

BOOK REVIEW

Science and certainty

By John T.O. Kirk

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Review by Terence Kealey

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This is a courteous, competent and well-written book, but it is not immediately clear who wrote it, or why. The author is a John Kirk but, more than that, the reader is not told. Yet the book is published by the Australian Government's Commonwealth Scientific and Industrial Research Organisation (CSIRO) and from its website¹ we learn that Kirk was Chief Research Scientist and Assistant Chief of Division (Plant Industry) at CSIRO, as well as a former lecturer in biochemistry at the University of Wales, so he is creditable. Since 1997 Kirk has worked for two companies, one a vineyard and the other an optics company, so his experience is wide, as is the ground covered by this book.

The book is divided into eight chapters, which cover seven separate areas of science. Chapter 1, entitled "Origin of the Cosmos and the Solar System" provides a competent overview of the current understanding of the evolution of the universe since the Big Bang 13.7 billion years ago. The story provided is conventional, accessible and comprehensive, and my only criticism is that Kirk is dismissive of the speculation of scientists including Edward Tyron that the mass-energy of the entire visible universe could have originated as a quantum fluctuation in nothing. Kirk dismisses that idea as bizarre but, under quantum theory, the laws of conservation of mass and energy may apparently be suspended, and a universe may indeed arise out of nothing. As Niels Bohr said, quoted by Kirk himself, "anyone who is not shocked by quantum theory has not understood it." The universe itself, moreover, might itself amount to nothing, because when all its energy and mass are added up, they seem to amount to zero. That is because gravity has the curious property of storing negative energy thus negating all the universe's positive mass and energy. If, therefore, the sum total of the universe's mass and energy is zero, the universe's total mass-energy may indeed arise by a quantum fluctuation in nothing.

Chapter 2 ("Origin of the Biosphere and *Homo sapiens*") provides a competent description of natural selection and of the evolution of the human being. This covers my own area of research and I can vouch for the soundness of Kirk's judgements.

Chapter 3 ("The Nature of Physical Reality") provides an excellent introduction to the peculiar world of quantum theory (the origin of the universe excepted). Why anyone should bother with Professor Dumble-dore when they have Professor Niels Bohr is a mystery, because quantum theory is more weird than any monster that haunts the corridors of Hogwarts. But quantum theory does require some understanding of mathematics, so perhaps most people are indeed better off with JK Rowling.

Chapter 4 ("The Physical Basis of Conscious Reality") provides a good introduction to modern neuroscience, as well as a stimulating description of the enigma of consciousness. I was pleased to have read it. But I disagreed with John Kirk when he denied that animals other than *Homo sapiens* possess consciousness. In his *Descent of Man and Selection in Relation to Sex* (1871) Charles Darwin described how his pet dogs demonstrated a sense of humour. That is my own experience of dogs - and can an entity possess a sense of humour if it does not possess consciousness?

Chapters 5 and 6 ("Environmentalism" and "Science and Environmental Concern") provide a fair account of current debates over global warming. My only concern is that Kirk seems not to have mentioned that global warming can be a cause rather than a consequence of higher carbon dioxide levels in the atmosphere, because warm seas release the carbon dioxide that is dissolved in them.

Chapter 7 on "Gaia" provides an excellent account of how the various biological and geological processes that

control the content and temperature of the atmosphere possess innate feedback mechanisms that help stabilise that content and that temperature in the face of external shocks. The great anxiety of the environmental movement is, of course, that global warming might disrupt those healthy feedbacks and generate unhealthy feedbacks such that every increase in temperature drives further increases in temperature – fortunately we seem not yet to have initiated that phenomenon.

The final chapter on “isms” asks a number of questions such as: does science have anything to say about feminism, or does science have anything to say about atheism? Kirk’s answers to these questions are unexceptional.

For whom is this book designed? Kirk seems to have no agenda other than to reassure the reader that science is essentially a benign and honest enterprise. I agree, but only because science these days – as in all days – is in the hands of the rich countries, and those are currently benign democracies. But it wasn’t so long since Winston Churchill was warning us of the “perverted science” of the European and Asian tyrannies.

The book has a slightly amateur feel about it in that many of the references are to secondary sources such as the *Encyclopaedia Britannica*, and some of the illustrations are slightly jejune. On page 65, for example, we are shown an artist’s impression of an asteroid smashing into the earth, thus precipitating the extinction of the dinosaurs. So? But any comprehensive view of the whole of modern science must inevitably be shallow in parts, and the remarkable aspect of this book is how comprehensive yet how accessible it is.

Nonetheless, the book is not for the general reader. It is too deep for that. Any book that launches into redox reactions as briskly as this has been written for the scientifically literate. This is a book for a researcher who wants to broaden his or her perspective on the other branches of contemporary research. I can think of many a biochemist who would find fascinating the chapters on quantum theory and consciousness, and I can think of specialists in those areas who would find others of the chapters equally enlightening.

To conclude, this is an unsensational account of seven of the more important areas of contemporary research, and it would make an excellent present for a practitioner in any one of those areas who wanted to keep up with developments in the other six.

Notes

1. See <http://www.publish.csiro.au/pid/5690.htm>

References

- Darwin, Charles. 1871. *Descent of Man and Selection in Relation to Sex*. London: John Murray.