

Calvinism—however that is viewed—provided Parsons with a launching-pad for the development of his theory. To the contrary. It is only after Parsons launched out in an **alternative** spiritual direction to the “liberal-Calvinism” which he says characterized his familial background, that he could wholeheartedly embrace the secularist direction his theorizing was taking. This is the confessional and doxological sense of Parsons’s scientific faith in the god of Evolution. In my view it is **this** (scientific) faith, rather than Calvinism, which gave Parsons his aversion to systematic philosophic self-criticism of his concepts.

I have assumed the importance of critical commentary; thus, the book is styled as a critical commentary. I do not think I wrote it out of some ritualistic devotion. But in my view such a critical commentary examining the pre-scientific assumptions of a major theorist should be read unambiguously as “secondary literature.” It is not intended as a prolegomena to something much larger; nor is it an introduction to Parsons for beginners. I am happy that the book has been read as I intended it—i.e., as secondary literature; I cannot help it if Klausner is not excited by this genre. Klausner reminds me of Qohelet: Of making many books there is no end and much study wearies the body.

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D. N. Osherson, Ed., with H. Lasnik, S. M. Kosslyn, J. M. Hollerbach, and E. E. Smith.
An Invitation to Cognitive Science. Cambridge, MA: MIT Press, 1990. 3 vols. \$55.00 (paper) (Reviewed by John F. Kihlstrom)

The emergence of a new scientific field is often marked by the publication of a synoptic textbook, which simultaneously summarizes the state of current knowledge and provides a framework within which future progress can take place. Within my own field, one thinks immediately of William James’s *Principles of Psychology* (1890); Floyd Allport’s *Social Psychology* (1924); Gordon Allport’s *Personality* (1937); E. R. Hilgard’s and Donald Marquis’s *Conditioning and Learning* (1940), and Hilgard’s later *Theories of Learning* (1948); Ulric Neisser’s *Cognitive Psychology* (1967); Alan Newell and Herbert Simon’s *Human Problem Solving* (1972); Tinbergen’s *The Study of Instinct* (1948) and E. O. Wilson’s *Sociobiology* (1975).

Cognitive science is a new field which combines the concepts, theories, and methods of a number of different disciplines—psychology, linguistics, philosophy, anthropology, computer science, and even another interdiscipline, neuroscience—to study the nature and exercise of human intelligence as it is manifested in perception, memory, thought, language, and action. Cognitive science, which began to emerge sometime between 1948 (the publication of Norbert Wiener’s *Cybernetics*) and 1959 (the publication of Noam Chomsky’s review of B. F. Skinner’s *Verbal Behavior*), already has two histories: Howard Gardner’s *The Mind’s New Science* (1985), and Bernard Baars’s *The Cognitive Revolution in Psychology* (1986). But until recently, it has not had a defining textbook. Now it has three, all published by MIT Press: *Cognitive Science: An Introduction* by N. A.

Stillings et al. (1987); *Foundations of Cognitive Science* edited by M. I. Posner (1989); and this three-volume set.

The present volumes, as their individual titles indicate, emphasize three core topics in cognitive science, and their constituent chapters are excellent summaries by recognized authorities. Volume 1, *Language*, edited by D. N. Osherson & H. Lasnik (xix + 272 pp.), contains chapters on syntax (by H. Lasnik), semantics (R. K. Larson), phonology (M. Halle), speech perception (J. L. Miller), lexical processing (K. I. Forster), sentence processing (M. F. Garrett), language and the brain (E. B. Zurif), language acquisition (S. Pinker), and philosophical issues in the study of language (J. Higginbotham). Volume 2, *Visual Cognition and Action*, edited by Osherson, S. M. Kosslyn, & J. M. Hollerbach (x + 356 pp.), contains chapters on computational theories of low-level vision (A. L. Yuille & S. Ullman), higher-level vision (I. Biederman), mental imagery (Kosslyn), the development of visual knowledge (E. S. Spelke), and philosophical approaches to visual cognition (F. Dretske); fundamentals of motor behavior (Hollerbach), planning of arm movements (Hollerbach), the control of arm movements (E. Bizzi and F. A. Mussa-Ivaldi), oculomotor control (H. L. Galiana), sequential motor control (C. E. Wright), and a philosophical view of action and free will (A. Goldman). Volume 3, *Thinking*, edited by Osherson & E. E. Smith (x + 308 pp.), contains chapters on remembering (M. C. Potter), categorization (Smith), judgment (Osherson), choice (P. Slovic), problem solving (K. J. Holyoak), cognitive development (S. Carey), and philosophical perspective on rationality (S. P. Stich); the volume, and the series, closes with chapters on artificial neural networks (P. M. Churchland), the evolution of cognition (R. C. Lewontin), and a philosopher's treatment of computer models of the mind (N. Block).

