

## ***World Enough and Time***

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*Time Reborn: From the Crisis in Physics to the Future of the Universe*

By Lee Smolin (Allen Lane 305pp £20)

When the American physicist Alan Sokal published his famous 'hoax' article in a leading cultural studies journal in 1996, the take-home lesson was supposed to be that anyone with a genuine understanding of contemporary physics will not be tempted to draw easy analogies between, say, the relational character of space-time and social constructivism simply because both look somewhat 'relativistic'. Clearly this lesson was lost on Lee Smolin, an eccentric but interesting physicist (cited by Sokal) who has probably done more than anyone in recent times to develop the idea that our ordinary experience of time's flow, which gives us a sense that reality is moving from the past through the present to the future, is not merely a feature of human psychology but is fundamental to the nature of physical reality. This book is the latest and most readable installment of that project.

Smolin dedicates *Time Reborn* to his friend, Roberto Unger, the Harvard law professor and sometime Brazilian patriot who rose to fame in the 1980s for spearheading the radically constructivist 'critical legal studies' movement. In his earlier work, *The Trouble with Physics* (2006), Smolin credited Unger with helping him to see the potentially profound implications of temporality as an irreducible feature of the universe. While this idea has periodically surfaced in the history of physics, most notably in early interpretations of Einstein's theory of relativity, Smolin draws relatively little from this tradition, which was explored to greatest effect by Milič Čapek in *The Philosophical Impact of Contemporary Physics* (1961).

To be sure, the crux of Smolin's cosmology — that black holes might serve as the seed bed for multiple evolving universes — only started to be taken seriously a decade after the publication of Čapek's book. Nevertheless the first half of *Time Reborn* diagnoses the ultimate unreality of modern physics in terms that recall Čapek's champion of time-driven cosmology, Henri Bergson. Bergson's entire career may be understood as a sustained revolt against the Platonism that he believed allowed his first intellectual love, mathematics, to export a radically false metaphysics that effectively reduced the flow of life, *l'élan vital*, to a succession of dead moments.

Even if Bergson would not know what to make of Smolin's own generative account of black holes, called 'cosmological natural selection', he would appreciate Smolin's animating concerns. Both vehemently deny the Platonist assumption that lived experience is just a pale representation of a timeless mathematical reality. Indeed, the composition of *Time Reborn* exemplifies the point. It presents a radical programme for physics research without a single equation expressed. Smolin would also join Bergson in stressing the significance of life as a continuously creative process that is conditioned by the past but not determined by it. However, disagreements would quickly arise about the exact nature of Smolin's project. After all, Smolin insists that he is still doing physics, while Bergson left mathematics for metaphysics.

The full measure of Smolin's proposed revolution in physics may be glimpsed

through the topsy-turvy idea that all the dimensions of the universe, not least what is normally called 'space', are really emergent features of time. The 'arrow of time' is no mere illusion created by a local reversal of entropy in the part of the universe where we happen to live but rather characterises the increasing complexity of the universe as a whole. The universe, in turn, is subject to periodic 'bounces', as it collapses into a black hole, only to be reborn with somewhat altered parameters that change the laws of nature so as to enable still greater complexity to flourish.

Smolin hints that physicists' imaginations remain in thrall to a lingering theological impulse from Newton that traces temporality to our biblically fallen attempt to come to grips with God's eternal mathematical vision. However, Smolin's own proposal would arguably make modern evolutionary theory the new master of physics. He is especially attracted to the formal characterisation of natural selection as a set of partially overlapping models of population changes. This is in contrast to a closed system of equations, the usual way of casting the Holy Grail of physical inquiry, the 'Grand Unified Theory of Everything'.

Nevertheless, as *Time Reborn's* much-trailed Epilogue makes clear, Smolin regards *Homo sapiens* as much more than just another biological species subject to natural selection. But why he continues to assign to humans Promethean powers of mind and spirit that hark back to an age when our species was second only to God remains a mystery. I doubt that Darwin himself would have ever been tempted to make Smolin's easy extrapolation from the beneficial risk involved in the original invention of fire to the risk that he now believes should be taken to geoengineer the Earth's climate.

The problem here is less Smolin's optimistic outlook than why he thinks it follows from his cosmological vision. Perhaps missing from his account is a deity that dares not speak its name: Progress. At the end of the *Time Reborn*, Smolin calls for the 'consilience' of the natural and social sciences to provide a coherent decision base for policymakers who currently appear to legislate as if the economy were governed by timeless laws. He fails to note that 'consilience' was a coinage of William Whewell, a great champion of Newton and believer in the power of consolidated knowledge to transform the world. It was a faith that Whewell's early admirer, Charles Darwin, lost as he developed his theory of natural selection.

Despite these doubts about the overall coherence of Smolin's vision, it must be said that the book itself marks a triumph in the presentation of cutting-edge physics as a sophisticated public philosophy. *Time Reborn* shows that Alan Sokal got it exactly wrong: Even after proper copyediting and fact-checking, contemporary physics remains well up to the task of 'transgressive hermeneutics'.