

**R.J. BERRY**

## Nothing in Biology makes Sense Except in the Light of Evolution

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*In his Boyle Lecture, Conway Morris provides an important counter to those who condemn Darwinian evolution as meaningless in direction and driven by random processes. In doing so, he answers the indictments of critics such as Jacques Monod and Stephen Jay Gould, and suggests an important bridge towards understanding evolution as the mechanism used by God in creation.*

The geneticist Theodosius Dobzhansky's statement that 'nothing makes sense except in the light of evolution'<sup>1</sup> is often quoted – applauded by scientists as a pithy statement of reality and pilloried by anti-evolutionists as typifying the arrogance and obduracy of those who disagree with them. Dobzhansky's spur was the report of a request in 1966 to King Faisal of Saudi Arabia to suppress a spreading heresy: 'The Holy Koran, the Prophet's teachings, the majority of Islamic scientists, and the actual facts all prove that the sun is running in its orbit.... [but] the earth is fixed and stable, spread out by God for his mankind.... Anyone who professed otherwise would utter a charge of falsehood toward God, the Koran, and the Prophet.' Dobzhansky regarded the request as based on the premise that the Copernican theory is merely a 'theory'. He averred, 'The Koran and the Bible do not contradict Copernicus, nor does Copernicus contradict them. It is ludicrous to mistake the Bible and the Koran for primers of natural science.' (For the record, King Faisal did not accept the complaint.)

It is true that the earth *seems* to us to be fixed and stable, as it did to the Psalmist (Pss. 19: 4-6; 96: 10; 104:2). It appeared so to Calvin. In a sermon on 1 Corinthians 10: 19-24, he rebuked those who are 'so deranged, not only in religion but who in all things reveal their monstrous nature that they will say that the sun does not move, and that it is the earth which shifts and turns'.<sup>2</sup> Four centuries later, we reject this rebuke; indeed, we have no doubts that both Calvin and the King's applicant were mistaken.

But we continue to make similar assumptions. To the casual observer the natural world seems to be a marvellous lattice of gloriously integrated contrivances. Archdeacon Paley typifies many who saw Creation as the work of a Designer God and a proof of his existence. This assurance has not persisted:

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1 Dobzhansky, T. 'Nothing in biology makes sense except in the light of evolution', *The American Biology Teacher* (1973) 35: 125-129.

2 Cited by Brooke, J.H. *Science and Religion*, Cambridge: Cambridge University Press (1991), p. 96.

widespread acceptance of change in both the physical and biological worlds has forced a re-examination of how God relates to his world. Challenges came first in the first half of the nineteenth century from geologists realising that the Earth is much older than 6000 years; their concerns were driven by science and had nothing to do with either biological evolution or doubts about biblical truth. But they were sharpened in mid century by Darwin's work and (coincidental but unrelated) attacks on the inspiration and authority of scripture. Doubts about accepting God as a Creator who works through an evolutionary mechanism were soon dispelled<sup>3</sup> for all but determined dissenters,<sup>4</sup> but exactly how God effects natural processes has remained necessarily speculative. A persisting problem has been the origin of the inherited variation on which natural selection depends to produce adaptation and hence the appearance of ecological integration. Mutations at any locus are apparently random in their effects. Is it realistic to think of God somehow directing the course of mutation?<sup>5</sup>

Richard Dawkins castigates anti-evolutionists for hanging their arguments on assumptions about improbability:

However superficially different they may appear, under the surface the deep structure of creationist advocacy is always the same. Something in nature – an eye, a biochemical pathway, or a cosmic constant – is too *improbable* to have come about by *chance*. Therefore it must have been *designed*. A watch demands a watchmaker. As a gratuitous bonus, the watchmaker conveniently turns out to be the Christian God (or Yahweh or Allah, or whichever deity pervaded our particular childhood). This is a lousy argument.<sup>6</sup>

In this context, there is considerable irony in the comment by R.A. Fisher that 'it was Darwin's chief contribution, not only to biology but to the whole of natural science, to have brought to light a process by which contingencies *a priori* improbable, are given, in the process of time, an increasing probability, until it is their non-occurrence rather than their occurrence which becomes highly improbable'.<sup>7</sup>

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3 Moore, A. 'The Christian doctrine of God', In Gore, C. (ed.) *Lux Mundi* 57-109, London: John Murray (1899), pp. 99-100; Moore, J.R. *The Post-Darwinian Controversies*, Cambridge: Cambridge University Press (1979); Numbers, R.L. *The Creationists*, New York: Knopf (1992).

4 Numbers, *op. cit.* [3]; Berry, R.J. *God and the Biologist*, Leicester: Apollos (1996); Johnson, P.E., Lamoureux, D. et al. *Darwinism Defeated?*, Vancouver: Regent Publishing (1999); Ruse, M. *Can a Darwinian Be a Christian?*, Cambridge: Cambridge University Press (2001).

