

Darwin – bane or blessing?

Christopher G. Knight, University of Manchester, Faculty of Life Sciences

I bought my first copy of Darwin's *The Origin of Species* [1] on a school trip. The battered green-bound 6th edition dating from the turn of the twentieth century was being sold off by a Christian community in a purge of their library. It took me over a decade to get round to reading it. By the time I did read it, the old green *Origin* had been joined on the shelf by modern paperback versions of both the first and sixth editions and I was well on the way towards a career in academic biology.

This use of *Origin* probably says something about my reading habits, but it also says something about biology. I felt I could stake a claim to be an aspiring biologist simply by having (and displaying) a copy of Darwin's great work. That 'Darwin' was a shorthand for a whole scientific culture, a set of allegiances and beliefs about how to understand the universe we find ourselves in. I had as yet only touched the hem of that science and its culture, but the book was a statement of intent.

My student desire to have Darwin in pride of place on my shelf is not perhaps so distant from the desire in some quarters of the Christian Church to give him pride of place in the armies of the anti-Christ. Those who wield a bearded image of Charles Darwin as an icon of all they despise about the secular world in general, and modern science in particular, have traditionally been subscribers to Creationism. That term is itself a shorthand for various sets of beliefs about the origin of the universe, lying somewhere between the a-scientific and the anti-scientific. The baton has now been taken on by the 'Intelligent Design' (ID) movement, a, more or less subtly, different set of beliefs with a similar relation to science [2]. And when evolutionary biology is referred to in ID, it is Darwin (and his '-ism') who is invoked as a shorthand (e.g. in ID-related book-titles such as. "*Darwin's black box*", "*Doubts About Darwin*" and "*Debating Design: From Darwin to DNA*" [3]).

So here is the first, most obvious, manifestation of Darwin as bane or blessing: a bane to certain sections of Christianity (and indeed other religious traditions, for instance see Seyyed Hossein Nasr's essay on 'Science and Islam' [4]) and a blessing to biologists. There are occasions when one might equally well invert the relationship: Darwin as a blessing to those anti-scientifically inclined sections of the Church who might never have found a public voice without Darwin as a rallying point; and Darwin as bane to evolutionary biologists whose forays in the popular media are associated *a priori*, not with the excitement of new discoveries about the way the universe works, but with a sterile slanging match over someone who died nearly 130 years ago. There are elements of reality in all these assignments. What they share is that they concern only Darwin the icon; none depends directly on Darwin the person, scientist or writer, let alone particular merits of his science or writing. The most straightforward answer to this essay's title might therefore be to cry 'A plague o' both your houses!' to scientific and religious standard-bearers alike: Anything or anyone who, like Darwin, is primarily used as an icon rather than engaged with in addressing real issues, be they scientific, religious or in any other sphere, can ultimately only be a bane to the progress of human understanding; with perhaps the only exception of providing interesting material for anthropologists and social scientists.

In such a view Darwin could best be done away with. Certainly the idea that life evolves long predates Darwin. Without him, Wallace's findings in South-East Asia would nonetheless have started to bring the process of natural selection to scientific notice at a similar point in history. The real breakthroughs of the neo-Darwinian synthesis, bringing together evolution and genetics, could still have happened and we might have avoided all the obfuscatory fuss over Darwin. Perhaps, in this view, there was something 'wrong' with Darwin—publishing such a weighty tome in *Origin* was too confrontational a way of doing science [5]. Perhaps he was too good a scientific

interpreter— through *Origin* the wider public has been enabled to believe it understands evolution by natural selection in a way we have never felt we understand other parts of science. Had we not had Darwin to interpret it we might have been left in a similar level of ignorance about evolution to that, for instance, associated with most of physics. In such a case it might have been down to writers on science and faith to glory in the way that random chance and apparently arbitrary phenomena have given rise to humans in the process of evolution by natural selection as they now do in physics for Heisenberg's uncertainty principle or the apparent 'fine tuning' of the fundamental constants of the universe [6].

