of “special creation” offered by religious apologists such as William Paley.¹² While this theory offered explanations of these observations, they seemed increasingly cumbersome and forced. A better explanation, Darwin believed, had to lie to hand. None of these could be regarded as “proofs” of natural selection; nevertheless, they possessed a cumulative force in suggesting it was the best explanation of what was actually observed.

The point here is that a number of explanations could be offered for what was observed in nature. The debate concerned which of these explanations was the best. Now the word “best” is difficult to define. Do we mean the simplest theory? The most elegant? The most natural? The great English natural philosopher William Whewell (1794-1866) used a rich visual image to communicate the capacity of a good theory to make sense of, and weave together, observations. “The facts are known but they are insulated and unconnected . . . The pearls are there but they will not hang together until some one provides the string.”¹³ The “pearls” are the observations and the “string” is a grand vision of reality, a worldview, that *connects* and *unifies* the data. A grand theory, Whewell asserted,

¹⁰ See the reflections of Scott A. Kleiner, “The Logic of Discovery and Darwin's Pre-Malthusian Researches.” *Biology and Philosophy* 3 (1988): 293-315.

¹¹ Charles Darwin and Nora Barlow, *The Autobiography of Charles Darwin, 1809-1882 : With Original Omissions Restored*. New York: Norton, 1993, 118.

¹² Scott A. Kleiner. “Problem Solving and Discovery in the Growth of Darwin's Theories of Evolution.” *Synthese* 62 (1981): 119-62, especially 127-9. Note that substantially the same issues can be discerned in Johann Kepler's explanation of the solar system: Scott A. Kleiner. “A New Look at Kepler and Abductive Argument.” *Studies in History and Philosophy of Science* 14 (1983): 279-313.

¹³ William Whewell, *Philosophy of the Inductive Sciences*. 2 vols. London: John W. Parker, 1847, vol. 2, 36. As has often been pointed out, Whewell's theory of induction is open to criticism: see, for example, Laura J. Snyder, “The Mill-Whewell Debate: Much Ado about Induction.” *Perspectives on Science* 5 (1997): 159-98.

allows the “colligation of facts”, establishing a new system of relations with each other, unifying what might have otherwise been considered to be disconnected and isolated observations. The “pearls” were the observations that Darwin had accumulated; but what was the best string on which to thread them?

The pearls – to continue with this visual analogy – include four categories of observations which clearly require to be strung together.

1. Many creatures possess “rudimentary structures”, which have no apparent or predictable function – such as the nipples of male mammals, the rudiments of a pelvis and hind limbs in snakes, and wings on many flightless birds. How might these be explained on the basis of Paley’s theory, which stressed the importance of the individual design of species? Why should God design redundancies? Darwin’s theory accounted for these with ease and elegance.

2. Some species were known to have died out altogether. The phenomenon of extinction had been recognized before Darwin, and was often explained on the basis of “catastrophe” theories, such as a “universal flood,” as suggested by the biblical account of Noah. Darwin’s theory offered a neater account of the phenomenon.

3. Darwin’s research voyage on the *Beagle* had persuaded him of the uneven geographical distribution of life forms throughout the world. In particular, Darwin was impressed by the peculiarities of island populations, such as the finches of the Galápagos islands. Once more, the doctrine of special creation could account for this, yet in a manner that seemed forced and unpersuasive. Darwin’s theory offered a much more plausible account of the emergence of these specific populations.

4. Various forms of certain living creatures seemed to be adapted to their specific needs. Darwin held that these could best be explained by their emergence and selection in response to evolutionary pressures. Paley’s theory of special creation proposed that these creatures were individually designed by God with those specific needs in mind.

