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This is Daniel C. Dennett's final draft before publication. It has been modified to reflect the pagination of the published version of the work.

# The Well-Furnished Mind

Richard L. Gregory

*Mind in Science: A History of Explanations in Psychology and Physics*

Cambridge, England: Cambridge University Press, 1981. 652 pp. \$29.95

Review by

Daniel C. Dennett

*Richard L. Gregory is professor of neuropsychology and director of the Brain and Perception Laboratory at the University of Bristol. He has also written The Intelligent Eye, Concepts and Mechanisms of Perception, and Eye and Brain. · Daniel C. Dennett is professor and chairperson of the Department of Philosophy at Tufts University. He is author of Brainstorms: Philosophical Essays on Mind and Psychology and coeditor of The Mind's I: Fantasies and Reflections on Self and Soul with D. R. Hofstadter.*

Psychologists striving to turn their enterprise into real science have at times fostered an attitude of narrow scientism, the dogmatic and authoritarian worship of the (imagined) rules, regulations, and results of the scientific method. Some say, in effect, "Now we are scientists ourselves, not historians or philosophers. What need have we to study Hippocrates or Descartes? And as scientists we are specialists. What need have we to study astronomy or physics?" Richard Gregory's cornucopia of the history of science, psychology, and philosophy is a compelling answer to these questions. Progress has been made on the science of the mind; we have gradually exorcised mind from the heavens and from well-understood physical processes. Wherever confusion and mystery remain, however-in physics and biology as well as in psychology-the mind is implicated. Is this because there really is something, the mind, that defies scientific understanding, or is it because residual mystery always invites explanation in terms of minds-elusive observers exempt from the rules of the rest of existence? Gregory, whose distinguished research career in the psychology and physiology of perception would "justify" an authoritarian answer, responds with undoctinaire, guarded optimism. He supposes we are closing in on the mind, a quarry that will be captured only if we appreciate the history of the chase.

Again and again in history, psychologists (and philosophers) have seized upon some fragment of what must be the truth about minds and then myopically attended to that fragment, surrounding it with ramparts of protective doctrine. They have been inspired by the latest advances in technology-the clock, the camera, the dynamo, the telephone, the computer, the laser-and by new doctrines of method borrowed from triumphant science-Locke's Newton-inspired "historical, plain method," the operationalism behaviorists bought from the physicist Percy Bridgman and the logical positivists, the current infatuation with Kuhn's "paradigms." Thus inspired, and with their vision conveniently narrowed by their inspiration, they have constructed a veritable parade of fore-doomed bandwagons-theories of the mind that could not possibly do justice to that most wonderful set of phenomena.

## **Orienting the mind in science**

The cure for the occupational disease of myopia scientistica is not less attention to science and philosophy but more, Gregory thinks. *Mind in Science* concentrates on the history of ideas about the mind, but pauses lovingly over the pre-Socratic philosophers (or better, proto-scientists) and traces the history of ideas in astronomy and cosmology, the various forms of atomism from Democritus to today's uncomfortably counter-intuitive theories of subatomic particles, and many other developments in the scientific world view. It contains lucid expositions of literally dozens of breakthroughs, from Aristotle's form-matter distinction, through Newton's development of the theory of light and Helmholtz's pioneering researches on nerve conduction, to the development of quantum theory.

Do these apparent digressions tell the psychologist anything helpful? They certainly do, for from the vantage point of this grand but detailed tapestry of the history of science, the historical skirmishes between the vitalists and their foes, the dualists and their foes, the behaviorists and their foe-and the rest-can be seen in perspective. This in turn permits current controversies-between cognitivists and behaviorists, "top-down" and "bottom-up" approaches, "emergentists" and "reductionists"-to be scaled down to manageable and digestible proportions.

One of the most striking virtues of Gregory's way of looking at things is his capacity to show why people thought as they did: why they were puzzled, why they were tempted by ideas that now look foolish to us, why they built their theories the way they did. The foundation of this virtue is respect; Gregory is a wonderfully smart person, but unlike some other wonderfully smart leaders in the field today, he does not suppose that

just about everyone else-predecessors and contemporaries-is stupid for failing to see things exactly his way. So not only has he read extraordinarily widely, but has also interpreted what he has read with a generous spirit. Almost everyone makes mistakes in this story, but there are no villains or jerks.