However, such a Darwin-free 'utopia' is unrealistic. Dismissing him simply for becoming a divisive icon is not only grossly unfair to Darwin, it ignores the possibility that Darwin's becoming such an icon might be a symptom of the divisive issues his science raises rather than a cause. We have an emotional reaction to 'Nature red in tooth and claw' not merely because Tennyson's phrase is a striking one, but because the processes of nature it refers to are something to which we can relate much more closely than, for instance, similarly fundamental processes in geology or quantum physics. Indeed the popular appeal of ideas of evolution in the natural world (particularly as set out in *Vestiges of the Natural History of Creation* in 1844) undoubtedly contributed to Tennyson's choice of this subject in a poem exploring human grief and loss from which the quote comes [7]. It therefore seems unreasonable to dismiss Darwin simply for becoming prominent in an inherently inflammatory area of science. The 'bane' that Darwin the icon might be is really only the bane that some religious groups see in evolutionary biology or that Richard Dawkins sees in religion or that many of the rest of us see in the fruitless argument between the two. If then we are to classify Darwin as bane or blessing, we need to set the icon aside and engage with him more directly.

When engaged with more directly, for instance by reading *Origin*, the different users of Darwin the icon find different things. It seems likely that, to those creationists or ID followers who get as far as reading *Origin*, it must be something of a let-down. Contrary to the experience of reading Dawkins, there is no polemic to get one's teeth into. Despite *Origin* being 'one long argument' [8], that argument is not like Job's, an argument with God, to be answered by the wonder of the Behemoth [9] (or bombardier beetle, bacterial flagellum, or any other claimed 'irreducible complexity' [10]). Rather, Darwin's argument is with his observations, with the scientific community of his time and with himself.

Perhaps then, engaging with *Origin* shows it to be a piece of its time. That could leave Darwin is neither bane nor blessing. It could be that, looking beyond the icon, he is irrelevant to modern science and modern anti-science alike. The fact that this is not true is what bowled me over when I did eventually take my iconic *Origin* down from the shelf to read it. I, along with much of the modern world, am steeped in a scientific universe of molecules and genetics. Darwin knew nothing of either [11]. Yet Darwin's thoughts on such commonplaces as domestic pigeons hold a depth and continuing relevance that I for one had not expected. He was encumbered by an inadequate fossil record and an inadequate theory of inheritance. He made up for it by careful thought and a dogged accumulation of evidence. We today have a robust theory of inheritance instantiated in mind-boggling molecular detail. We have also accumulated vastly more data on the history of contemporary organisms, bacteria in particular, in the genome sequences of thousands of species. These genomes attest to the tree-like history of life with new biological taxa originating from common ancestors just as Darwin envisaged [12]. Similarly Darwin's process of natural selection has been reinforced and renewed by modern science. Compared to Darwin's day we now have both have vastly more mathematically robust theory, in the form of population genetics, and vastly more evidence from different quarters, not least experimental evolution [13].

Importantly this more robust theory and data allow modern evolutionary biologists to probe the limits of evolution as Darwin envisaged it, discovering where it breaks down. For instance the tree-like structure of life breaks down in the cases of one organism engulfing another, a crucial process

in evolution since it resulted in mitochondria, the engine of all our cells and chloroplasts the solar power plants of all plant cells [14]. Similarly, neutral theory now provides a robust framework against which to identify natural selection as a cause for evolutionary change. But while modern scientists have all these advantages over Darwin in terms of data and mathematically grounded theory, what we frequently lack is the depth of thought he achieved. In *Origin*, that depth was obtained at least in part through the length of time between observations and publication— decades spent honing thought and intuition, an approach not available to those who earn their living from science today. It is therefore not surprising that, whenever tackling a new area, biologists are well advised to check what Darwin had to say about it first [15].

But even if *Origin* and others of Darwin's writings can be an inspiration and a blessing to modern science, perhaps the rest of humanity, and faith communities in particular, should respectfully leave Darwin and his works on one side as an author of his time and no longer relevant. This seemed to be the message when I bought that first copy of *Origin*. From the same table I also bought a copy of the Book of Common Prayer (1662) and a King James translation of the bible (1611), each bearing a stern admonition not to remove them from the chapel. The Franciscan community who was selling them undoubtedly meant no disrespect to these venerable tomes, making use of both the bible and liturgy several times a day, but they had clearly moved on to more recent texts and had no continuing need for such historic artefacts. The implication was that *Origin* was surplus to requirements for the same reasons.