With all this coverage, it would be hard to find anything missing. One area that deserved more attention was memory: the single chapter on this topic focuses on short-term stores of various sorts, without spending much time on long-term retention of episodes, or the relations between different ostensible memory systems (e.g., procedural, semantic, and episodic) or different expressions of memory (e.g., explicit and implicit). (To be fair, Posner's volume also offers only a single chapter on memory, though it is more comprehensive; that of Stillings et al. treats memory only in a chapter on "Topics in Cognitive Psychology"). Insofar as memory is the storehouse of the knowledge that forms the basis for perception, thought, and language, it should play a central role in cognitive science.

Similarly, because so much about the structure of the mind has been revealed by neuropsychological studies of brain-damaged individuals, and through various brain-imaging techniques such as event-related potentials, x-ray computed tomography, positron emission tomography, and nuclear magnetic resonance, these techniques and the knowledge derived from them might have been given expanded coverage.

And while the editors are to be congratulated for including a treatment of the evolution of cognition, it would have been interesting to be able to read more about the place of mind in the evolution of species, cross-cultural studies of thought (including, but not limited to, contrasts between literate and preliterate cultures), language as a tool for interpersonal communication as well as a tool of thinking, potential differences between social and nonsocial cognition, and the contribution of sociocultural factors to perception, language, and thought.

Finally, one might wish that the editors had cast a somewhat broader net for contributors: fully fourteen of the series' thirty-one chapter authors hail from MIT, while

another five have Boston-area affiliations. While it is not entirely clear that there is an MIT/Boston point of view in cognitive science, differing from what is espoused at Hampshire, Michigan, Carnegie-Mellon, Oregon, Berkeley, Stanford, San Diego, Arizona, etc., not to mention perspectives held outside of North America, there might well be one. And if there are schools of cognitive science, readers (especially those with historical interests) seeking an introduction to the field as a whole might well want some explicit orientation to the differing points of view that contribute to the vigor of its internal debates.

Still and all, as an introduction to cognitive science, this work succeeds admirably. The individual chapters are each written in such a manner as to be accessible to a newcomer yet teach something to a specialist. There is good treatment of developmental issues, so that the reader gets the idea that cognition is something that grows and is acquired, not just something that *is*. Except for thinking and problem-solving, computational theories of cognition (both connectionist and symbol-and-rule approaches) are treated throughout the book. It is usable as a textbook, for both graduate students and advanced undergraduates who are well into a major in one of the constituent disciplines of cognitive science, and want an overview of the whole. But it is probably best treated as its editors intended: as an enticement, a lure, and a temptation. The editors have effectively opened the door to a new way of looking at the mind, and those who want to understand this most recent turn of events are encouraged to accept their invitation.

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Geoffrey Keynes, *A Bibliography of the Writings of Dr. William Harvey 1578-1657*, 3rd edition, revised by Gweneth Whitteridge and Christine English. London: St. Paul's Bibliographies, 1989. (Reviewed by Harold J. Cook)

William Harvey's name resounds in the annals of the history of science and medicine for his discovery of the circulation of the blood, announced in his *De motu cordis* of 1628. Harvey's discovery (or, if you prefer, theory) undercut one of the primary concepts about animal physiology accepted since the ancient Greeks: that the contents of the veins and arteries brought nutriment to the parts in a unidirectional flow from liver and heart outwards, as water in ditches and irrigated fields. If accepted, Harvey's view would force virtually the whole of physiology to be reconsidered, and consequently his work drew fire. Harvey therefore also published two essays defending his views against one of his most learned critics, Jean Riolan the Younger of Paris, in *De circulatione sanguinis* (1649). His other and also famous work, *De generatione animalium* (1653), saw the light of day due to the efforts of one of his young English followers, George Ent. Harvey's many investigations considered many other matters as well, including insects; but most of his manuscripts were destroyed during the English civil war when his rooms at Whitehall Palace were looted, so that only a few manuscripts and letters survive. Consequently, virtually every fragment of known Harveiana has been carefully

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