So what could be inferred from these? What was the best explanation of these observations? The best string to connect them? Darwin was quite clear that his theory of natural selection was not the only explanation of the biological data which could be adduced. He did, however, believe that it possessed greater explanatory power than its rivals, such as the doctrine of independent acts of special creation, as set out in the writings of William Paley. “Light has been shown on several facts, which on the belief of independent acts of creation are utterly obscure”.¹⁴

Let us pause at this point, and consider an aspect of Darwin’s scientific method that is often glossed over. Darwin was confronted with a series of observations about the natural world. Indeed, he had even contributed to these himself, through his voyage on the *Beagle*. Yet Darwin’s voyage on the *Beagle* was more productive in terms of the ideas it ultimately generated in Darwin’s mind than the biological specimens he brought home with him, even

¹⁴ Charles Darwin. *On the origin of the species by means of natural selection*. 6th ed. London: John Murray, 1872, 164

though these two are interconnected. The challenge was to find a theoretical framework which could accommodate these observations as simply, elegantly, and persuasively as possible. Darwin's method is a textbook case of the method of "inference to the best explanation" which is now widely regarded as lying at the core of the scientific method.¹⁵

Yet most popular accounts of the scientific method emphasize the importance of prediction. If a theory does not predict, it is not scientific. I think it is important to challenge this approach. Darwin was quite clear that his theory did not predict, and could not predict. That was just the nature of things.¹⁶ In a letter praising the perspicuity of F. W. Hutton (1836-1905), Darwin singled out this point for special comment:

He is one of the very few who see that the change of species cannot be directly proved, and that the doctrine must sink or swim according as it groups and explains phenomena. It is really curious how few judge it in this way, which is clearly the right way.¹⁷

Let us linger over that phrase "the doctrine must sink or swim according as it groups and explains phenomena". The nature of the scientific phenomena was such that prediction was not possible for Darwin. This point, of course, led some philosophers of science, most notably Karl Popper, to suggest that Darwinism was not really scientific.¹⁸

Yet more recent studies, especially in the philosophy of biology, have raised interesting questions about whether prediction really is essential to the scientific method. This issue emerged as important in the nineteenth-century debate between William Whewell and John Stuart Mill over the role of induction as a scientific method.¹⁹ Whewell emphasized the importance of predictive novelty as a core element of the scientific method; Mill argued that the difference between prediction of novel observations and theoretical accommodation of existing observations was purely psychological, and had no ultimate epistemological significance. The debate, of course, continues. In their recent discussion of the issue,²⁰ leading philosophers of biology Christopher Hitchcock and Elliott Sober argue that while prediction can occasionally be superior to accommodation, this is not always the case. Situations can easily be envisaged where accommodation is superior to prediction. Prediction is neither intrinsically nor invariably to be preferred to accommodation. The relevance of this point to the scientific character of Darwin's approach will be obvious. Yet it also raises some significant doubts about the reliability of popular accounts of the scientific method.

¹⁵ For the best general statement of this method, see Peter Lipton, *Inference to the Best Explanation*. 2nd ed. London: Routledge, 2004.

¹⁶ See especially the detailed study of Elisabeth Anne Lloyd, "The Nature of Darwin's Support for the Theory of Natural Selection." In *Science, Politics, and Evolution*. Cambridge: Cambridge University Press, 2008, 1-19.

¹⁷ *The Life and Letters of Charles Darwin*, ed. F. Darwin. 3 vols. London: John Murray, 1887, vol. 2, 155. Hutton deserves much greater attention as a perceptive interpreter of Darwin: see, for example, John Stenhouse, "Darwin's Captain: F. W. Hutton and the Nineteenth-Century Darwinian Debates." *Journal of the History of Biology* 23 (1990): 411-42.

¹⁸ Karl R. Popper, "Natural Selection and the Emergence of Mind." *Dialectica* 32 (1978): 339-55.

¹⁹ Laura J. Snyder, "The Mill-Whewell Debate: Much Ado about Induction." *Perspectives on Science* 5 (1997): 159-98. Snyder elsewhere argues that Whewell's views on induction have been misunderstood, and merit closer attention as a distinctive approach: Laura J. Snyder, "Discoverers' Induction." *Philosophy of Science* 64 (1997): 580-604.