I did not discover whether the 'biology' shelf of their library was thereafter empty. But if not literally true, it is certainly the case that for many faith communities there is no interface with the science of biology. So while not being directly allied with creationism or ID, science in general and evolutionary biology in particular has been laid on one side as not relevant to faith. One might imagine advantages to such an approach. It avoids what could undoubtedly be a distraction from the rightful concerns of the faithful. The popular level of discussion sees little beyond a dichotomy between, on the one hand Darwin, whose most vocal proponent is also the author of 'The God Delusion' [16] and on the other ID which, while perhaps trying to distance itself from obvious reality-denial of young-earth creationism, nonetheless enjoys no support among relevant scientists, who otherwise seem to have a reasonable grasp of physical, if not spiritual, reality [2]. Engaging with Darwin would seem to imply positioning oneself in one camp or the other, an action which itself would split many faith communities, and having done so, neither camp seems particularly attractive to those wishing both to be true to their faith and to engage with the reality in which they find themselves. Even for those who might see beyond the dichotomy, there is little motivation to push the point, given that doing so would rile those with a more limited view and the advantages of a more constructive engagement with evolutionary biology are unclear.

Such a laying aside of evolutionary biology could leave a space where Darwin is neither bane nor blessing to people of faith. It is however an uneasy space, the bile of the Dawkins vs. ID altercation being fought over Darwin questions whether he can be put on one side with any true respect. Beyond that, there is a problem in the science: one of the things Darwin the icon stands for is evolution itself and, as the great geneticist Theodosius Dobzhansky put so succinctly, "Nothing makes sense in biology except in the light of evolution" [17]. In other words, if we put aside what Darwin stands for, we lose our ability to engage with the whole gamut of biological science. This is a problem since, although the direct relevance of evolutionary biology to faith is not obvious to many, the relevance of other areas of biology increasingly is. So, for instance, in a world of human-induced climate change, the resulting crisis for creation is increasingly being seen as an issue with which people of faith need to engage, and the relevant science here is biology. Thus, for instance, the Christian conservation organization A Rocha makes science a priority. This prioritization is necessary for it to do its work: without a credible scientific basis for its actions it cannot put effective arguments to the secular organizations with which it deals to make its care of creation a reality [18]. But more than being a necessity, the process of ecological science, for this organisation

and many scientists beyond it, is a process of understanding God's creation, the second of 'God's two books' and therefore a devotional act in itself [19]. Why is evolution relevant to such ecology? In academic science, ecology is very closely allied to evolution, with many joint departments. This perhaps reflects the rooting of both in the population genetics begun in the 1930s, a body of theory that considers the change in frequency of particular versions of genes in populations (which is the definition of evolution) in terms of the interactions between different organisms and between organisms and their environments (which is ecology). More generally, ecology attempts to understand the interactions of organisms in real environments, which is precisely what Darwin points to when he imagines a 'tangled bank' and sets this as the result of the evolutionary 'laws' he presents [20]. More pragmatically, evolutionary biology may also be the only hope for achieving a generally acceptable measure of the biodiversity threatened by climate change. Conservation efforts need to be prioritised. Agreeing how many, how diverse and how unusual species are in any particular area provides grounds for that prioritisation. The empirical degree of evolutionary divergence among those species, and between them and those in other areas, is necessarily an important part in this [21].

Faith communities have had longer-standing connections with biology in the ethics of human reproductive biology, which undoubtedly requires evolution to make sense of, not least in view of the claims that changes in human reproductive patterns are leading to 'the end of evolution' [22]. My own Christian denomination, Anglicanism, seems currently to be tearing itself apart over the ethics of homosexuality, a biological subject. The biology of any putative genes affecting sexual orientation certainly needs to be made sense of 'in the light of evolution', given the fact that people with different sexual orientations might be expected to leave different numbers of offspring [23].