5 Russell, R.J. 'Special providence and genetic mutation: a new defense of theistic evolution', In Miller, K.B. (ed.) *Perspectives on an Evolving Creation*, Grand Rapids, MI: Eerdmans (2003), pp. 335-369.

6 Dawkins, R. 'Foreword', In Shanks, N. *God, the Devil, and Darwin*, New York: Oxford University Press (2004), pp. vii-x.

7 Fisher, R.A. 'Retrospect of the criticisms of the theory of natural selection', In Huxley, J.S., Hardy, A.C. & Ford, E.B. *Evolution as a Process*, London: George Allen & Unwin (1954), pp. 84-98.

## Randomness in Darwinian Evolution: Monod

The two most important scientists who have argued in recent years for evolutionary randomness (or contingency) are the French Nobel Prize winner, Jacques Monod,<sup>8</sup> and the American palaeontologist, Stephen Jay Gould.<sup>9</sup> Simon Conway Morris responded in depth to Gould in a book, *The Crucible of Creation*, published in 1998,<sup>10</sup> and in subsequent work<sup>11</sup> and in his Boyle Lecture he has extended his critique, particularly of the denial by Gould that there has been any 'progress' in evolution. I return to Conway Morris's arguments below. Before considering these, it is worth revisiting the debate following the publication in 1972 of *Chance and Necessity*, which was acute in the 1970s although little mentioned today. Monod was a molecular biologist at the Pasteur Institute in Paris. He received a Nobel Prize in 1965 jointly with his colleagues François Jacob and André Lwoff for 'discoveries concerning genetic control of enzyme and virus synthesis'. His thesis in *Chance and Necessity* was that 'Pure chance, absolutely free but blind [is] at the very root of the stupendous edifice of evolution... Man at last knows that he is alone in the unfeeling immensity of the universe.' He claimed that we now have 'biological proof of the absence of a master-plan' and 'belief in a universe in which man was destined to appear is contrary to modern biology'.<sup>12</sup>

Monod's book elicited detailed Christian responses from Donald MacKay,<sup>13</sup> John Lewis,<sup>14</sup> Arthur Peacocke,<sup>15</sup> Bill Thorpe<sup>16</sup> and David Bartholomew.<sup>17</sup> Both MacKay and Lewis emphasised that Monod was ontologically reductionist in his argument. MacKay pointed out further that events for which no cause is known provide no argument against God's involvement. He used his well-rehearsed argument that we must view God's activity as complementary to our understanding of causal relationships; it is logically inept to claim that a scientific fact can say anything for or against the supernatural. MacKay quoted Proverbs 16: 33, 'The lot is cast into the lap, but its every decision is from the Lord.' He said, 'It may be charitably supposed that Simpson and Monod would have been ready to admit that their arguments could not be deduced from sci-

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8 Monod, J. *Chance and Necessity*, Wainhouse, A. (trans.), London: Collins (1972).

9 Gould, S.J. *Wonderful Life*, London: Hutchinson Radius (1990).

10 Conway Morris, S. *The Crucible of Creation*, New York: Oxford University Press (1998).

11 Conway Morris, S. *Life's Solution. Inevitable Humans in a Lonely Universe* Cambridge: Cambridge University Press (2003); The Boyle Lecture 2005: 'Darwin's compass: how evolution discovers the song of creation', *Science & Christian Belief* (2006) 18(1), 5-22.

12 BBC interview with Peter Medawar in June 1972, cited by Bartholomew, D. in *God of Chance*, London: SCM (1984), p. 16.

13 MacKay, D.M. *The Clockwork Image*, London: IVP (1974); *Science, Chance and Providence*, Oxford: Oxford University Press (1978).

14 Lewis, J. 'The Cartesian paradox', In Lewis, J. (ed.) *Beyond Chance and Necessity*, London: Garntstone Press (1974), pp. 27 -50.

15 Peacocke, A.R. *Creation and the World of Science*, Oxford: Clarendon Press (1979).

16 Thorpe, W.H. *Purpose in a World of Chance*, Oxford: Oxford University Press (1978).

17 Bartholomew, D. *op. cit.*, [12].

entific fact... Christians have here a constructive, if humbling task of clarification, in which not only the Bible but the nature of science itself support them as they seek to bring such misrepresentation to an end.<sup>18</sup>

Thorpe also inveighed against reductionism. As a behavioural biologist, he was particularly concerned with emergent properties and possibly even the appearance of 'mind' in the natural world. Peacocke argued that chance may have positive consequences through producing new potentialities. Bartholomew, a statistician, showed how order can come from apparent chaos, a line of mathematical argument which has developed rapidly in recent years. He built on Peacocke's thesis that chance is a deliberate and perhaps necessary part of God's creation and suggested that abandoning 'the traditional idea of an all-powerful God in intimate control of every electron' does not prevent him achieving his intended goals.

