

current models for the molecular precursors of life. As an example, the transport of organic materials to the early Earth by interplanetary dust particles, for which frictional heating would be small, yields the 'bad news' that only one microgram per litre of amino acids would be dissolved in the primordial ocean. Yet such calculations clearly depend not only on the delivery rate, but also on the (highly variable) half-lives of the organic compounds in these micrometeorites. At present, we lack enough analytical data to inform such estimates, which could yield much higher concentrations of robust molecules. Moreover, a dilute soup would be advantageous in its protection from photochemical decomposition, and most workers agree that some adsorption and/or partitioning process would have been essential for subsequent catalysis.

The authors provide an excellent and compellingly written overview of the spontaneous-generation controversy and other historical themes as they relate to the emergence of life. The coverage is not comprehensive, but is lively and includes a sampling of topical approaches, from meteorite analysis to the study of subsurface microorganisms.

Neither author is an organic chemist: Wills is a geneticist at the University of California at San Diego, and Bada is a geochemist and exobiologist at the Scripps Institution of Oceanography at La Jolla, California. This background is evident in occasional lapses, such as the claim that "RNA, which probably appeared before DNA, uses the more stable molecule uracil instead of cytosine [thymine?]". (For it is thymine in DNA, not cytosine, that forms less stable adducts than uracil — as occurs during photohydration — which could explain this base change when DNA arose in evolution.) Errors of attribution arise in the discussion of Leslie Orgel's 'life on the rocks' scenario for the synthesis of RNA oligonucleotides — although Orgel did develop the theory behind this process, he relied on the explicit collaboration of James P. Ferris, whose laboratory has pioneered the study of clay-catalysed oligomerizations of activated nucleotides. Although a popular account may be allowed some licence in the assignment of credit, the authors are notably more generous to co-workers when they are indigenous to southern California.

Nevertheless, this book provides a highly readable survey of the historical prelude to the study of the origins of life, as well as selected areas of current research, including the search for extraterrestrial life. ■

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Pitfalls, blind alleys
and much more

**Through the Rearview Mirror:
Historical Reflections on Psychology**

by John Macnamara
MIT Press: 1999. 266 pp. \$39.95, £26.50

Sam Glucksberg

John Macnamara taught psychology and the history of psychology at McGill University until his death in 1995. For those who knew him, his reflections on the history of psychology will evoke memories of his intense personal approach to his work. For those who did not know John, his affectionate survey of the interplay of psychology with philosophy and Christianity will introduce a lively intellect striving to understand how conceptions of human nature have developed over the past 2,000 years of Western thought.

Macnamara begins with what some might see as an invidious comparison between psychology and physics. He argues that, whereas Aristotle's *Physics* may be comfortably ignored by contemporary physicists, his psychology (in *De anima*; 'On the Soul') would amply repay careful reading. Why? Because Aristotle, Plato and other great figures in Western thought not only place modern ideas in historical perspective, but would also, if taken seriously, alert contemporary thinkers to "foreseeable pitfalls and blind alleys". A case in point is Thomas Aquinas' *De ente et essentia* ('On Being and Essence'), which, according to Macnamara, "refuted the modern theory" of concepts as abstractions from perception (emphasis added).

Macnamara's view of psychology and its history is, in a very real sense, parochial. It is explicitly limited to Western psychology, and excludes conceptions of human nature in any other of the world's cultural and religious traditions. Moreover, it is explicitly limited to a narrow, though central, set of human capacities: beliefs and belief-informed desires. And finally, it is concerned with the interplay of philosophy and psychology with Christianity.

Surprisingly for a scholar of such broad interests, Macnamara barely touches on the interplay of psychological ideas with the social, political and economic issues of the times. He begins by concentrating on conceptions of learning and truth, and how people might acquire and represent these concepts. He shows that the contemporary tension between nativists, who argue that ideas may be innate rather than acquired through experience, and empiricists, who claim experiential bases for human knowledge, has surfaced repeatedly in the history of ideas, from Aristotle and Plato to the radical behaviorism of John Watson.

Curiously, he does not bring his historical



Lessons from the master: could Aristotle's *De anima* be of help to today's psychologists?

survey to the present, where such thinkers as Noam Chomsky continue to argue for innate ideas and idealized (symbolic) representation against modern associationists who use connectionist networks to extract generalizations from experience. But the lessons of history, traced through 27 chapters, make it clear that some form of this debate has captured the attention of the major figures in philosophy, biology and psychology for more than 2,000 years.

And yes, even in theology. Beginning with Aristotle, and ending with the gestalt psychologists of the 1940s, who emphasized the holistic nature of perception, Macnamara takes us through the major movements in philosophy and psychology, along with a side trip to the Book of Genesis, an essay on the impact of Christianity on psychology and, in three chapters, a summary of how St Augustine and Thomas Aquinas influenced Western psychology and philosophy.

Surely, a 266-page book with 27 chapters, each a self-contained vignette, must represent the epitome of superficiality. But this would miss the point of Macnamara's argument: that even a nodding acquaintance with the ideas and debates of the past will put contemporary debates on the nature of human knowledge into perspective. He firmly believed that people who are ignorant of history are condemned to repeat it. Unfortunately, even those who are immersed in history may still be condemned to repeat it. I seriously doubt that even the most careful reading of the history of psychology would save contemporary workers from pitfalls and blind alleys. Even more to the point, it would neither prevent nor resolve the conflict between modern nativists and empiricists. ■

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