It is therefore problematic for faith communities to try to leave evolutionary biology on one side. If evolutionary biology cannot be avoided, then perhaps Darwin the icon needs, not so much to be put aside, as moved beyond. How might one move beyond the bane of the icon—hero or anti-Christ? I suggest that the first step is to ask if there are ways in which Darwin, on his own terms, can be a blessing beyond a limited scientific community. I will make only a couple of speculative suggestions for what such ways might be, based on the discussion so far:

Firstly, Darwin might be a blessing beyond the scientific community in the way that he was a brilliant communicator and has spawned a line of brilliant communicators in this key area of science [24]. *Origin* is infinitely more readable than similarly transformative scientific works such as Newton's *Philosophiæ Naturalis Principia Mathematica*. Part of that has to do with the closeness to home of his subject matter (as discussed above), but that by no means covers it. Subsequent seminal works in the same field, such as Fisher's *The Genetical Theory of Natural Selection* (1930) have been much less accessible. There is a direct connection from Darwin's readable science to the readable scientists of the 20th and 21st centuries. Whatever one makes of what they communicate, Stephen Jay Gould, Richard Dawkins, Steve Jones and a host of lesser-known authors are brilliant communicators in a tradition that can be traced directly to Darwin. Science is deeply tied up with the development of the modern world, its successes and its crises. Darwin's legacy of commitment to effective communication of some of that science can surely only be a net blessing.

The down-side of this communicative tradition, as noted above, can be a rather unhelpful confrontation between science and faith, of which the axis between Dawkins and ID is the most relevant here. As observed above, neither extreme, nor anything on a line between them, is particularly palatable to many, particularly those belonging to faith communities. My second suggestion for how Darwin might be a blessing outside science is therefore as a counter to the Dawkins-ID axis. Darwin and his works point in a direction orthogonal to the axis that uses science as a tool for speculation as to the presence or absence of a creator. Darwin attests to understanding

creation on its own terms, via acute observation, the accumulation of data and, only after that, careful reasoning. This also puts his works orthogonal to the works of William Paley– whose argument from design effectively remains the Dawkins-ID axis. Darwin himself certainly admired William Paley’s arguments [25], but his own works use a completely converse approach. Where Paley starts with a hypothetical world (‘IN crossing a heath, suppose I pitched my foot against a stone’ [26]), Darwin starts with the concrete physical world (‘When on board H.M.S. ‘Beagle,’ as naturalist, I was much struck with certain facts’ [27]) and only after decades of observation and accumulation of such ‘facts’ culminates in the argument of *Origin*. If people in general and people of faith in particular want (or, as I’ve argued above, need) to engage with evolutionary biology, Darwin, offers a paradigm for engagement with that science that is very separate and distinct from the ‘Paley-esque’ line between Dawkins and ID and therefore much more acceptable to those wishing to be true to both their faith and the physical reality in which we find ourselves.

There are undoubtedly other ways in which Darwin might be or become a blessing outside a narrow scientific community. However, it is suffice here to observe that the possibility is there. Darwin, when limited to being an icon for evolutionary biology, is frequently a bane. It may be possible, in principle at least, to prise apart Darwin the historical figure from the multifarious issues evolutionary biology raises about our place in the universe, and set him aside with respect, both as an unnecessarily divisive icon and a scientist of his time. However, I have argued here that those issues raised by evolutionary biology cannot so easily be put aside. With or without Darwin, the science cuts sufficiently close to our experience that it will necessarily connect with lives well beyond academia. Evolutionary biology is also sufficiently pervasive that it would not be desirable to put it on one side even if we could. The vitriolic scientism of Richard Dawkins and the non-science of ID are two manifestations of the wider force of this science. It seems hard to classify either of those as anything but a bane either to science or the world beyond. In that context, can Darwin himself be a blessing, beyond being a less antagonistic cipher for evolution and evolutionary biology than Dawkins (a role he performed effectively in many of 2009’s anniversary celebrations)? I have argued that he can. To contemporary science he remains a blessing through a collection of deeply insightful works which continue to inspire, guide and spark ideas. Beyond science he has the potential to be a blessing both as a paramount communicator of science whose legacy continues into the present and as an antidote to the more baneful collisions between evolutionary science and the world beyond. I therefore live in hope that the Christians’ library that blessed me by selling me my first copy of *Origin* continues to bless its readers with less battered volumes both by Darwin and his successors in evolutionary biology.