²⁰ Christopher Hitchcock and Elliott Sober. "Prediction vs. Accommodation and the Risk of Overfitting." *British Journal for Philosophy of Science* 55 (2004): 1-34. The "weak predictivism" defended by Hitchcock and Sober has parallels elsewhere: see, for example, the careful assessment of approaches in Marc Lange. "The Apparent Superiority of Prediction to Accommodation as a Side Effect." *British Journal for Philosophy of Science* 52 (2001): 575-88; David Harker. "Accommodation and Prediction: The Case of the Persistent Head." *British Journal for Philosophy of Science* 57 (2006): 309-21.

So how does this bear on William James's idea of faith as a "working hypothesis"? I think it is clear that James's emphasis on the importance of such "working hypotheses" finds ample exemplification in the *Origin of Species*. Darwin's theory had many weaknesses and loose ends. Nevertheless, he was convinced that these were difficulties which could be tolerated on account of the clear explanatory superiority of his approach. His "working hypothesis", he believed, was sufficiently robust to resist the many difficulties that it faced. So what difficulties are we talking about?

Darwin's *Origin of Species* went through six editions, and Darwin worked constantly to improve his text, adding new material, amending existing material, and, above all, responding to criticisms in what can only be described as a remarkably open manner. Those who concern themselves with such details have shown that of the four thousand sentences in the first edition, Darwin had rewritten three in four by the time of the final sixth edition of 1872. Interestingly, some 60% of these modifications took place in the last two editions, which introduced some "improvements" that now seem unwise – for example, his incorporation of Herbert Spencer's potentially misleading phrase "the survival of the fittest".²¹

The contents of these successive editions of the *Origin of Species* make it clear that Darwin's new theory faced considerable opposition on many fronts. There is no doubt – for the historical evidence is clear – that some traditional Christian thinkers saw it as a threat to the way in which they had interpreted their faith. Yet there can also be no doubt – for the historical evidence is equally clear – that other Christians saw Darwin's theory as offering new ways of understanding and parsing traditional Christian ideas. More importantly, however, Darwin's theory provoked scientific controversy, with many scientists of his day raising concerns about the scientific foundations of "natural selection". If the successive editions of the *Origins* are anything to go by, Darwin's theory was assaulted by many scientists of the day. Yet as historians of science have pointed out, this is the norm, not the exception, in scientific advance. Criticism of a theory is the means by which – to use a Darwinian way of speaking – we discover whether it has survival potential. The reception of a scientific theory is a communal affair, in which a "tipping point" is gradually reached through a process of debate and reflection, often linked with additional research programmes. Darwin's theory appears to have met more sustained opposition from the scientific community than from its religious counterpart, especially on account of its failure to offer a convincing account of how innovations were transmitted to future generations.

A good example of such scientific criticism is found in Fleeming Jenkin's concerns about "blending inheritance".²² Jenkin was a Scottish engineer, heavily involved in the business of developing underwater telephone cables, who identified what Darwin clearly believed to be a potentially fatal enquiry flaw in his theory. Fleeming pointed out that, on the basis of existing understandings of hereditary transmission, any novelties would be diluted in subsequent generations. Yet Darwin's theory depended on the transmission, not dilution, of such characteristics. In

²¹ Spencer used the phrase in his *Principles of Biology* (1864); Darwin incorporated it into the fifth edition of the *Origin*: "This preservation of favourable variations, and the destruction of injurious variations, I call Natural Selection, or the Survival of the Fittest." Charles Darwin, *Origin of Species* 5th edn. London: John Murray, 1869, 91-2.

²² On which see Michael Bulmer, "Did Jenkin's swamping argument invalidate Darwin's theory of natural selection?" *The British Journal for the History of Science* 37 (2004): 281-97.

other words, Darwin's theory lacked a viable understanding of genetics. Darwin responded to Jenkin in the fifth edition of the *Origin*. The reply is generally thought to be very weak and unsatisfactory. But how could it be otherwise?

