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P. Redondi and P. V. Pillai, eds., The History of Sciences: The French Debate (London: Sangam Books, 1989)

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Citation

McAllister, J. W. (1990). P. Redondi and P. V. Pillai, eds., The History of Sciences: The French Debate (London: Sangam Books, 1989). Retrieved from <https://hdl.handle.net/1887/11981>

Version: Not Applicable (or Unknown)

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Note: To cite this publication please use the final published version (if applicable).

Book Reviews

The History of Sciences: The French Debate

P. REDONDI & P.V. PILLAI (Eds) 1989

London, Sangam Books

268 pp., £14.95 (hardback), ISBN 0 86131 995 8

The historiography of science has in France a wonderfully rich and important tradition. Of perhaps the greatest interest to the likely readers of this book is the fact that the presuppositions and lines of research of French historiography of science have been and remain distinctive and different from those of Anglo-American scholarship.

One of the most striking aspects under which French and Anglo-American scholarship have tended to differ is in the roles accorded to empirical and conceptual factors in explaining the formation and evolution of scientific beliefs. Traditionally, Anglo-American scholars have seen changes in a community's scientific beliefs as prompted by the discovery or recognition of novel empirical data, which subsequently necessitates the emendation of conceptual schemes; French historiography has tended to interpret them as initiated by conceptual innovations (perhaps in the community's metaphysical or philosophical corpus) from which originate new lines of empirical research. This difference is perhaps most clearly seen in work on early modern science: while S. Drake and R. H. Naylor have emphasized the extent to which Galileo's mechanics arose from novel experimental results, the work of A. Koyré and M. Clavelin has attempted to retrace its origin to the conceptual reinterpretation of a largely unchanging body of data. It might be interesting to consider the extent to which each culture's methodological preferences in the historiography of science are a reflection of its predispositions in scientific practice itself: the traditions of French rationalist and Anglo-Saxon empiricist science, manifest from the time of Descartes and Bacon until the 19th century, may have shaped the expectations of historians in the two cultures as to the likely dynamic of past science.

The aim of bringing French historiography of science further to the attention of the English-speaking community is thus an important one, to which this anthology contributes. In the words of Redondi, the book 'aims at presenting the critical advancement which has profoundly marked the study of the history of sciences in France since the last century' (p. 11). It reproduces writings of French historians and philosophers in English translation; the book is one of a series of anthologies on the French social sciences edited jointly by scholars in France and India and issued by this publisher.

First, an outline of the contents. The book opens with an introductory piece by each editor. The anthology is divided into four sections, each of which carries a short editorial introduction. The first section, 'Positivism: a philosophy of history', presents some positivist writings by Condorcet, A. Comte and P. Duhem which bear upon the historical investigation of science. The section titled 'History of scientific thought' offers samples of French historiography culled from the work of P. Tannery and of Koyré. 'Historical epistemology' allows an insight into the epistemological views of G. Bachelard, G. Canguilhem and M. Foucault. Lastly, 'Avatars of a non-academic discipline' retraces through writings of Tannery, P. Laffitte and Koyré some episodes of the development of the discipline of history of science in France. The volume is concluded by biographical notes on the writers whose contributions are reproduced, and by a bibliography and index.

Part of the introductory material presents a somewhat dated view of Anglo-Saxon historiography of science. The editors strive, as one might expect, to establish the specificity of the French contribution to the historiography of science by contrasting it with that of the Anglo-Saxon tradition. There are several convincing and fruitful ways of drawing such a contrast, on one of which I remarked in the second paragraph above. P. V. Pillai, however, claims that the distinctiveness of French historiography resides largely in its paying attention to discontinuous change in the development of science, a phenomenon which—Pillai says—escapes the notice of Anglo-Saxon studies. Pillai supports this contention by a characterization of Anglo-Saxon historiography as guided entirely by 'the principles of logical empiricism':

[Anglo-Saxon epistemology] chooses to see the domain of scientific 'facts' as a homogeneous and stable field of indefinite extension as if new theories do not give rise to new 'facts' while abandoning large numbers of old ones. The placing of all facts on the same plane makes it insensitive to the important problem of incommensurability, one aspect of what Bachelard terms epistemological rupture. (pp. 2-3)

This might have constituted an adequate depiction of Anglo-Saxon epistemology at the end of the 1950s, but it ignores the lines of research which sprung shortly thereafter from the works of T. S. Kuhn, N. R. Hanson and S. Toulmin. It would have been more interesting if, recognizing that the notion of discontinuities in

rationality had featured in both Anglo-Saxon and French work, the introduction had investigated whether the two schools' treatments showed any systematic disagreements or differences of emphasis.