Footnotes

- [1] *The origin of species by means of natural selection, or the preservation of favoured races in the struggle for life*. Darwin C., London: John Murray. 6th ed., with additions and corrections (1876). The title of earlier editions started with ‘On’ and by the time of my impression the initial definite article had also been dropped from the cover and spine. It will hereafter be referred to simply as *Origin*. The full text of all major editions of *Origin*, all of Darwin’s other extant writings plus an array of Darwin-related works (including Paley’s *Natural Theology*) may be found at <http://darwin-online.org.uk>
- [2] The Intelligent Design (ID) movement claims (e.g. according to the ID think-tank, the Discovery Institute <http://tinyurl.com/y89aodw> accessed 06/09/10), that ID is a “[theory] that certain features of the universe and of living things are best explained by an intelligent cause, not an undirected process such as natural selection”. This is not the place for a discussion of ID itself. A thorough and readable but disinterested (legal) treatment of ID’s relationships to both science and creationism can be found in the 2005 decision on the American school board case *Kitzmiller v. Dover area school district et al.* available from <http://is.gd/6X3le> It concludes: “In making this determination, we have addressed the seminal question of whether ID is science. We have concluded that it is not, and moreover that ID cannot uncouple itself from its creationist, and thus religious, antecedents.”
- [3] *Darwin's Black Box: The Biochemical Challenge to Evolution*, Michael J. Behe, Free Press: New York (1996); *Doubts About Darwin: A History of Intelligent Design*, Thomas Woodward, Baker books (2003); *Debating Design: From Darwin to DNA*, Cambridge University (2007) Press, William A. Dembski & Michael Ruse (Eds.).
- [4] *The Oxford Handbook of Religion and Science* P. Clayton (Ed) and Simpson (As. Ed.) (2006).
- [5] The definite article in *Origin*’s title (missing as noted in [1] from the cover of my late edition) could also be seen as unnecessarily confrontational. What Darwin deals with is the origination of novel species, and doesn’t touch on *The* origin of the first species or life itself. The origin of life is today a separate and surprisingly productive area of research biology.
- [6] John Polkinghorne in particular clearly sets out the modern natural theology of ‘fine-tuning’ arguments from physics. For a recent brief summary, see J. Polkinghorne *Christianity and Science* in *The Oxford Handbook of Religion and Science* P. Clayton (Ed) and Simpson (As. Ed.) (2006).
- [7] In Memoriam A.H.H. 1849, ‘Nature red in tooth and claw’ appears in canto 56 which concerns the difficulty of reconciling the idea of a loving God with a natural world where whole species go extinct, issues now confounded with Christian concerns over the process of natural selection that Darwin outlined in *Origin* a decade later.
- [8] The final chapter of *Origin* opens with ‘As this whole volume is one long argument...’, referred back to in his autobiography: ‘Some of my critics have said, "Oh, he is a good observer, but has no power of reasoning." I do not think that this can be true, for the *Origin of Species* is one long argument from the beginning to the end, & it has convinced not a few able men.’ Darwin, Francis ed. 1887. *The life and letters of Charles Darwin, including an autobiographical chapter*. London: John Murray. Volume 1 p103.
- [9] “[Then Job answered:] But I would speak to the Almighty, and I desire to argue my case with God... Then the Lord answered Job out of the whirlwind:... ‘Look at Behemoth, which I made just as I made you’ ” Job 13.3 and 40:6,15a NRSV translation, anglicized edition (1989).
- [10] A term credited to Michael Behe, a key figure in the ‘Intelligent Design’ movement, to mean (biological) features unreachable by evolutionary routes. It is a re-invention of a pre-existing concept of irreducible complexity, meaning features that emerge specifically from complex systems, which can and do evolve like anything else.