The answer, of course, lay in the writings of the Austrian monk Gregor Mendel. Yet while Mendel knew about Darwin, Darwin did not know about Mendel. Mendel possessed a copy of the German translation of the third edition of Darwin's *Origin of Species*, and marked the following passage with double lines in the margin. It was clearly of considerable importance to him. In Darwin's original English, this reads:

The slight degree of variability in hybrids from the first cross or in the first generation, in contrast with their extreme variability in the succeeding generations, is a curious fact and deserves attention.²³

This curiosity would not remain mysterious for much longer, and Mendel might well have taken some pleasure from the thought that his theory was able to explain this "curious" fact.²⁴ Yet the confluence of Mendel's theory of genetics and Darwin's theory of natural selection still lay some years in the future.

Yet even though Darwin did not believe that he had adequately dealt with all the problems which required resolution, he was confident that his explanation was the best available. A comment added to the sixth edition makes this point clear:

It can hardly be supposed that a false theory would explain, in so satisfactory a manner as does the theory of natural selection, the several large classes of facts above specified. It has recently been objected that this is an unsafe method of arguing; but it is a method used in judging the common events of life, and has often been used by the greatest natural philosophers.²⁵

While recognizing that it lacked rigorous proof, Darwin clearly believed that his theory could be defended on the basis of criteria of acceptance and justification that were already widely used in the natural sciences, and that its explanatory capacity was itself a reliable guide to its truth. As Darwin noted, there were indeed those who argued that his was an "unsafe method of arguing" – but, in an important anticipation of some of William James's points, Darwin correctly points out that it is widely used in everyday situations. We often find ourselves trusting a way of thinking, believing it to be true, but not being able to offer the decisive proof that some – such as W. G. Clifford – seem to think is essential for an opinion to be held with integrity.

Darwin was aware that his scientific explanation lacked the logical rigour of mathematical proofs, and that any theoretical account of what was observed would always be provisional. That is no criticism of Darwin, and it is no criticism of science. It's just the way things are. I have scientific colleagues who believe passionately in the multiverse, and others who believe with equal passion, integrity and intellectual excellence in a single universe. The evidence is not unequivocal, and both positions can be maintained. But both, I would suggest, cannot be right. What some scientists today believe to be true will one day be shown to be wrong. But that's how science develops. And William James's idea of faith as a "working hypothesis" fits both the theory and practice of science

²³ Charles Darwin, *On the Origin of Species by Natural Selection*. 3rd edition. London: John Murray, 1861, 296.

²⁴ Vítězslav Orel, *Gregor Mendel : The First Geneticist*. Oxford: Oxford University Press, 1996, 193.

²⁵ Charles Darwin, *Origin of Species* 6th edn. London: John Murray, 1872, 444. This comment is not present in earlier editions of the work.

surprisingly well.

As historians and philosophers of science keep telling us, the positivist notion of science proving its theories stands at some considerable distance from the reality of scientific practice, and certainly does not apply to Darwin's scientific method. All of us, I trust, know that the great theories of classical physics, widely regarded as settled and stable towards the end of Darwin's life, underwent complete revision in the twentieth century through the rise of quantum mechanics and the theory of relativity. But we don't stop doing science because our successors may show our present theories to be wrong, and we can at least take consolation in knowing that future theories tend to incorporate, rather than reject, what is best in older theories.

So what of Darwin's religious faith? Did his theory of evolution turn him into an atheist crusader against religious belief, as some seem to suggest? Sadly, Darwin's authority and example are continually invoked to justify metaphysical and theological claims that go far beyond anything that he himself expressed in, or associated with, his evolutionary biology. Happily, the fundamentally *historical* question of Darwin's religious views is relatively easy to answer, thanks to the intensive scholarly study of Darwin and his Victorian context in the last few decades.²⁶ The excellent online Darwin Project has a section which brings together the most important historical evidence in a way that seems to me to be historically objective and trustworthy.²⁷ Let me try to summarize this vast body of literature as simply as I can.

First, it seems clear to me that Darwin's religious faith alters as he becomes older. I certainly see a change in its content; I think I am also right in seeing a decline in its fervency. But let me concentrate on the contents of that faith, looking first at Darwin's religious views as a young man.