Part of the introductory material appears unaware too of some recent strands in French historiography of science. This is clearly a greater defect, in view of the book's aim of promoting an understanding of this national school among outsiders. Pillai writes:

The discipline of the history of sciences in France [...] is marked by a sharp and explicit awareness that science constitutes a very particular kind of activity and that it therefore requires a historiography distinct in kind from that which characterizes the historical treatment of general culture or politics. (p. 1)

Notwithstanding Pillai's criticism of positivism on the succeeding pages, it is in fact an assumption typical of neo-positivism that science is a rationally privileged activity of discovery which is separate from movements in general culture and impervious to social and political interests. Since the late 1970s the rationalist and internalist approach to scientific practice—according to which, for instance, there exist such things as objective facts of nature awaiting discovery, and scientists' beliefs and actions are typically distinguished by their exercise of a privileged canon of rationality—has been joined and challenged by externalist and constructivist approaches, which see a community's scientific beliefs (and, in some interpretations, also the facts of nature) as resulting from a process of social construction and negotiation. These new historiographic approaches have been forced primarily in studies of laboratory science, in which French scholars have distinguished themselves; see for instance the work of Lemaine *et al.* (1977), Callon (1978), and Latour & Woolgar (1979). It is disappointing not to find some recognition of this important new component of modern French historiography of science within this anthology, which would thereby have more truly reflected the 'French debate' mentioned in the book's subtitle.

Now for some comments on the individual parts of the anthology. The texts gathered in the first section give a sound and useful exposition of the tenets of French positivism, especially with regard to the notion of progress.

The second section aims to exemplify French achievements in historiography of science, but the choice hardly conveys breadth of either subject-matter or personnel: of the five articles reproduced, Galileo is the subject of three and of much of a fourth, and Koyré is the author of four. Greater notice might have been taken for instance of G. Milhaud, in his time an influential historian of science as well as a mathematician, whose main work of historiography (1906) treated both ancient Greek and modern science. His name occurs on p. 253, in

the biographical note on his contemporary Duhem, but is there misspelled.

The third section, on historical epistemology, is somewhat disappointing. This section could have been in many respects the nucleus and inspiration of the book. The philosophical and historiographic writings of French scientists in the late 19th and early 20th centuries were enormously influential in succeeding discussions of science: for instance, Bachelard's views on epistemological discontinuities illuminate many later discussions of the nature of scientific revolutions, Duhem's intuition that scientific hypotheses approach experimental test not in isolation but in broad bodies of theory inspired much future reflection, and Poincaré's conventionalism played an important role in interpretations of physical theory. While perhaps philosophical in origin, all these contributions have held great interest also for elaborations of a historiography of science. Yet the original formulations of these ideas are not captured in the anthology. This section contains a passage of Bachelard's of comparatively minor importance; if, as we are told by Pillai, the chief distinction of French historiography is its interest for discontinuities in science, it is a pity not to have reproduced an extract from Bachelard's influential treatment of epistemological rupture (1934). Similarly, the section offers nothing of either Poincaré or Duhem (though two passages by the latter appear to different effect in the first section of the anthology). The cursory editorial introduction to this section does not make up for the gaps.

The fourth section, on the formation of the discipline of history of science in France, repays attention. French culture incorporated the teaching of the history of science into the national system of higher education at an early date, and the motivations and manner of this introduction are of great interest, as this section helps to show. It reproduces Laffitte's inaugural lecture as professor of the General History of Sciences at the Collège de France in 1892, an article written by Tannery in 1903 upon his nomination (later to be overruled) as Laffitte's successor to that post, and a lecture given in 1951 by Koyré as an eventually unsuccessful candidate for the new chair of History of Scientific Thought at the Collège. The articles outline the *curricula* and didactic approaches intended by the authors, and are therefore valuable to anyone interested in charting the intellectual and institutional history of the academic discipline. Laffitte's lecture, as might be expected from a disciple of Comte, announces a strongly positivistic programme: he was to teach upon the evolution of the sciences in the light of Comte's classification, the role of science in the progress of mankind, and the relationship between scientific knowledge and wider culture. Both Redondi's introduction to the book as a whole and the brief *editorial* foreword to this section, make it clear that the political establishment of the Third Republic saw the introduction of history of science into university institutions as

a means to promote secular education and technical progress.

