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succeed in gaining few new converts to the propositional camp, in part because few psychologists really care about what an internal representation "really" is at a microscopic level, and in part because imagery research (e.g., of Cooper, Kosslyn, and Shepard) has progressed so well despite these objections.

Reitman, Nado, and Wilcox's chapter on "Machine Vision" describes a computer program for playing the Oriental game of Go. The program is especially noteworthy for its method of perceiving dynamic spatial groupings and interactions of game pieces across the playing board. Also included are criticisms of Minsky's notion of "frames" and of the idea of symbolic (propositional) representation obviating the need for analogical representations. Unfortunately, no reference is made to Pylyshyn's paper, which argues the opposite.

Ulric Neisser, whose 1967 *Cognitive Psychology* helped define the field, elaborates on the changes that have taken place in his thinking—changes first described in his 1976 *Cognition and Reality*. Neisser takes issue with characterization of the perceptual system as a processor of static ("snapshot") sensory input, which is a common simplification in information-processing models. In place of linear-stage models, Neisser proposes perceptual cycles to reflect the fact that perception is a continuous interplay between the environment and the active, anticipating perceiver. His new position is an eclectic mix of his own earlier ideas, of Gibson's notions of direct pickup of sensory information, and Hochberg's view of images as sets of expectancies. The chapter, which is a good one, could have been even better if Neisser had responded to some of the objections to his 1976 book. For example, why is it that no processing mechanisms need be constructed to explain direct perception, and why is it that laboratory subjects can perceive unanticipated stimuli so well under tachistoscopic conditions (a point made explicitly in the Reitman paper)? In any case, Neisser's paper is, as usual, scholarly and engaging.

Jenkins, Wald, and Pittenger's chapter describes a set of experiments on event perception that is designed to provide an operational definition for an event as a bona fide unit of analysis. The experiments, which are based roughly on a technique popularized by Bransford and Franks, are clever; and approaching the identification of units of analysis as an empirical problem dovetails quite well with the notions of other perceptual psychologists, most notably Garner.

**Leonard Uhr** outlines an ambitious undertaking in artificial intelligence—namely, the creation of a complex program called SEER, which is an attempt to simulate the kinds of intelligent, integrated thought processes underlying normal, "everyday" behavior (e.g., as opposed to the "complex" behavior underlying play of the game of Go). Uhr also makes a preliminary effort to define the meaning of such tricky concepts as "consciousness," "knowledge," and "self," by identifying their corresponding structures and processes in computer programs. To the extent that the programs are well understood, this approach would seem to have more promise than most of its predecessors.

Perhaps the most significant contribution to the book is Roger Shepard's chapter, "On the Status of 'Direct' Psychophysical Measurement." Here, Shepard questions the fundamental assumption that for each physical magnitude of the stimulus there exists a corresponding psychological magnitude. He argues further that psychological magnitudes cannot be measured on anything more than an ordinal scale, and that the form of the psychophysical function is basically indeterminate. In place of "absolute" psychophysics, Shepard calls for a "relative" psychophysics, where one tries to relate differences (or ratios) between two or more psychological magnitudes to corresponding differences (or ratios) between physical magnitudes. He suggests that in contrast to other scientific disciplines, psychology has attempted to develop advanced scales of measurement before developing a basic theory of the entity being measured. In the case of the perception, the evidence is that our perceptual systems are structured so as to detect relations and not absolute magnitudes, and our scales of measurement should be constructed accordingly.

The remaining papers are written by the philosophers Harman, Dretske, Martin, Schwartz, Dennett, Fodor, Block, Maxwell, and Hooker. These chapters are quite scholarly by and large, but they will make difficult reading for psychologists who are rusty on their philosophy; it would be advisable for the reader to keep a dictionary of philosophical terms close at hand.

**Australian Grab Bag**


Review by Anne Cutler

J. P. Sutcliffe is Professor and Chairman of the Department of Psychology at the University of Sydney (Australia), where he earned his PhD. He has been a Rockefeller Fellow at Harvard University, Research Psychologist at the Educational Testing Service, and Visiting Professor at the University of Washington. Sutcliffe is editor of Mathematics in the Social Sciences in Australia and of Mathematics Needed for Particular Social Sciences.

W. M. O'Neil, in whose honor these essays were published, is Honorary Visiting Fellow of Macquarie University, currently retired in Roseville, Australia. He was previously Deputy Vice-Chancellor and McCaughhey Professor of Psychology at the University of Sydney, where he earned his M.A. O'Neil's numerous publications include...
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Leonard Small

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Reviewed by Albert Ellis

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