Obviously, the arguments behind Monod's atheism are not as robust as he claimed. However the criticisms that his book have elicited were useful in showing that chance at the molecular (or genetical) level does not rule out the possibility of a Designer who has a purpose for his design; and more positively, they provide a useful underpinning to Conway Morris's belief that we are not 'the result of a series of mindless accidents [but that] history has directions and conceivably end-points'.

### **Randomness in Darwinian Evolution: Gould**

Steven Gould was fond of arguing that there was no direction to evolution; if evolution was repeated, it would almost certainly run a different course.<sup>19</sup> Conway Morris maintains that the possibilities for change at any decision point in a lineage are so limited that historical outcomes would have a high chance of being repeated. It is the complete antithesis of the notorious Fred Hoyle and Chandra Wickramasinghe assertion that the probability that life originated by the random association of molecules is one in ten to the power of 40,000, 'as ridiculous and improbable as the proposition that a tornado blowing through a junk-yard may assemble a Boeing 747'.<sup>20</sup> Their calculation was based on the likelihood that 2000 enzyme molecules are formed simultaneously from their 20 component amino acids at a particular place on a specified occasion. But the correct probability is of a much simpler self-replicating system capable of natural selection occurring at any point on earth at any time within a period of 100 million years. With the restraints removed, Andrew Huxley suggests that this probability is probably near one.<sup>21</sup>

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18 MacKay *op. cit.* [13] (1974), p.55.

19 See for example: Gould, S.J. *op. cit.*, [9], p. 48.

20 Hoyle, F. & Wickramasinghe, C. *Evolution from Space*, London: Dent (1981).

21 Huxley, A. 'Anniversary address', *Proceedings of the Royal Society* (1983) A, 217, 117-128. See also Bartholomew, D. *op. cit.*, [12], pp. 42-44.

But a more serious objection raised by Gould is that there has never been – nor can be – any ‘progress’ in evolution. Evolution proceeds by adaptation which is the result of differential survival and this depends wholly on the interaction of an individual with its particular environment(s). This may lead to the loss of complex structures (as is often the case in parasitism) or the reversal of a previous trend (clearly seen in some fossil lineages). It has to be acknowledged that even on Gould’s interpretation, this absence of progress is not absolute; it has to be modified on occasion when a morphological, physiological or behavioural development (such as the development of a nervous system, air-breathing, homeothermy, etc.) opens the possibility of a new range of adaptations. However, Conway Morris goes further; he effectively argues that the procession from ‘stage’ to ‘stage’ is not simply a series of adventitious lurchings.

He may be correct. As Conway Morris has shown in his scientific work,<sup>22</sup> Gould was certainly wrong in the inferences he drew from the primitive fossils of the early Cambrian. Gould thought that most early forms rapidly disappeared from the record; by painstaking study of the same material, Conway Morris found that putatively related forms almost all continued, many of them to the present. In other words there is more continuity in the history of life than claimed by Gould.

This brings us back to the question of ‘progress’. As Peter Bowler has shown,<sup>23</sup> many liberal religious thinkers in the post-*Origin of Species* decades espoused some form of vitalism or non-materialism because it seemed to them to offer hope for humankind, but they were building on sand. They were led astray by extrapolating certain scientific ideas<sup>24</sup> which were quickly rejected by most in the scientific community (notable exceptions being the astronomers James Jeans and Arthur Eddington). This led to a fragile and false synthesis between faith and science which disappeared in the face of depression and militarism in the 1930s as any optimism that humanity was able to save itself by its own efforts collapsed.

By examining a series of evolutionists from Erasmus Darwin to the present day, Michael Ruse has convincingly shown that evolutionary biologists have been increasingly successful in emancipating themselves from cultural pre-conceptions.<sup>25</sup> Notwithstanding, the notion of progress beloved of Enlightenment thinkers will not go away, despite general agreement that any assumption of progress from scientific results is a philosophical extrapolation and cannot be read legitimately from the science itself.<sup>26</sup> Ruse comments on two to the

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22 Conway Morris *op. cit.*, [10].

23 Bowler, P.J. *Reconciling Science and Religion. The Debate in Early-Twentieth Century Britain*, Chicago: Chicago University Press (2001).

