The Cognitive Paradigm: Cognitive Science, a Newly Explored Approach to the Study of Cognition Applied in an Analysis of Science and Scientific Knowledge by Marc de Mey (review)

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waking life, never both at the same time since they are mutually exclusive. When a change occurs it is sudden as in the analogy of the light switch which has a degree of freedom of movement in going from the 'on' to the 'off' position, where the switch position has no effect on the light until at the crucial moment the reversal is complete and total.

One of the salient features of this work is its attempt to deal with the complexities of behaviour, created when different levels of *physical* alterations of state interrelate with *functional* and *cognitive* states in which meanings may change for both the subject and the observer, depending upon the organization of different levels at any given moment. The net result, however, is a book so rich in interrelations that it is in danger of becoming unreadable. Reversal theory is a hermeneutic theory and like much which has been written from this point of view, this book is not a 'sparkling read'. There is much to chew over, but the work seems to be attempting two things. On the one hand it attempts a general theory of the subjective experience of behaviour and on the other, it is almost a manual of how to interpret particular pieces of behaviour. It is a useful addition to the small number of systems and cybernetic approaches dealing with psychotherapeutic problems. Perhaps the next step would be a book dealing with case histories of treatments using this approach by Michael Apter's co-worker, Dr. K. C. P. Smith. I would very much welcome this.

The Cognitive Paradigm: Cognitive Science, a Newly Explored Approach to the Study of Cognition Applied in an Analysis of Science and Scientific Knowledge. Marc de Mey. Reidel, Dordrecht, 1982. 314 pp., illus. Cloth, $43.50. ISBN: 90-277-1382-0. Reviewed by **Trevor Pateman***

This is the first volume in a series of monographs in sociology of the sciences, although it is neither monographic nor sociological. It is a long, unfocused book in which interesting ideas occasionally relieve a stodgy, textbook exposition. The sense is always clear enough, however.

If there is a central idea, it is this: to marry the history, philosophy and sociology of science as studies of expert communities and their achievements, understood centrally in terms of Kuhnian paradigms, with a cognitivist theory of the individual mind as a community of experts, in the Minsky–Papert formulation of that idea (to be found most accessibly in Seymour Papert's *Mindstorms*, Harvester Press, Brighton, 1980). Mey hopes to reconstruct the possibility and rationality of scientific change as progress, which has been threatened by Kuhnian relativism. He uses a cognitivist-inspired theory of perception, set out at pp. 188–192, which shows the inadequacy of concept-driven versus data-driven controversies in the history and philosophy of science. These controversies fail to recognize that data can be perceived from more and less global perspectives, depending on whether they are approached top-down or bottom-up by the perceiving subject. Scientific discoveries involve integration and reintegration of data within organizations of conceptual knowledge (mental schemata), which have *both* tops and bottoms. This idea is briefly illustrated by reference to Harvey's discovery of the circulation of the blood. The idea is worth examining at greater length than Mey gives it. In particular, I missed any discussion of post-Kuhnian controversies; there is no reference to Larry Laudan's *Progress and Its Problems* (University of California Press, 1977), for instance.

Mey's account of perceptual organization is also his solution to the 'cognitive paradox': "When perceptions depend on anticipations [as cognitivists argue], it is difficult to see what the further point is of perception. Furthermore, it becomes impossible to conceive of the perception of the unexpected. Nothing seems solved by moving massively into the subject all the information that was previously localized in the object" (p. 181). In the theory of perception Mey employs, and more generally in the Minsky–Papert account of the mind, schemata are, as indicated, *directly* connected to data at both global and specific levels, so that satisfaction of an anticipation at one level does not lead automatically to satisfaction at another. In addition, schemata are organized in terms of heterarchical rather than hierarchical control, so that one level of a schema does not permanently dominate others, nor does one schema dominate other schemas. This idea of the mind's pluralism could have been connected with Paul Feyerabend's celebration of the virtues of theory proliferation in *Against Method* (New Left Books, London, 1975), but discussion of Feyerabend's work is all but nonexistent.

Mey's central ideas are all very interesting, but probably not very relevant to readers of *Leonardo*, whose questions regarding theories of perception and mind will be better addressed by the sources on which Mey draws than by Mey. Likewise, though I was interested to find out about bibliometrics and scientometrics in the sixty-page Part Two, these disciplines—concerned with establishing citation networks, invisible colleges, and such like—may be germane to art historians and sociologists of art, but scarcely define "The Social Structure of Science" (the title of Part Two). The final, brief chapter on Piaget is an act of homage, rather than an integral part of the work, despite Piaget's importance to some workers in the cognitive paradigm, such as Margaret Boden and Seymour Papert.

The Promise of Cognitive Psychology. Richard E. Mayer, W. H. Freeman, Oxford, 1981. 120 pp., illus. Paper, £3.70. ISBN: 0-7167-1276-1. Reviewed by **Kim James***

This book's aim is defined in the preface as being an adjunct to short descriptive introductory psychology texts. It gives a clear, but restricted, description of the subject with the usual flow-diagrams that have come to be standard in information-processing approaches to the question of human learning and performance abilities. The booklists at the end of each chapter are the standard textbooks which one would expect from an author clearly in the mainstream of the computer-based research into cognitive psychology.

The author is so clearly mainstream in his approach that a student coming into contact with this area of psychology for the first time might be misled into thinking that the computer was a magic wand under which each operation brought undeniable proofs of how human cognition works. One hesitates to accuse the author of selecting his texts to strengthen his case, but I do find it remarkable that whilst Neisser's 1967 book *Cognitive Psychology* is cited as setting a tone and direction for the splendid progress of the following years, there is no mention at all of Neisser's later and equally important work *Cognition and Reality*, published in 1976. This seems to me to be a major fault. By not referring to anything but supportive texts, the author could mislead students into thinking that all is well in cognitive psychology.

A brief glance at Neisser's *Cognition and Reality* would provide a useful corrective to the viewpoint of unalloyed joy at the onward march of computer technology. Neisser, who it must surely be admitted is one of the giants of cognitive psychology, has voiced his disquiet with the information-processing approach that describes cognition in terms of processing and still more processing. There is no hint in this present book of the philosophical problems which bedevil the computer-based approach to cognition. I am aware that there is a somewhat cavalier attitude to philosophy among devotees of the computer keyboard. There is a fairly widespread devotion to mechanical materialism which expresses itself as, "To hell with the philosophy; this works. Look, we can make a computer solve problems that we can solve and we know how to break it down for the computer, so is there any good reason why it doesn't work like this in the human brain?"

As an analogy for problem solving, the computer approach is sound. There is a similarity between the methods used for solving mathematical problems for both computers and humans. Cognitive psychology, however, spreads its net wider than the restricted area of solving logical problems in the formal classroom situation. The claims for cognitive psychology spread into the investigation of perception. If the computer-based information-processing approach is valid for solving the 'Ability Problem', the 'Procedural Skill Problem', the 'Verbal Knowledge Problem' or the 'Strategy Problem' (all sections of this book), then, so the reasoning goes, it can be used in solving the 'perceptual problem' (not mentioned at all). This is an area where there is some dispute, as readers of this journal will have noted.

This book gives no hint of the problems arising for cognitive psychologists when they use information-processing methods as a tool for investigating the overlap between cognition and perception. The problems dealt with by Descartes and Bishop Berkeley are still lying around in the computer laboratories. There should be more unease in

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