nonlocality and its apparent conflict with relativity may look very different from a deterministic and an indeterministic point of view.

David Deutsch explains and defends his own version of the Everett many-universes interpretation, that reality "splits" every time we take a measurement. His claim that the existence of the resulting "parallel" universes could be demonstrated experimentally is interesting but undoubtedly controversial. John Wheeler in his interview explains why he has now abandoned support for the Everett approach — "too much metaphysical baggage", as he puts it. He now leans to the view that the existence of conscious observers is crucial to quantum observation, a view definitely not to be ascribed to Bohr. Indeed it is fair to say that the whole language of observers and observables that clutters up books on quantum mechanics is an unfortunate legacy of a long-outmoded positivist attitude to the nature of science, but which tends regrettably to invite the casual reader to incorporate an ineliminable subjectivity into the understanding of quantum mechanics.

John Taylor attempts to defend what he calls the statistical interpretation, that quantum mechanics is a theory about ensembles of identically prepared systems, and has nothing to say about the single system. It is quite true that the nonlocality difficulties do not arise in terms of statistics. But Taylor's discussion of the Einstein–Podolsky–Rosen experiment is very confused, leading one to believe that mirror-image correlations do not exist in the *statistics* of measurement results on the same spin-component of the two particles. For example, Taylor says that "We can't say in any particular case what that spin of the far away particle is from the measurement nearby". This is potentially misleading, because it might be taken to imply that we cannot predict what the result of a subsequent far-away measurement would reveal, and that is just wrong. Presumably Taylor means that we cannot say what the spin of the far-away particle was *before* the measurement on the nearby particle. This is much closer to Bohr's position than what most people would regard as the statistical interpretation.

In all, this book is a useful introduction to a variety of ideas and approaches about understanding quantum mechanics. It shows that there is no longer a regimented uniformity of view even among "respectable" physicists. That is a healthy sign: dogmatic metaphysical strait-jackets are best consigned to the scientific lumber-room. □

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Photograph by J. Vertut

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Captured in clay — 15,000-year-old models of bison from Le Tuc d' Audoubert cave in the French Pyrenees; the animal in the foreground is 60 cm long. The picture is reproduced from Dark Caves, Bright Visions: Life in Ice Age Europe, *by Randall White, an account in words and pictures of the accomplishments of the inhabitants of Europe during the Upper Palaeolithic (35,000–12,000 years BP). The book is based on an exhibition at the American Museum of Natural History, New York, and is published by W. W. Norton. Price is $35.*

Change in the field

Subir K. Banerjee

Environmental Magnetism. By Roy Thompson and Frank Oldfield. *Allen & Unwin:1986. Pp.227. £35, $50.*

THE TITLE of Thompson and Oldfield's book may lead one to think that it deals with the magnetic field and its fluctuations in the human environment. This, however, is not the case. The authors' respective backgrounds are in geophysics and geography, and over the past decade or so they have worked together on the magnetism of terrestrial materials — such as soil, and sediments deposited in lakes, peat bogs and oceans — with the purpose of reconstructing environmental and climatic changes. In spite of the complexities of natural magnetic minerals, the myriad ratios in which two or more such minerals can be present and the simplicity of the magnetic apparatus used, many of the stories told and the examples given constitute brilliant successes in scientific detective work.

Because of the many examples listed, the book will probably be of most use to non-magnetists interested in palaeoenvironmental change. It is well-structured, in that the first six chapters cover the basics of magnetism, magnetic minerals and the behaviour of the geomagnetic field, while the remainder deal with the applications to nature. The diagrams are many and of excellent quality, although a large number of them suffer from lack of acknowledgement of the source so that the reader will mistakenly think that they are either the results of the authors' own work or "given truths" in rock magnetism. For example, in Fig. 4.9 the authors purport to show the grain-size dependence of the ratio of susceptibility to saturation remanence for magnetite, but it is not made clear that these are the results of a thought experiment only. Similarly, on p.56 a non-magnetist not familiar with the literature may interpret the authors' hypothetical model of frequency dependence of susceptibility of very small magnetite grains to be proven, while a thorough test of such a model has yet to be made.

It is important to emphasize that nature's cooperation in sometimes providing a simple mixture of one strongly magnetic and one weakly magnetic mineral (for example, magnetite and haematite) has been most helpful to the authors in solving their magnetoforensic problems. In discussing one particular topic, the magnetism of lake sediments, Thompson and Oldfield themselves point out that "further progress, as distinct from the pragmatic application of the approaches illustrated above to new sites will depend on ... closer and more quantitative specification..." (p.123). I believe that the statement applies to most of the applications of magnetism to the environment, as described in this book. □

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