- [11] For a discussion of the extent to which Darwin's ideas stand up in the light of modern genetics and molecular biology see Charlesworth, B. and D. Charlesworth, *Darwin and genetics*. Genetics, 2009. **183**(3): p. 757-66.
- [12] With the recent Darwin anniversaries, Darwin's notebook sketch from 1837 with its 'I think' annotation has received much coverage <http://tinyurl.com/6hs5uv> particularly given its striking similarity to modern phylogenies of life derived primarily from DNA sequences. However a tree-like vision for the origin of species goes back further, at least to an obscure diagram by Augier (1801) and Lamarck's 1809 book *Philosophie Zoologique* p 463 <http://tinyurl.com/knt7vr>, though Pallas in 1766 used the analogy: "the system of organic bodies is best of all represented by an image of a tree" quoted in Archibald, J.D., *Edward Hitchcock's pre-Darwinian (1840) "tree of life"*. J Hist Biol, 2009. **42**(3): p. 561-92 see also Stevens, P.F., *Augustin Augier's "Arbre Botanique" (1801), a Remarkable Early Botanical Representation of the Natural System*. Taxon, 1983. **32**(2): p. 203-211. I am indebted to the Evoldir list (<http://evol.mcmaster.ca/evoldir.html>), in particular Joel Parker, and Peter Gogarten for highlighting these references.
- [13] For a recent review see Buckling, A., et al., *The Beagle in a bottle*. Nature, 2009. **457**(7231): p. 824-9.
- [14] Recent work suggests that such 'endosymbiosis' events may have profoundly influenced even more of contemporary life than previously thought, see Lake, J.A., *Evidence for an early prokaryotic endosymbiosis*. Nature, 2009. **460**(7258): p. 967-71.
- [15] I most recently encountered this advice from Deborah Charlesworth, one of the UK's leading population geneticists, in her Fisher memorial lecture 2010: 'Fisher and Modern Evolutionary Genetics' see (<http://tinyurl.com/27ssa6t>) In fact she almost took the consultation of Darwin as a given, her point being that in addition, the less accessible work of Ronald Fisher should be consulted.
- [16] Dawkins, R., *The God Delusion*. 2006: Bantam Books.
- [17] A very similar phrase is best known as the title of an essay: Dobzhansky, T., *Nothing in Biology Makes Sense Except in the Light of Evolution* American Biology Teacher 1973. **35**: p. 125-129. though this quote comes from an earlier piece trying to reconcile the then new science of molecular biology with more traditional biology: Dobzhansky, T., *Biology, molecular and organismic*. American Zoologist, 1964. **4**: p. 443-452.
- [18] This practical role for research amounts to much more than pragmatism, as illustrated by Will Simonson's article on the A Rocha website: "The science is important because it is all too easy for well-intentioned intervention to wreak damage to a natural environment by lack of ecological understanding. Science helps create that understanding, and becomes an important tool for the biblical mandate to care for God's world." <http://tinyurl.com/24vy2br>, accessed 06/09/10.
- [19] While the idea of God speaking through the 'book of nature' as read by science dates back at least to Galileo's use of the metaphor, the ideas of such natural theology peaked around the time of Darwin, notably with William Paley (see [25-26] below).
- [20] The final paragraph of *Origin* begins "It is interesting to contemplate a tangled bank, clothed with plants of many kinds, with birds singing on the bushes, with various insects flitting about and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us"
- [21] This interface between the degree of evolutionary divergence and the cataloguing diversity is currently inhabited by the DNA bar-coding movement that uses short, evolutionarily informative DNA sequences to identify species. See <http://barcoding.si.edu/history.html>
- [22] Steve Jones, head of genetics at University College London, is particularly associated with this view, he has long held that various factors "seem to be conspiring to slow down human evolution," (<http://is.gd/6xGbJ>) though there was a recent flurry of press interest in the subject, e.g. <http://is.gd/6xIqy> (Times, 7th October 2008).

- [23] See <http://is.gd/6xCvf> for a sophisticated, if speculative, discussion from the popular press of the possible evolutionary biology of ‘gay genes’ (Sunday Times 24th August 2003).
- [24] The ISI database of scientific journals lists only 0.6% (39 out of 6620) under ‘Evolutionary Biology’, but over 7 times that proportion of ‘popular science’ books in Amazon.com have ‘evolution’ as a keyword (3,154 out of 74,089 in January 2009).
- [25] “The logic of this book [Paley’s ‘Evidences of Christianity’] and, as I may add, of his ‘Natural Theology,’ gave me as much delight” Darwin, Francis ed. 1887. *The life and letters of Charles Darwin, including an autobiographical chapter*. London: John Murray. Volume 1 p47
- [26] The opening words of Paley, W. 1809. *Natural Theology: or, Evidences of the Existence and Attributes of the Deity*. 12th edition London: Printed for J. Faulder. p1
- [27] The opening words of *Origin*, see [1]