himself, with very little treatment of the contexts surrounding James's personal genius. When read on the professional level, this biography may reinforce philosophers' prejudices against historians as nontheoretical compilers of information rather than as collaborators supplying the contextual components of ideas in process. But if readers bracket Bjork's theoretical speculations, they can learn much about the personal dimensions of James's life that Bjork has assiduously mined from published and unpublished sources.

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WHAT IS COGNITIVE SCIENCE? Barbara Von Eckardt. The MIT Press, 1993. x plus 466 pp. $45.00

When one is on a quest, the reckoning of one's position is a vital component to the overall goal. The quest for understanding the cognitive processes, thought, consciousness, and for the development of a comprehensive theory of neuroscience, the mind, and the brain, is perhaps the grandest enterprise of the close of this millennia. There have been a plethora of books and addresses defining issues, developing theories, or detailing discoveries. There is, however, little in the way of unity or even a comprehensiveness that could be called a reckoning.

The text that Von Eckardt provides is singularly an attempt to calculate the current position of a relatively new field of cognitive science. In short, the book seeks to determine exactly what cognitive science is and is not, where it is in its quest, and what must be done to complete the adventure. It provides a depth of logic and mathematics that suggests the use of navigational reckoning, plus fills the pages with an overview of the issues, contributions, and problems as numerous fields come together to form a new science--cognitive science.

Von Eckardt's purpose is to determine if, indeed, what has transpired warrants the title "science" and if a Kuhnian paradigm exists, or is developing, for this infant field. To reckon the position of this potential science, the author analyzes a myriad of arguments at every turn within the quest. Such a comprehensive approach makes calculations tedious, but provides an accurate assessment for the current position of cognitive science and suggests corrective measures needed to remain on course.

Chapter 1 develops the foundation for the book, but in doing so, offers more issues than is possible to address cogently in one text. The answer to the dilemma is to move some of the issues to appendices, which address topics of special interest to the author. In Chapter 2, the author, in her own words, "will chart and attempt to adjudicate the various disagreements, and will present what I take to be the most defensible conception."
Chapter 3 addresses the whole contribution and discussion which artificial intelligence and neural networks have to offer.

Chapters 4, 5, and 8 will be of special interest to Peirce scholars, because the author realizes the centrality of representation within the cognitive science quest and understands that the issues are barely beginning to be understood. She therefore, provides an overview of representation from the semiotic theory of Charles Peirce. She goes on to apply that theory in later chapters, although the Peircean contribution is more brief than would be helpful to her in the long run.

Chapters 6 and 7 address the issues inherent in grounding representation, that is in defining the context of the semiotic signification. The final chapter examines the methodological assumptions which will provide the paradigm for cognitive science, given the development of the text.

Von Eckardt is non-reductionistic in her approach, either as a biological or mathematical reductionist. She boldly proclaims where the navigation problems are and what needs to be done to get around them. In the Epilogue she offers four points of concerns. First, cognition is somewhat autonomous from its surroundings, but not completely so. Therefore, this new science must attempt to integrate the "outer and inner contexts in which human cognizing takes place." Second, computation is certainly present within human cognition, but what kind is "truly neural plausible?" since the current modes all have significant problems, which she addresses. Third is the representational issue that need to be better understood. Finally, cognitive science needs to be more sociological is its integration of interdisciplinary contributions. This final suggestion is the most brief and the most politically loaded obstacle.

From my perspective, the issues that the book raises would be well served by a comprehensive application of George Mead's social philosophy and a deeper inspection of Charles Peirce's semiotic theory. Von Eckardt is only interested in the semiotic within human thought and thus misses the dynamics of integration between the individual mind and the social environment. Like so many others, including Professors Sebeok and Eco, she only sees the semiotic as part of human thought. Von Eckardt, however, unfortunately draws the line of cognitive science at the edge of the human mind/brain and limits her own conclusions. She is so very close to directing the navigation and seems to breath it between the lines of her assumptions and conclusions. She must say out loud with Peirce in his "Architecture of Theories," "matter is effete mind, inveterate habits becoming physical laws." Then, and only then, will it be understood, what the author already senses, that Peirce's triadic representation is a mathematical and logical system iterated at all levels from the social and psychological, to the computational, and to the neurological, chemical, and physical. The human mind/brain is of the same semiotic dynamics one finds at any level, but is irreducible to biology or mathematics.