

relativity, resolved in an excellent discussion of the twin paradox. In quantum mechanics Rohrlich deals with Schrödinger's cat paradox and the Einstein-Podolsky-Rosen experiment, and confidently identifies the points at which these arguments 'fail'. Not all his scientific readers will agree with him, and his non-scientific readers should perhaps have been told that in this area there is no general consensus among physicists.

Rohrlich devotes a section to quantum logic, the notion that the empirical success of quantum mechanics forces us to abandon classical logic in the same way that general relativity forces us to abandon Euclidean geometry. Quantum logic is the subject of the second half of Peter Gibbins's *Particles and Paradoxes*; the first half is an account of quantum mechanics for philosophy students. Gibbins makes some interesting points about the place of the philosophy of quantum mechanics, and his development of quantum logic will be of interest to readers with some knowledge of formal logic. Unfortunately, his account of quantum mechanics contains mistakes and confusions, and is written in a disjointed style which is hard to follow in places. Nevertheless, as a book for philosophy students on this most philosophically puzzling part of physics it can only be welcomed. □

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In the beginning

John Tarney

The Young Earth: An Introduction to Archaean Geology. By E.G. Nisbet. *Allen & Unwin*: 1987. Pp. 402. Hbk £40, \$60; pbk £17.95, \$34.95.

The Young Earth is really about old rocks — those formed during the Archaean period, more than 2,500 million years ago. Whereas geologists feel they are beginning to have a reasonable understanding of how the modern Earth works in this era of plate tectonics, the picture becomes increasingly hazy as we go back in time. It is not always easy to interpret the rocks in terms of modern tectonic processes, and more comprehensive observations are required which have to be integrated with existing knowledge to formulate new or modified processes. Thus models of the early Earth are necessarily tempered with speculation, and the author freely admits to the difficulty by describing his book as "a personal view".

Nonetheless, this is one of the most comprehensive texts ever produced on the Archaean. Nisbet appears to explore every possible avenue to uncover the

Crystal clear

R.A. Howie

Optical Mineralogy, Vols 1 and 2. By Ernest G. Ehlers. *Blackwell Scientific*: 1987. Vol. 1 Theory and Techniques, pp. 158, \$39.95, £32. Vol. 2 Mineral Descriptions, pp. 286, \$49.95, £38.

Optical Mineralogy provides in two volumes the necessary information to identify the commoner rock-forming minerals, both in thin section and grain mounts, by use of the petrographic microscope. Both volumes are illustrated by numerous line drawings, and both have the same colour plates of the Michel-Lévy chart of polarization colours and of interference figures, with the addition in Vol. 2 of 70 colour photomicrographs (these are of high quality but remote from the text descriptions of the minerals shown). The work is thus similar in scope to Shelley's *Optical Mineralogy* (Elsevier, 1985) and Nesse's *Introduction to Optical Mineralogy* (Oxford University Press, 1986).

In Vol. 1, after introductory chapters on the polarizing microscope and on the nature and behaviour of light, there are sections on the examination of isotropic substances, uniaxial and biaxial minerals, the relation between the optic behaviour of biaxial materials and crystal symmetry, and the microscopic identification of unknown minerals. This volume ends with a chapter dealing with the spindle stage and (briefly) with the universal stage. Readers get the benefit of a text written by an experienced teacher who fully appreciates the problems likely to be encountered by students, particularly when dealing with the biaxial indicatrix.

facts, assess their significance, link them together and weave them into plausible models. He describes typical Archaean low-grade greenstone belts and high-grade granite gneiss terrains, supplying some of the detail from his own observations. He then marshals together field, geochronological, isotopic and trace-element evidence from Archaean volcanic, plutonic and sedimentary rock associations to develop ideas about the nature and evolution of the Earth's mantle and the growth and development of the continental crust. A whole chapter is devoted to Archaean mineral deposits (gold, copper, nickel and so on) in recognition of their importance as a world resource.

A large part of the book, however, is devoted to the evidence for life in these ancient rocks. This theme is later developed into a discussion of molecular palaeontology and a review of various ideas on the origin of life, and the influ-

ence living organisms have had on the development of the planet itself — particularly the atmosphere and hydrosphere. It is useful to have this essay tied in with more fundamental aspects of the growth and development of the Earth's crust and early crustal processes. The result is a comprehensive view of the early stages of evolution of the planet.

To make the book suitable for the general reader, passages of detailed scientific argument are interlaced with sections of chatty text and quotations from classical, biblical or even more unusual sources. A glossary of geological terms is provided for those who might get bogged down with the jargon. Popularization is, however, not excessive: it is not Page Three but the very last page which tells us that sex began in the Proterozoic. □

The books are well set out, with numerous black-and-white photographs as well as sketches. Together the two volumes are expensive, but a student might well consider settling for Vol. 2 and hope to find Vol. 1 in the library. □

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