Palaeontologia Electronica
http://palaeo-electronica.org

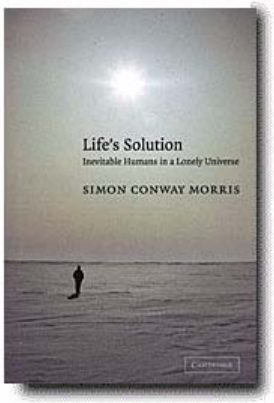
Life's Solution: Inevitable Humans in a Lonely Universe

Reviewed by Michael Ruse

by Simon Conway MorrisCambridge: Cambridge University Press, 2003. xxi+464 pp., $30.00.
ISBN 0-521-82704-3

In one of his most popular books (*Wonderful Life*), the late Stephen Jay Gould singled out for special praise the work on the Burgess Shale (those well-preserved, soft-bodied, Cambrian organisms found in a deposit in the Canadian Rockies) of English paleontologist Simon Conway Morris. At the same time, however, Gould used Conway Morris's findings as support for his own thesis about the non-directedness of life's history. Gould argued that most of the Burgess Shale organisms went extinct, and pure chance determined which lost and which won. Hence, the history of life could easily have been different. In Gould's vivid metaphor, "the tape of life" replayed would always be very different from the time before. If we could put the clock back to the Cambrian (just over 500 million years ago), one has no guarantee that subsequent history would be as it has been.

Conway Morris objects strongly to this conclusion, and his new book, *Life's Solution: Inevitable Humans in a Lonely Universe,* provides an extended, science-based argument intended to support his conviction that the arrival of humans on this planet was both highly improbable (in the sense of any life appearing at all) and highly probable (in the sense of, life having commenced, intelligent beings were was just a matter of time). Conway Morris's improbability-of-life arguments are fairly standard and, although updated by modern science, belong to the tradition going back at least to William Whewell who, in the middle of the nineteenth century, provided many reasons why life on earth is unique – the inhospitality of other planets and other solar systems and so forth. (With the new findings that there was probably water on Mars, these arguments are perhaps less convincing already than when Conway Morris put pen to paper.)



More creative and interesting is the positive side to Conway Morris's argument, about the nigh-inevitable appearance of human-like organisms once life had commenced here on Earth. Conway Morris's basic starting position is that of Franklin and Marshall paleontologist Roger Thomas (among others), namely that only certain areas of potential morphological space are going to be capable of supporting functional life – in the language of the famed population geneticist Sewall Wright, that only certain areas of the landscape are going to be adaptive peaks. Conway Morris draws attention to the oft-noted absence of wheels in the living world. Given that wheels are such an efficient way of transporting loads, it seems very strange that, far from being ubiquitous, they are absent. We organisms have legs, wings, fins, and even slither, but no wheels. Actually, however, the reason why wheels do not normally exist is very simple. Wheels need flat, hard surfaces to function properly. Unfortunately, such surfaces are rare. "In the natural world as often as not, and especially on sea floors, this means acres of mud

and other soft, sticky, substrates, ideal for getting bogged down" (Conway Morris 2003, 112). Wheels are simply not adaptively plausible.

Building on this kind of point, Conway Morris adds the assumption that selection is forever pressing organisms to look for potential, functional spaces. Hence, if such spaces exist, sooner or later they will be occupied – probably sooner rather than later, and probably many times. This directly challenges Gould's claim that, if you run life's tape more than once, you would get completely different results. Conway Morris draws attention to the way in which life's history shows an incredible number of instances of convergence – instances where the same adaptive morphological space has been occupied again and again. The most dramatic perhaps is that of saber-toothed, tiger-like organisms, where the North American placental mammals (real cats) were matched item for item by South American marsupials (thylacosmilids). Clearly existing was a niche for organisms that were predators, with cat-like abilities and shearing/stabbing-like weapons, and natural selection found more than one way to enter it. Indeed, it has been suggested, that long before the mammals, the dinosaurs might also have found this niche.