The bibliography (pp. 260–262) is neither as comprehensive nor as accurate as one would wish, and fails to constitute a dependable guide to further study. It fails to point out significant items useful to the interested reader, including the English translation of Clavelin (1968), recent work on Bachelard such as Tiles (1984), and even a previous book—albeit in neither French nor English—on French historiography of science by one of the editors, Redondi (1978). For some reason, a list headed ‘Recent publications’ is appended to the main bibliography, but that list includes literature published as far back as the 1960s, while the main bibliography extends to 1986.

Throughout the book there are many typographical mistakes, notably in citations and references in French, German and Italian: see for instance the notes on pp. 141–145. In some of the translations prepared by A. Virmani specially for this anthology, the French original shines too clearly through. The publishers announce a forthcoming companion volume, *From Techniques to Technology: French Studies in the History of Technology*; this further anthology will be welcomed too, but one hopes that its editorial and typographical standards will be higher.

In sum, this book best achieves its aim in two areas: in laying out and illustrating the tenets of positivism with regard to science and its history, and in retracing and discussing the early development of the academic discipline of history of science in France. In the latter task, the volume is valuable in reproducing some otherwise little-known texts accompanied by the interesting commentary in Redondi’s introduction. However, the anthology does not fully succeed in conveying the breadth and originality of French work in either historiography or what it calls ‘historical epistemology’. The resulting panorama of the French debate needs therefore to be supplemented from other sources.

JAMES W. McALLISTER

**Elusive and Highly Ambiguous, but
Nevertheless Existing:
Consciousness in Contemporary Science**
A. J. MARCEL & E. BISIACH (Eds) 1988
Oxford, Clarendon Press
£45.00

This book fills the gap between advanced research papers, which tend to be dispersed in the sea of journals that are available to only a narrow circle of specialists, and academic publications intended for the wider and interdisciplinary community. Sixteen scholars, many of them leaders in the fields of philosophy, psychology and neuroscience, discuss the current status of ‘consciousness’; both as an *explanans*

and as an *explanandum*. Although the collection derives from two meetings (one at the Villa Olmo, the other at the Centre for Interdisciplinary Research in Bielefeld), it shows a surprisingly high degree of coherence—surprising, given that almost all the contributors have their own, often divergent, views on this complex issue. It gives a stimulating and welcome impression of an ongoing and lively dialogue.

Marcel & Bisiach, in their careful introduction, give the reader an orienting and helpful preview of what is to follow.

Then in the first chapter Kathleen Wilkes undertakes a breathtaking linguistic expedition in space and time—ancient Greece, contemporary China and Croatia, medieval and contemporary England. She claims to discover that the resulting assortment of different terms, which could be considered as closely associated with the English term ‘mind’ and ‘consciousness’ as they are *now* perceived, are not so closely associated after all; they do not constitute a natural kind, but rather compose a loose and arbitrary set. This, of course, invites the question whether there are *explananda* here at all, or at least whether there are *explananda* worth scientific pursuit. For entirely different reasons, Daniel Dennett in his contribution also questions the scientific validity of an *explanandum* identified closely with consciousness: in this case that of qualia—the hypothesized properties of sensory experience. Then, the possibility of a neurophysiological reduction of consciousness, where ‘consciousness’ is regarded as a notion belonging to the lexicon of ‘folk psychology’, is examined by Patricia Churchland. Moving mostly on the terrain of the facts about the activation-states or organisms (the sleeping–waking continuum), she sees no reason to expect any prototypical or smooth reduction of consciousness to neurophysiological mechanisms. Her arguments will annoy dualists; the reduction is bound to fail “. . . not because there is spooky stuff . . ., but because the folk psychological categories lack sufficient integrity to stick” (p. 301).

The rest of the book could be described as a formidable illustration of this last point; were it not for the fact that the contributors very often belong in the functionalists’ camp, and offer many (often mutually contradictory) arguments about the elusive aspects of consciousness from that perspective. Functionalism itself is only loosely, and inadequately, defined (‘function’ as a role, and as an equation, are certainly very different things); but it is easy to see under this dominant umbrella-framework the paradigm of contemporary cognitive science; both in its symbolic and connectionist variants. Alan Allport, for example, whose contribution is sharply critical of the common cognitivists’ criteria of consciousness (such as readiness for action; capacity to memorize; and subjective confidence) eventually concludes that the role or function of the sought-after ‘phenomenal awareness’ consists in perceptual and behavioural integration, which