

Book Review

Persuading Science edited by Marcello Pera and William Shea

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Pera, Marcello and Shea, William, eds. (1991). *Persuading Science: The Art of Scientific Rhetoric*. Canton, MA: Science History Publications, USA. Pp. xi + 212. ISBN 0-88135-071-0.

In June 1990, Marcello Pera gathered together in Naples several distinguished historians and philosophers of science to discuss how rhetoric may bridge two polar images of scientific reasoning: the positivist picture of universal methodological standards and the historicist picture of relativized standards of inquiry. For most of the people invited, this was the first time they had explicitly considered the role of rhetoric in science. Some turn out to be more receptive to the role of rhetoric than others, though no one really embraces a "strong thesis" about the rhetoricity of science. In fact, Dudley Shapere ends up arguing that progress in a science can be measured by the extent to which the science has developed a self-contained discourse which procedurally rules out rhetorical factors from influencing the arguments!

For the informal logician or the analytic argumentation theorist, the main question to ask about the nature of rhetoric is how it differs from what linguists call *pragmatics*, namely, the study of those features of a speech situation that determine the meaning of an utterance. Clearly, for someone like Ernan McMullin, there is no difference at all. His idea of the "rhetoric of science" is the pragmatics of theoretical discourse,

especially as understood by Bas van Fraassen, who argues that the explanatory virtues that realists take to be emblematic of scientific theories are really "pragmatic" in that the adequacy of an explanation depends on the interests of the person requesting an explanation. There are no better or worse scientific explanations *per se*. Fearing that van Fraassen might demote the status of explanations in science, McMullin responds by observing that those so-called pragmatic indicators of good explanations—such as coherence and fecundity—often presage genuine epistemic improvements in scientific theories. McMullin thinks he is doing rhetoric a favor by showing that it has latent epistemic tendencies.

McMullin's understanding of the role of rhetoric in science is typical of philosophers who view it as synonymous with pragmatics. The telltale sign is that rhetoric is imagined to be something that lies beyond the core scientific reasoning process, which is taken to be a formal(izable) language. Whether our cue is from Carnap or Chomsky, language is seen as consisting of a mapping function from one syntax to another (i.e. its semantics), which is then embedded in a speech context, which, in turn, determines how the language is used in particular situations.¹ After Quine, this picture has acquired special significance for science, as it is now realized that no datum bears decisively on the fate of a scientific theory—a pragmatics is needed to negotiate the exact relevance of the one to the other.²

While a rhetorician would have no trouble recognizing this pragmatic resolution of the "underdetermination" problem as a species of *casuistry*,³ she would nevertheless find the philosopher's priorities strangely misplaced: Why focus so much on articulating and formalizing theories in the first place, when all the arguments are over which theory applies in particular cases? The source of the rhetorician's puzzlement is already suggested by the very expression "underdetermination," which implies that methodology can get the scientist some of the way to testing a theory, but then, after a point, something more contextual needs to take over to fully determine the relevance of data to theories. Yet, in fact, relatively little scientific—though much philosophical—effort is spent on formal theory development, and usually that effort is made independently of any specific tests. Indeed, one finds in science what one finds in other spheres of casuistic reasoning, namely, flexibly interpretable theories that can be adapted to an audience as the situation demands.⁴

The rhetorician, then, does not suppose that the targets of argumentation are the theories themselves, but rather that theories function as tokens that are variously mobilized in debates which may consist almost entirely of scientists but which have implications that extend beyond the fate of this or that research program. Such an inversion of the status of theories from targets to tokens is characteristic of a strongly rhetorical approach to scientific argument, one which sees rhetoric not as an accretion on logic and methodology but as something from which logic and methodology are abstracted.⁵ While nobody in the volume grants such a strong role to rhetoric, sometimes the price that is paid is a warped sense of the history of science. To elaborate on this point, I will focus on Philip Kitcher's paper, which philosophers should find the most interesting one in the entire volume.

