



The spoon-bending abilities of Uri Geller, a professional magician who claimed to be psychic, made headline news. Scientific tests of his powers have now become "little more than a collection of anecdotes"

firmed adequately or that a new hypothesis could be tested experimentally and confirmed by independent investigators.

Most of the claims examined in the first section are not new, but are dependent on ideas going back into prehistory that have failed to be accepted within science. They have not been totally rejected for scientists from many disciplines working within parapsychology have been attempting to provide repeatable experimental demonstrations of the various psychical phenomena for more than a century. When such a demonstration becomes available, it will then be necessary for the sceptics to see whether they can also confirm its findings. The main reason for examining such claims in advance of evidence supporting them is made clear by Kurtz: "... we are concerned not simply with paranormal beliefs in the laboratory but with their dramatization in the media".

Two types of investigation may be distinguished: first, experiments, in which the researcher decides on the experimental design and procedures to be adopted whilst the subject does as he is told; second, demonstrations, in which a person attempts to convince observers of his psychic powers. Here the investigator observes the subject while he performs under his own conditions, often reminiscent of those enjoyed by a conjuror in the music hall.

What has emerged from the experimental work is that attempts to confirm an original "positive" finding will either fail or "succeed" at a low level of significance, the result depending mainly on the experimenter. This has led to the conclusion within parapsychology that there is an "experimenter effect", which is not dependent on the slap-happy nature of the investigation but on some new interaction between the experimenter and the hypothetical process being considered. Of particular interest here is the discussion of an experiment on "remote viewing" — or clairvoyance — reported in *Nature* (252, 602; 1974) by Targ and Puthoff of the Stanford Research Institute (SRI). The experiment was shown by Marks and Kamman (*Nature* 292, 177; 1981) to con-

tain a schoolboy blunder that could account for the result. Marks himself reviews this and further experiments which claimed to indicate that the fault in the procedure made no difference to the result. His conclusion is that:

Well-controlled experiments never find the RV effect, while poorly controlled experiments nearly always do so. Data suppression, flawed methodology, and lack of replication lead to the conclusion that remote viewing is a cognitive illusion, an artefact of human error and wishful thinking.

An investigation of the second type is discussed by Martin Gardner in "How Not to Test a Psychic: The Great SRI Die Mystery". Uri Geller, a professional magician who claimed to be psychic, was tested during a visit to SRI where it was stated that he was able to name correctly the face uppermost on a concealed die on each of eight attempts and that he made no attempt on two occasions. After discussing means whereby any trained conjuror might have obtained similar results, and his attempts to find out more about the tests, Gardner writes:

What conclusion can we reach from all this? The most important is surely the following. What seemed to any reader of *Nature* to be a carefully controlled die test has now become little more than a collection of anecdotes.

The section on fringe science is concerned in the main with certain claims that are not inconsistent with contemporary scientific theory but that are not supported by evidence. A large amount of material is available here relating to matters that become headline news but are seldom reported fully and critically.

Science Confronts the Paranormal should be of considerable value to those puzzled by accounts of "paranormal" events appearing in the media, to teachers interested in the scientific method and to parents who are disturbed by what their children are taught. It could well be made compulsory reading for science correspondents and television producers. □

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Wide sweep

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Physical Methods for Inorganic Biochemistry. By John Wright, Wayne Hendrickson, Shigemasa Osaki and Gordon James. Plenum: 1986. Pp.384. \$71.40, £47.60.

THE task this book sets itself is ambitious. It attempts to cover the spectroscopic, diffraction and analytical methods used to probe the structural properties of the elements employed by living organisms. But, before beginning, the authors needed to decide whether to write a book about the methodology of the techniques, their principles and practice, or to describe the ways in which our understanding of biological systems has been advanced. This choice has not been made, and as a result most chapters fall short of meeting either goal.

The consequences of indecision are seen clearly in the chapter on the principles, practices and applications of nuclear magnetic resonance (NMR). Here the authors have slipped between three stools. Principles are stated briefly but inadequately, and it is doubtful that those readers who do not understand the basis of Fourier transform NMR, say, will be much clearer after reading this section. The description of practice extends to giving absurd detail for a circuit diagram of a low-pass noise filter — surely a topic for a technical manual — while applications are dealt with on an element-by-element basis; this makes a useful compendium, but hardly shows the powerful ways in which NMR has helped biologists.

To make things worse, the authors have tried to cover too many techniques, several of which are as yet of little established value in biological research. For example, nuclear quadrupole resonance (NQR) spectroscopy is an insensitive technique that has produced no information of biological significance. Electron spectroscopy (ESCA) is also out of place, whereas EXAFS (extended X-ray absorption edge fine structure) is not discussed even though it has had considerable impact. The sweeping scope has inevitably led to areas being tackled that are well outside the authors' competence — the statement that "there have been few temperature-dependent magnetic circular dichroism studies of transition-metal enzymes" is false and renders the chapter concerned out-of-date and inadequate.

Altogether, it is difficult to see the aim or the value of this book. Much of the material is available elsewhere, either in reviews or texts on the individual techniques written by more authoritative authors. □

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