Gregory's view of the history of philosophy is particularly refreshing and idiosyncratic. Unlike many psychologists, he is neither contemptuous nor ignorant of philosophy. Nor is he in awe of it. Under the tutelage of the legendary N. R. "Russ" Hanson at Cambridge, Gregory learned not only what philosophy has to offer science, but also which traditional promises philosophy could not keep. In *Mind in Science* there are thumbnail sketches of the lives and contributions of many philosophers from Thales and Heraclitus through Reid and Kant to Smart and Putnam. There are longer discussions of Aristotle and Plato, Descartes, Mill, Wittgenstein, and Russell. Almost all of this makes uncomfortable reading for a philosopher because it is all slightly "wrong"; Gregory refuses to read philosophers as they have thought they ought to be read (rather like reading Joyce for what can be learned about the Dublin climate). Gregory often ignores these philosophers' traditional triumphs and puts embarrassing weight on their traditionally overlooked or excused weaknesses-but never with an eye to making them appear fools. Instead they emerge-quite correctly, in my opinion- as full partners in the scientific enterprise, often the source of major advances in outlook, but at least as often merely eloquent and all-too-influential defenders of creeds outworn, protectors of dubious boundaries, ideologues with a murky sense of their actual method and status, whose intricate supporting arguments are often wisely ignored. A fruitful heresy, I think.

In addition to the chapters that place the psychological enterprise within the frame of the rest of learning, there are some excellent chapters illuminating dark corners within psychology. I found Gregory's expositions of the Weber-Fechner law and S. S. Stevens's psychophysics, for instance, much better motivated than any textbook discussion I have seen. And his masterful dismantling of the shaky edifice of IQ testing and the very concept of intelligence should be required reading for anyone who believes IQ testing is a salvageable practice.

### **Dogmatism dethroned**

The theme that emerges most powerfully from the book is the dethroning of dogmatism-both of "common sense" and of various portions of science and philosophy. Common sense is revealed to be no natural kind of special wisdom, but a catchall of popular science, changing as science has advanced but always lagging behind. Philosophers' pretensions to a priori truth are diagnosed as arising, typically, from failures of imagination interpreted as insights into necessity. The rival pretension of some scientists to be above philosophy, to inhabit a sterile and rigorous world of scientific truth, is also unmasked.

*Mind in Science* is, for better and for worse, a very personal book. For better, because only someone with Gregory's boundless energy and unquenchable enthusiasm could have compiled the life-time of reading and thinking that went into writing this book. For worse, because that enthusiasm makes for a somewhat chaotic and jumbled book. Gregory can apparently tolerate many more loose ends and digressions than most readers can, and one often gets the sense that the book was crunched together hurriedly out of a mountain of cherished notes. This disorder is accentuated, unfortunately, by some of the least pleasing typography and book design I have ever seen from a major publisher. The table of contents is an assault on one's visual system.

No one could understand in expert fashion everything Gregory has written about here. Although his discussions of, say, astronomy and physics impress me as lucid and wise, I am no expert in those fields, and I would not be surprised if astronomers and physicists reacted to those passages much the way I react to his account of philosophy: It is impressive and valuable overall, but ranges from brilliant, iconoclastic insight through sound exposition to arresting misreadings (well, arguably misreadings), and ill-digested textbook filler. Throughout the book, though, there are generous quotations from the thinkers Gregory is discussing, and these invariably support and deepen his vision of the issues. Gregory's scholarship, "amateur" though much of it is, must be admired, and the quotations provide a rich source of fascinating lore (which I expect to draw on, gratefully, for years!).

Gregory's choices of what to discuss and where to insert the discussions are often baffling to me, and his writing is uneven. Some of it is superb (for instance, in the presentation of his own view of perception as hypothesis-confirmation-by now a beautifully engineered and well-oiled exposition machine); some is choppy and uninspired. A stern editor might have helped with the shaping and trimming of this somewhat ungainly book, but such an editor might have cut out the jokes and stifled Gregory's irrepressible delight in odd facts uncovered by his researches: Freud, like Aristotle before him, tried and failed to find the testes in the eel; the opossum spends more minutes of its life dreaming (not just sleeping) than awake. In a discussion of the Second Law of Thermodynamics, Gregory notes that a chicken can un-scramble omelettes-by eating them! This reviewer would rather have the playful surprises at the cost of wading through the ill-shaped parts of the book for them, but others might be less patient.

Finally, American readers will be baffled by Gregory's thanks to Scott Kim for the marvelous invertible signature which appears on the back dust jacket in England, but was unaccountably removed from the American edition. Since it is one of Kim's best, it is reproduced here.