In examining Darwin's rhetoric, Kitcher shares a curious obsession with several of the authors in this volume—especially Gerald Holton (on Bohr's and Einstein's rhetoric)—in wanting to show that scientific authors use rhetoric to persuade themselves about the truth of their theses before they try to persuade others. The obvious rhetorical force of appealing to such alleged episodes of self-persuasion is to show that the scientific author is a sincere inquirer, not a mere practitioner in that "glib and oily art" which often passes for rhetoric. Yet, purity of motives notwithstanding, I doubt that scientists do—or should—only publish what they sincerely believe. Rather, they publish arguments that they are willing and able to defend before an audience, anticipating many of the considerations that such an audience would raise in response. Let us not forget the Popperian point that a commitment to arguing a position is not equivalent to a declaration of faith. There is, after all, an important rhetorical difference between science and religion that turns on the distinction between suspended disbelief and outright belief.

An important consequence of Kitcher's fixation on Darwin's sincerity is that his paper gives the impression that everyone who read and argued with Darwin were preeminently concerned with determining the "origin of species." In this context, Kitcher presents the successive editions of *Origin* as Darwin's follow-up attempts to get his points across more clearly to his multiple audiences and to correct earlier errors. While this may have been Darwin's strategy, it does not follow that he was read that way by those audiences, most of whom were not intrinsically interested in our animal origins but in what implications particular accounts might have for their own interests. Failure to heed this point renders mysterious the obvious misfirings and misunderstandings that delayed the acceptance of Darwinism. It also invites spurious questions such as "Were Darwin's

interlocutors so biased that they failed to see what he was saying?" A rhetorician would conjecture that the interlocutors were really using, not addressing, Darwin's arguments, probably in order to score points with some powerful audiences. In order to approximate Kitcher's ideal speech situation, these audiences would themselves have had to express an interest in having Darwin and his interlocutors address each other directly.

Even rhetoric's biggest avowed defender in the volume, the convener and editor Pera, fails to take to heart rhetoric's inversion of the status of theoretical discourse. Strictly speaking, Pera's "rhetoric" is a theory of dialectics that enlarges on the project of dialogical logic associated with Paul Lorenzen and Nicholas Rescher. As such, it is limited to arguments about the merits of propositions that reflect the beliefs of the parties to the dialogue. To his credit, Pera realizes that his approach leaves the termination of arguments mysterious. The mystery is dissolved, however, once dialectics is seen as only a partial representation of rhetoric, one that is suitable for teaching how to make moves in an argument, but one that, at the same time, fails to offer guidance on when an argument should begin or end. The timing of arguments, what the Greeks called *kairos*, depends on knowing what is at stake in a particular dialectical encounter *beyond* the

fate of a proposition, and this typically requires knowledge of people and events *outside* the context where the argument takes place. Scientists, no less than philosophers, can argue about things endlessly, but usually in science the arguments become implicated in events outside the speech situation that force closure.⁶ The distinctiveness of the rhetoric of science will come from such a study of *kairos*.

Since it is still radical for philosophers even to invoke "rhetoric" non-pejoratively, my review of this brave book should not end on a negative note. In particular, Kitcher's view that rhetoric focuses the attention of cognitively limited but interested reasoners is very worthy of further elaboration. In addition, about half the volume is devoted to provocative studies of changes in scientific rhetoric during the seventeenth century. Taken together these papers—authored by Peter Machamer, Richard Westfall, Paolo Rossi, Maurizio Mamiani, and the editor Shea—attempt to explain how scientists moved from what Machamer calls a "Neo-protogorean" rhetoric early in the century (Galileo and Descartes) to a depersonalized anti-rhetoric at the end of the century (Newton). Westfall's explanation is perhaps the best, namely, that the Neo-protogoreans were conjuring a modern scientific audience into being, whereas Newton could simply take that audience for granted.