24 Particularly influential was Bergson, H. *Creative Evolution*, New York: Henry Holt (1911).

25 Ruse, M. *Mystery of Mysteries*, Cambridge, MA: Harvard University Press (1999).

26 Nitecki, M.H. (ed.) *Evolutionary Progress*, Chicago: Chicago University Press (1988); Miller, K.B. (ed.) *Perspectives on an Evolving Creation*, Grand Rapids, MI: Eerdmans.

most eminent evolutionists of the recent past, 'Dobzhansky had yearnings for the Russian Orthodox faith of his youth and [Julian] Huxley in his "secular humanism" was trying to compensate for the aching void of his family's agnostic tradition. How else can one explain their shared fuzzy-headed delight in the wild progressive speculations of that heretical Jesuit theorist, Teilhard de Chardin?'<sup>27</sup>

Where does the Christian faith fit into all this? Christian evolutionists are sometimes attacked for being fettered by 'scientific naturalism' which is said to be synonymous with atheism.<sup>28</sup> Whilst evolutionists may be atheists (as may be philosophers, lawyers or physicists), this faith (in a lack of faith) involves philosophical assumptions on their part.<sup>29</sup> Conway Morris accepts that 'today's culture is blatantly scientific and deeply manipulative [and] wedded to a naturalistic programme' but (obviously writing as a convinced evolutionist) he believes that 'Christian theology offers insights [while] science reminds us that Creation is far more wonderful, far more extraordinary, far more diverse, far richer than we could have ever anticipated.' But he goes further, 'The study of evolution itself already hints that to reduce all to the accidental and incidental may turn out to be a serious misreading of the evidence... The view that evolution is open-ended, without predictabilities and indeterminate in terms of outcomes is negated by the ubiquity of evolutionary convergence... The evidence now strongly suggests humans to be an evolutionary inevitability.'

Conway Morris thus explicitly dissociates himself from contemporary culture and fashionable criticisms of Darwinism, and at the same time bases his conclusions about the way evolution has proceeded on potentially verifiable scientific argument. There is a clear convergence here between the emergence of mankind and a Creator God who oversees the process. This is rigorous science, not speculative 'God-of-the-Gaps-ism'; Conway Morris seems to be pointing a way to a robust strengthening of theistic creationism rather than yet another of the insecure speculations about the history of life on earth which have marred our understanding of God's work in his creation.<sup>30</sup>

## The Song of Creation

Conway Morris's picture of the billions of years of life's history overseen by God

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27 Ruse, M. 'Molecules to men: evolutionary biology and thoughts of progress', In Nitecki, M.H. (ed.) *Evolutionary Progress*, Chicago: Chicago University Press (1988), pp. 97-126, p. 108.

28 For example, Phillip Johnson has written, 'Naturalism is not something about which Darwinists can afford to be tentative, because their science is based upon it... The absence from the cosmos of any Creator is therefore the essential starting point for Darwinism', Johnson, P. *Darwin on Trial*, Downer's Grove: IVP (1991), p.115.

29 Ward, J.F.K. *God, Chance and Necessity*, Oxford: Oneworld (1996); McGrath, A. *Dawkins' God*, Oxford: Blackwell (2005).

30 See also Peters, T. & Hewlett, M. *Evolution from Creation to New Creation*, Nashville, TN: Abingdon (2003).

is complemented by the history of the Israelites in the Promised Land described in the older Testament. Both life's history through millions of years and the travails in the Promised Land through decades represent a developing saga characterised by pragmatic (and frequently wrong) decisions; both can be seen in retrospect as much more than random walks through history (see for example the complementary Psalms 103 and 104). When Conway Morris talks about the 'song of creation' he is reaching outside his professional expertise in evolutionary palaeontology, but he is legitimately seeking to draw out the implications of his understanding. It is a commonplace of ecology that intense concentration on local detail obscures general pattern.<sup>31</sup> It could be that Conway Morris is pointing us to a bridge between the science of evolution and the awe of Creation described in Job 38, 39. As he writes, 'Animals *are* astonishing. Is he right to hint at 'a "prior landscape" which predetermines, albeit in an extraordinarily rich way, the outcomes of the [evolutionary] process, not least human intelligence and by implication the inevitability of contact with a different sort of Mind, an encounter with God'? If God is truly infinite and outside time, there seems no problem in this idea. Is the 'encounter' here the '*bara*' event that led to our becoming 'made in the image of God'? Much reflection is needed and Conway Morris's hypothesis (for that is what it is) may be wrong, but true or false he has given us ammunition to challenge the deism of creationism, the Gnosticism of the intelligent designers, the naivety of the literalists and the reductionism of the sceptics. He has built a mighty apologetic plank, and one which goes a long way towards supporting Dobzhansky's contention that 'nothing in biology makes sense except in the light of evolution'.

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**Prof. R.J.Berry is a former President of Christians in Science. He is also a former President of the Linnean Society, at which the original presentation by Charles Darwin and Alfred Russel Wallace of the theory of evolution by natural selection was made.**

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31 Berry, R.J. *God's Book of Works*. London: T&T Clark (2003), p.112f.

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