We cannot really hope to understand the young Darwin without seeing his ideas through a refracting lens, shaped by the writings of William Paley and others influenced by him, such as John Bird Sumner (1780–1862), later to become Archbishop of Canterbury. There is a physical and intellectual continuity between the young Darwin and Paley: not only did Darwin occupy the same room as Paley had before him at Christ College, Cambridge; Darwin refers with warmth to Paley's classic *Natural Theology*, which in many ways defines the position that he eventually believes he must reject. Paley's detailed descriptions of the adaptations to be found in plants and animals – such as the human eye – seem to have become normative for Darwin. Darwin may have exaggerated slightly in stating that he had committed Paley to memory; nevertheless, echoes of Paley's works are found throughout the *Origin of Species*. Stephen Jay Gould, for example, has pointed out how Darwin's statement of his principle of natural selection is deeply indebted to the language and imagery found in Paley's writings, even though Darwin would later draw some very different conclusions.²⁸

²⁶ See, for example, John Hedley Brooke, "The Relations between Darwin's Science and His Religion." In *Darwinism and Divinity*, edited by John Durant. Oxford: Blackwell, 1985, 40-75; Frank Burch Brown, *The Evolution of Darwin's Religious Views*. Macon, GA: Mercer University Press, 1986; Nick Spencer, *Darwin and God*. London: SPCK 2009.

²⁷ <http://www.darwinproject.ac.uk/>

²⁸ Stephen Jay Gould, *The Structure of Evolutionary Theory*. Cambridge, MA: Belknap, 2002, 118-21.

Paley's view is essentially that God, in his wisdom, created the world in a manner that displays that wisdom in both design and execution – a notion that Paley expresses using the word “contrivance”. The famous image of God as the divine watchmaker expressed both these ideas of design and skilful fabrication. Darwin would, of course, come to reject this model, arguing that natural selection offers a more plausible account of things. Indeed, Darwin himself adopted Paley's heavily loaded term “contrivance” in one of his own works, dealing with the methods of fertilization of orchids. Darwin's *On the various contrivances by which British and foreign orchids are fertilised by insects* appeared in 1862, shortly after the appearance of the *Origin of Species*. Although it was not a commercial success, it had the potential to make a significant contribution to the debate about the implications of Darwin's theory for natural theology. Asa Gray is reported as declaring that “if the Orchid-book (with a few trifling omissions) had appeared before the ‘Origin’, the author would have been canonised rather than anathematised by the natural theologians”. Indeed, a review in the *Literary Churchman* had only one criticism to make of this work – namely, that Darwin's expression of admiration at the “contrivances” found in orchids amounted to an unnecessarily indirect manner of saying, “O Lord, how manifold are Thy works.”²⁹

It should not surprise us that many natural theologians took the view that Darwin rescued Paley's theory, by placing it on a firmer intellectual foundation through rectifying a faulty and ultimately fatal premise. Charles Kingsley, then a canon of Westminster Abbey, was certainly one to take this viewpoint. In his 1871 lecture “On the Natural Theology of the Future,” Kingsley singled out Darwin's work on orchids as “a most valuable addition to natural theology”.³⁰ Insisting that the word “creation” implies process as much as event, Kingsley went on to argue that Darwin's theory clarified the mechanism of creation. “We knew of old that God was so wise that he could make all things; but, behold, he is so much wiser than even that, that he can make all things make themselves.”³¹ Where Paley thought of a static creation, Kingsley argued that Darwin made it possible to see creation as a dynamic process, directed by divine providence. Yet as subsequent developments made clear, Darwin did not himself share Kingsley's confidence concerning Paley's natural theology. However, it is important to appreciate that Darwin's intellectual anxiety about Paley's approach antedates his reflections on natural selection, and is religious, rather than scientific, in character. Let me explain.

Paley's approach to nature is optimistic and positive. Nature exudes evidence of divine wisdom. So what then of evil? Or suffering? Kingsley certainly held that these could be incorporated within Paley's approach to natural theology.³² Yet Darwin's travels on the *Beagle* led him to witness events which called into question his early belief in divine providence. For example, while in South America, Darwin witnessed at first hand the terrible struggle for existence faced by the natives of the Tierra del Fuego; he saw the devastating effects of an earthquake; and he began to grasp the magnitude of the staggering numbers of species that had become extinct – each of which, according to Paley, was providentially created and valued by God. We can see here the beginnings of the erosion of

²⁹ These comments are noted in a letter to Asa Gray, dated 28 July 1862: see *Life and Letters of Charles Darwin*, ed. F. Darwin, vol. 3, 272-4.