Notes

1 In the very first paper in the volume—a paper that is otherwise devoted to Darwin's rhetoric—Philip Kitcher tips his hand in this direction by taking as his paradigm case of the role of rhetoric in scientific reasoning to be the difference in how a geometric proof needs to be presented to a student *vis-a-vis* an expert in order to be understood. Since the student is unfamiliar with the canonical formulation of the proof, steps must be provided that the expert would regard as logically trivial. Rhetoric, then, involves fine-tuning the expression of an

epistemic entity to a target audience. The epistemic entity itself—in this case, the target audience. The epistemic entity itself—in this case, the proof—is typically established by non-rhetorical means, such as deductive logic as interpreted through the semantics of geometry. Although Kitcher liberalizes his view a bit when he discusses Darwin's heuristic use of rhetoric, he does not countenance anything near a rhetorically robust view of mathematical reasoning—one associated with the "intuitionists" and "strict finitists"—which makes

the intelligibility of a chain of reasoning to a "natural consciousness" a big part of what constitutes that reasoning as a "proof." This "natural consciousness" functions much as the "reasonable man [*sic*]" does in Anglo-American law—someone who is not a complete mathematical illiterate but who has retained enough commonsense not to be overly impressed by the *ex cathedra* pronouncements of expert mathematicians and their non-natural numbers. Such a sensibility would perhaps be most familiar to readers from the later Wittgenstein's *Remarks on the Foundations of Mathematics*.

- ² In response to a query by Jonathan Adler, I should say something about three senses of "pragmatics" that are suggested by my discussion. The first is the branch of linguistics devoted to the study of situated speech (and writing). The second is the philosophical tenet (associated with followers of Quine and Goodman) that science's most salient epistemic activities cannot be reduced to formal logical procedures but always require the introduction of certain "pragmatic" virtues. The third is the philosophical school of pragmatism, especially its commitment to "action" or "practice" as an ontological primitive. While these three senses are analytically distinct, they are also historically intertwined. A relevant point of convergence is the person most responsible for canonizing the syntax, semantics, pragmatics distinction, Charles Morris, whose work with Carnap in the Unity of Science movement in Chicago first brought together pragmatist and positivist concerns with language. The merger was greatly eased by Morris's assimilation of "practices" to the behavioral units that by the 1930s had become standard in field linguistics. The precedent for this turn to behaviorism can be found in Morris's teacher, G.H. Mead, and its ultimate descendant was Quine's radical translation episode in *Word and Object*. One of the costs of Morris's move, however, has been the tendency to see language as relatively autonomous from the rest of human action, contrary to the original spirit of pragmatism. Some linguists who specialize in pragmatics have tried to resist this tendency to reify language by reviving J.L. Austin's original idea of speech acts, not

as an empirical gateway to semantics (à la Searle), but as a sensitizing device to discovering the different types of human actions. These pragmatists often see themselves as recovering the "rhetorical" dimension of language. See Geoffrey Leech, *Principles of Pragmatics* (London: Longmans, 1983).

- ³ The best philosophical history of this topic is Albert Jonsen and Stephen Toulmin, *The Abuse of Casuistry* (Berkeley: University of California Press, 1988).
- ⁴ This insight would be most familiar as characteristic of the recent "constructivist" turn in the sociology of science. A good introduction is Steve Woolgar, *Science: The Very Idea* (London: Tavistock Books, 1988).
- ⁵ This inversion is most clearly stated in Alan Gross, *The Rhetoric of Science* (Cambridge MA: Harvard University Press, 1990). It is worth noting the affinities this view has with idealist and pragmatist approaches to logic. For a historical overview, see John Passmore, *A Hundred Years of Philosophy*, 2nd edn. (Harmondsworth UK: Penguin, 1966), pp. 156-173.
- ⁶ The complaint that dialectics provides an impoverished theory of rhetoric goes back to Renaissance criticisms of the Scholastics. For a recent expression, see Brian Vickers, *In Defense of Rhetoric* (Oxford: Oxford University Press, 1988), pp. 214-253. I stress the importance of *kairos* to the rhetoric of science in Steve Fuller, *Philosophy, Rhetoric & the End of Knowledge* (Madison: University of Wisconsin Press, 1993). The article that epitomizes for me the importance of timing to the termination of scientific debates is Paul Forman, "Weimar Culture, Causality, and Quantum Theory," in R. McCormach (ed.), *Historical Studies in the Physical Sciences* (Philadelphia: University of Pennsylvania Press, 1971).

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