Conway Morris's repeated point is that this sort of thing happens over and over again, showing that the historical course of nature is not random but strongly selection-constrained along certain pathways and to certain destinations. From this, Conway Morris concludes that movement up the order of nature, the chain of being, is bound to happen, and eventually some kind of intelligent being (what has been termed a "humanoid") is bound to emerge. We know from our own existence that a kind of cultural adaptive niche exists – a niche where intelligence and social abilities are the defining features. More than this, we know that this niche is one to which other organisms have (with greater or lesser success) aspired. We know of the kinds of features (like eyes and ears and other sensory mechanisms) that have been used by organisms to enter new niches; we know that brains have increased as selection presses organisms to ever new and empty niches; and we know that, with this improved hardware, have come better patterns of behaviour and so forth (more sophisticated software). Could this not all add up to something?

> If brains can get big independently and provide a neural machine capable of handling a highly complex environment, then perhaps there are other parallels, other convergences that drive some groups towards complexity. Could the story of sensory perception be one clue that, given time, evolution will inevitably lead not only to the emergence of such properties as intelligence, but also to other complexities, such as, say, agriculture and culture, that we tend to regard as the prerogative of the human? We may be unique, but paradoxically those properties that define our uniqueness can still be inherent in the evolutionary process. In other words, if we humans had not evolved then something more-or-less identical would have emerged sooner or later. (p. 196)

Discerning readers of this review might have noticed that in the second paragraph above I referred to Simon Conway Morris's "science-based" argument, and may have wondered why I felt it necessary to add such a description. Surely, given that Conway Morris and Gould are paleontologists, one would expect no less (and probably no more). But this is to miss an important layer of meaning. There is more between Gould and Conway Morris than facts, and also there is more between them than scientific interpretations. Gould was an agnostic, thinking that no ultimate meaning can be gained from the study of nature. Things just happen. He made this clear in one of his last books, *Rocks of Ages.* Conway Morris is a Christian (an Anglican, what Americans call Episcopalian), and he clearly thinks that the emergence of humans (or something human-like) was no mere chance. In such a universe as we have, something made in the image of God was bound to happen. At least, it was bound to happen once life got going.

I find myself in the happy position of disagreeing with both authors. I doubt that life is anything like as contingent as Gould claimed. To belittle natural selection in the way that he did strikes me as just plain wrong. But, on the other side, I would like to see a bit more about these niches that supposedly exist out there, waiting to be conquered. Geneticist Richard Lewontin for one has argued that organisms create niches as much as they discover them, and hence we have no good reason to assume that something like a consciousness niche exists even before consciousness arose. Perhaps in another world, organisms will enter/create something entirely different. (And before you ask me about that different world, let me point out that I cannot tell you because if I could I would myself have conquered it rather than – or as well as – consciousness!)

But, this apart, even were I a Christian, I would be uncomfortable with Conway Morris's arguments that life's history points so strongly to deeper meanings. As I argued in my last book, *Darwin and Design: Does Evolution have a Pur-*

pose?, I am uncomfortable with any natural theological approach that tries to support belief by appeal to nature. Too often, scientists change their minds, and the believer is left to scramble to shore up religious claims that no longer have strong empirical support. Far better to go with a theology of nature, that starts with faith, and then delights in the creation, whatever its nature and our contemporary understanding.

But let me not end on a negative note. Agree or disagree, Stephen Jay Gould and Simon Conway Morris are talking about important things. If you have not done so, read *Wonderful Life.* Then read *Life's Solution: Inevitable Humans in a Lonely Universe.*

REFERENCES

Gould, S J. 1989. *Wonderful Life: The Burgess Shale and the Nature of History.* New York, N.Y.: W. W. Norton Co.

Gould, S J. 1999. *Rocks of Ages: Science and Religion in the Fullness of Life.* New York: Ballantine.

Lewontin, R C. 1978. Adaptation. Scientific American 239, no. 3: 213-30.

Ruse, M. 2003. *Darwin and Design: Does Evolution have a Purpose?* Cambridge, Mass.: Harvard University Press.

Whewell, W. [1853]2001. *Of the Plurality of Worlds. A Facsimile of the First Edition of 1853: Plus Previously Unpublished Material Excised by the Author Just Before the Book Went to Press; and Whewell's Dialogue Rebutting His Critics,* Reprinted from the Second Edition . Chicago: University of Chicago Press.