³⁰ Charles Kingsley, “The Natural Theology of the Future.” In *Westminster Sermons*. London: Macmillan, 1874, v-xxxiii; quote at xxiii.

³¹ Kingsley, “The Natural Theology of the Future,” xxv. Note Kingsley's emphasis on divine providence in the direction of the evolutionary process (xxiv-xxv).

³² Note especially the comments at Kingsley, “The Natural Theology of the Future,” xiii-xiv.

any belief in divine providence which would become characteristic of the later Darwin. If a crisis point was reached, it may have been through the death of Darwin's daughter Annie in 1851, at the age of 10, which Darwin's biographer James Moore sees as marking a watershed in Darwin's religious convictions.³³ Yet the origins of this development date from much earlier in his life.

This brings us to our second point. Darwin's religious beliefs unquestionably veered away from what we might loosely call "Christian orthodoxy". Yet we do not find anything remotely resembling the aggressive and ridiculing form of atheism we unfortunately find in some of those who have presented themselves as his champions in more recent times. Many have praised the prescience and cool neutrality of Darwin's *Origin of Species*, noting its Olympian social and political detachment and scrupulous religious neutrality. It is in Darwin's letters that we must turn for illumination of both the fluctuations of his religious beliefs over time, as well as his reluctance to comment on religious matters, including his own personal beliefs. Yet when the context demanded it, Darwin seems to have been willing, not merely to go on record concerning, but to emphasise, the consilience of religious faith and the theory of natural selection.

It would be tedious to illustrate this in detail. A representative example lies to hand in his reference to "laws impressed on matter by the Creator", which is given a higher profile in the second edition of the *Origin* than in the first.³⁴ This certainly points to a deistic God, rather than a Trinitarian God. But there is not even the whiff of a personal atheism here. While some might argue that Darwin may have made it possible to be an intellectually fulfilled atheist, Darwin did not himself draw that conclusion. I find it very difficult to believe that his references to a Creator in the *Origin of Species* were simply contrived to mollify his audience, representing crude deceptions aimed at masking a private atheism which Darwin feared might discredit his theory in the eyes of the religious public. My own reading of the evidence was that Darwin regarded religious beliefs as a private matter, and was reluctant to talk about his own religious commitments. Yet the needs of the situation regularly obliged him to say something on this matter. The evidence, I believe, points to reluctant, painful and diplomatic self-disclosure of Darwin's beliefs, not the fabrication or manipulation of those beliefs for tactical purposes.

I must begin to bring this lecture to a close, not because the issues we have been considering have been exhausted, still less settled, but simply because we have run out of time. The core theme of this lecture has been Darwin's belief that his theory of natural selection offered the best explanation of what could be observed in the living natural world. It is not true to state that science believes only what has been empirically proven. At points, inference is necessary, in which an hypothesis (such as a "missing link" or an unobserved entity, such as "natural selection") is postulated as the "best explanation" of known facts or established observations. This is an accepted norm of scientific reasoning, and is not controversial. Yet it is important to note that the same process can be seen in religious thinking, which also aims to give the best explanation of what it observes. As William James once

³³ See further Randal Keynes, *Annie's Box: Charles Darwin, His Daughter and Human Evolution*. London: Fourth Estate, 2001.

³⁴ See the analysis in John Hedley Brooke, "'Laws Impressed on Matter by the Creator'? The *Origins* and the Question of Religion." In *The Cambridge Companion to The "Origin of Species"*, edited by Michael Ruse and Robert J. Richards, Cambridge: Cambridge University Press, 2009, 256-74.

pointed out, religious faith is basically “faith in the existence of an unseen order of some kind in which the riddles of the natural order may be found and explained.”³⁵ Although some persist in portraying religious belief as irrational, the fact is that its proponents regard it as eminently reasonable. In any classical philosophical theism or natural theology, God would be proposed as the best explanation of the way things are.

