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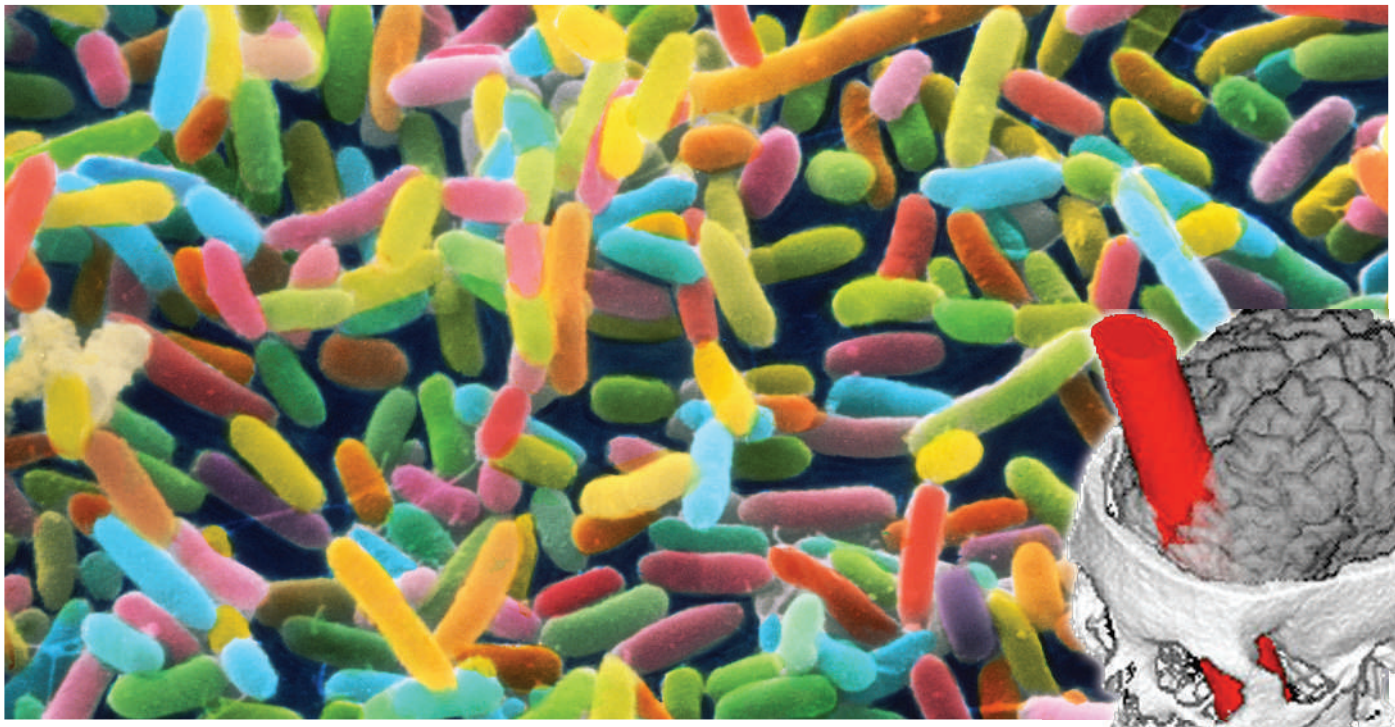

H. DAMASIO ET AL. SCIENCE 264, 1102-1105 (1994), REPRINTED WITH PERMISSION OF AAAS

***Escherichia coli*** **bacteria and the skull of Phineas Gage, whose injury profoundly altered his personality: do model organisms, case histories and computer simulations have interesting similarites?**

# Comparing modes of inquiry

**Science Without Laws: Model Systems, Cases, Exemplary Narratives**
edited by Angela N. H. Creager, Elizabeth Lunbeck & M. Norton Wise
Duke University Press: 2007. 287 pp. $22.95

**Carlos Martínez del Rio**

What do fruitflies, computer simulations and the daydreams of a psychoanalysis patient have in common? A lot, according to the editors of *Science Without Laws*. This essay collection contends that there is telling overlap between model organisms, mathematical models and exemplary narratives — such as the accounts of patients beloved by neurologist Oliver Sacks. As the economist and historian Mary Morgan argues, all these model systems that scientists use to explore the world are themselves objects to be inquired into, as well as being objects with which to inquire. So much so, indeed, that philosophers have begun to discover and catalogue them, as in this book. Model systems are, in effect, the species in the tangled bank of science today.

*Science Without Laws* has three sections: biology, simulations and the human sciences. Each chapter analyses an exemplar and illustrates its value as a model. The word 'model' is construed much more broadly here than in other similar books, such as Ronald Giere's *Science Without Laws* (University of Chicago Press) or Mary Morgan and Margaret Morrison's *Models as Mediators: Perspectives on Natural and Social Science* (Cambridge University Press) both published in 1999.

The collection thus reflects on science's elaborately constructed descriptors and test beds, and tries to discern their dependence on each other. Morgan's superb chapter on the prisoner's dilemma in game theory illustrates how a model can, in symbiosis with economic narratives, shake the theoretical principles of a discipline — much as an invasive species can disrupt an ecosystem. In an otherwise very nice chapter, Josiah Ober attempts to find analogies between Athenian democracy and laboratory mice. Not surprisingly, this is more of a stretch.

With the exception of the book's beginning and end, there is little cross-fertilization between chapters. This lack of exchange is a pity, as we shall probably learn the most about how we know by creating a comparative natural history of modes of inquiry. An opportunity is missed, for instance, for interplay among the chapters on model organisms in biology and on simulations in geology and atmospheric science. Naomi Oreskes and Amy Dahan Dalmedico emphasize how scientific practices in atmospheric science shape and are shaped by scientists interacting with each other and with their patrons. Similarly, the study of the nematode worm *Caenorhabditis elegans*, the plant *Arabidopsis*, the bacterium *Escherichia coli* and the like have led to huge changes in the workings of biologists and in the expectations of their governments and corporate financiers. But the fact that modes of inquiry evolve in a sociological theatre is largely absent in the essays on flies and worms.

There is also a gulf between the biology and simulations sections and the one on the human sciences. These last chapters weaken the opportunity for a theme that could unify *Science Without Laws*. Discussing worms, Jane Albert Hubbard makes the point that the genealogical structure of life allows model organisms to act both as individually interesting cases and as sources for general inferences and implications. In contrast, the chapters that conclude the book suggest that such a flexible role is more difficult for the case studies of psychoanalysis and history. In her afterword, Morgan is too generous in seeing a hint of exemplarity in John Forrester's detailed account of the trials of a psychoanalytical patient and in Carlo Ginzburg's pocket history of a failed Dutch merchant.

Taxonomists are either lumpers or splitters. The authors of this book are lumpers: they seek commonalities. But the diversity of science also requires judicious splitting. Our experience of trying to use the ways of a single scientific discipline, such as physics, as a template for correct thinking suggests that forcing too much epistemological common ground can be unwise. ■

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