Both the natural science and religions offer what they believe to be warranted, coherent and reliable explanations of the world. Darwin, as we have seen, believed firmly that the explanatory power of his theory was such that it could coexist with anomalies and potential threats. This is a reminder that both scientific and religious theories find themselves confronted with mysteries, puzzles and anomalies which may give rise to intellectual or existential tensions, but do not require their abandonment. In the case of Christianity, I would judge that the greatest such anomaly is the existence of pain and suffering.³⁶ Yet I believe that the theory is big enough ultimately to be able to embrace and accommodate this anomaly, even though at present the manner of its resolution seems less than clear. Neither Darwin’s theory nor Christian theology can really be said to “predict”; they do, however, accommodate what is known about the world, even though both experience points of tension.

To bring out the theological importance of this parallel, let us consider two scenarios. As we have seen, Darwin held that the ideas set out in *The Origin of Species* offer an excellent and deeply compelling account of the diversity of life forms on the earth. Yet there are many difficulties in its path. How could change be transmitted from one generation to another? Darwin offered an explanation of how different species come into existence. Yet speciation – the formation of a new species by the accumulation of mutations – had never been demonstrated in real life or under laboratory conditions. Yet Darwin held on to the theory, believing that its explanatory ability and coherence are sufficient to justify it, and that the difficulty will one day be resolved.

Consider now the case of a Christian, who holds that a theistic worldview, especially one which takes full account of the doctrine of the incarnation, offers a compelling and attractive understanding of things. The issue of pain and suffering in the world remains something of a puzzle, and at times troubles her considerably. Yet she holds on to her faith, believing that its explanatory ability and coherence are sufficient to justify it, and that the difficulty will one day be resolved.³⁷ In each case, there is a common structure of an explanation with anomalies, which are not regarded as endangering the theory by its proponents, but are seen as puzzles which will be resolved at a later stage. Neither theory predicts; both accommodate what can be observed. In celebrating Darwin, we also affirm the possibility of believing in a theory, a way of making sense of things, a “working hypothesis”, which is not finally confirmed, and may not ultimately be capable of final confirmation – yet which is found to be reliable.

The point here is that a theory of sufficient explanatory power has earned the right to be allowed to coexist with observations that do not accord with it, and may at times even seem to be in conflict with it. In the end, some

³⁵ William James, *The Will to Believe*. New York: Dover Publications, 1956, 51.

³⁶ For the ability of Christian theology to cope with such theoretical anomalies, see Alister E. McGrath, *A Scientific Theology: 3 – Theory*. London: T&T Clark 2003.

³⁷ For the importance of the notion of “eschatological verification”, see John Hick, “Theology and Verification.” In *The Existence of God*, London: Macmillan, 1964, 252-74.

theories die because of their incapacity to deal with such anomalies. Darwin knew this; he also believed that his theory would be shown to be able to cope with them, even if the final vindication of his theory lay in the future. Dare I suggest that the same is true for Christianity, which currently affirms that we see things through a glass darkly (1 Corinthians 13:12), but rejoices that we shall one day see them with the clarity that is found only within the New Jerusalem?

Let me draw this lecture to a close by citing some words from the first edition of the *Origin*, which are retained throughout subsequent editions. As Darwin pauses to allow his readers to catch up with him, he lays the groundwork for his argument that his new theory can co-exist with anomalies and apparent contradictions. I believe these words apply with equal force to the Christian vision of reality:

A crowd of difficulties will have occurred to the reader. Some of them are so grave that to this day I can never reflect on them without being staggered; but, to the best of my judgement, the greater number are only apparent, and those that are real are not, I think, fatal to my theory.³⁸

³⁸ Charles Darwin, *Origin of Species* 1st edn. London: John Murray, 1859, 171. For examples of such “difficulties”, see Abigail J. Lustig, “Darwin’s Difficulties.” In *The Cambridge Companion to The “Origin of Species”*, edited by Michael Ruse and Robert J. Richards. Cambridge: Cambridge University Press, 2009, 109-28.