

math and music, and a nod to such cross-sense experiences as synesthesia, where we can 'taste' a colour).

Which brings us to paradigms, and such. Kuhn, and others are here. But they don't hold the floor. Paradigms far, far back in scientific history are shown, exposed, and discussed. Interestingly, in my field of anthropology, albeit cultural anthropology with a cybernetic bent, Leslie White is here, but not Gregory Bateson, perhaps the bravest of us. (Interesting, too, for it was Bateson who organised the Wenner-Gren Conference on the Effects of Conscious Purpose on Human Adaptation, where six real scientific discoverers met for six days in 1968 to try to figure out from widely variant data that great question; recorded in prose and journal and transcript by Mary Catherine Bateson as *Our Own Metaphor*, Alfred Knopf, New York).

Yet Richard Feynman is here, so we are not left without the brave by any means. The late Richard Feynman, Nobel laureate, was the man who dared to tell NASA that the workers on the Space Shuttle had been trying to warn their managers of the possibility of a crash. Perhaps the only glaring exception is Charles Sanders Peirce, whose might have attended almost as a participant, so little known is he even in his native United States. Yet he is the one who gave us American Pragmatism, and sired, intellectually, Dewey and George Herbert Mead, and many of the Chicago School; as well as his own invention of abduction, a third form of reasoning, apart from deduction and induction, in which the data fall into place as the theory which explains them comes to mind.

Each of us would have those favourites, or mentors, whom we would like to see not missed out. This would surely be the only exception we might possibly take to Root-Bernstein's work — and even then feel possibly a little churlish in the face of such generous scholarship. This honesty, and generousness of intellectual spirit, is what commends the book to us all. It can be dipped into or read in huge chunks. It should be on any shelf which has Peter Medawar, or Poincaré; its dialogues would sit nicely next to the dialogues of Popper and Eccles (Karl Popper and John Eccles, *The Self and its Brain*, Springer International, 1977). As an annotated reference book, it is an enormous resource; as an adventure book, it is a pleasure to read. And it has such fine spirit.

The character Imp, whom we are sure is the author's *alter ego* or at least that portion of his *alter ego* fashioned after such irresistibly forthright and honest scientists as Richard Feynman — says in his last report to the six,

For the complacent, for those who are satisfied with their present position in science, and for those whose fondest desire is to become the editor of several journals, to sit on all the relevant NSF committees, to become head of the department at thirty-five and president of the university at fifty — in short, to do the things that Pasteurs, Mendels, Darwins, McLintocks, Curies, Maxwells, Einsteins, Feynmans never do — the body of my report is not for you.

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The Boundaries of Economics by Gordon C. Winston and Richard F. Teichgraber III

(Murphy Institute Studies in the Political Economy, Cambridge University Press, Cambridge, 1988), pp. xi + 117, £75.00, ISBN 0-521-34450-6.

The title of this slim volume is somewhat misleading. None of the five essays is really concerned with the boundaries of economics. Rather the common

thread, as Winston's introduction suggests, is a consideration of the way economists think about human behaviour and how their mode of thought differs from that of other disciplines.

Several of the contributions have particular interest in terms of the role of information. This particularly applies to what from my viewpoint was the most interesting and stimulating chapter, that by Winston on the treatment of time in economics. This provides a new perspective on some of the difficulties involved with Shackle's notion of "unknowability".

Winston first emphasizes the distinction between analytical and perspective time, pointing out that in the former events are ordered on a before-simultaneous-after basis, whereas in perspective time the ordering is past-present-future.

While economic theorising is performed in the context of analytical time, in the real world we are compelled to live and act and decide in perspective time. The observer in analytical time knows what is to come at any moment but the actor in perspective time can only know what is happening now and what has happened in the past. Winston echoes Shackle in emphasizing that in perspective time the future is not just unknown but unknowable. He cautions against the tendency of the economic analyst to unwittingly attribute to the subjects of study the wisdom, insight and temporal mobility possessed by an observer considering their actions in analytical time.

An important clarification of the concept of unknowability is provided by Winston's distinction between the knowledge content of repetitive and unique events. He argues that where there is a significant degree of repetitiveness the individual may justifiably have considerable confidence as to what will happen in the future, which no longer appears unknowable. In the extreme case of frequently and perfectly repetitive events the distinction between analytical and perspective time is blurred. However for truly unique events there is no basis for anticipation. Such events necessarily come as a surprise.

He asserts that by failing to identify the repetitiveness of behaviour as an important variable, economics sets inconsistent tasks for itself. It attempts to encompass within its theoretical structure everything from highly repetitive to highly unique phenomena. While repetitive behaviour is amenable to scientific analysis, "novelty denies theory" (p. 40).

In a felicitous phrase Winston speaks of Shackle's "often nihilistic subjectivism", based on his repeated insistence that nothing at all can be known about the future. However, as Winston convincingly argues, repetitiveness of a particular action permits the veil of ignorance to be penetrated.

The concluding section of Winston's chapter is of less importance. He points out that the choice of a time unit in economic analysis suppresses information about the timing of events within it and from this argues that the 'free rider' problem associated with public goods can also occur with private goods. He uses as an example a simple exchange transaction where there are in effect three separate events, agreement between buyer and seller, payment of money and delivery of the goods. Whereas it is conventional to assume that these events occur simultaneously, there is potential for one of the parties to opportunistically renege on their part of the transaction. Of course, in the overwhelming majority of transactions such a possibility can be ignored and thus the issue raised seems somewhat trivial.

John Gray's chapter, which focusses on the intellectual antecedents of the Nobel Prize winning economist F.A. Hayek, also emphasizes his distinctive contributions to both economics and social philosophy. Hayek's principal

concern is with the epistemological function of the market mechanism. For him the market is essentially a discovery procedure in which knowledge not possessed by any single mind is rendered accessible to society as a whole.

Gray stresses that Hayek's view is substantially different from the approach usually adopted in studies in the economics of information. Hayek's position is not that market processes lower the costs of information to economic agents, but rather that they allow the use of information that would otherwise not be available to participants at all. Gray also notes the correspondence of views between Hayek and Polanyi (1962) on the importance of tacit knowledge, that is, unarticulated knowledge that people may not be aware they possess.

One of the distinctive features of Hayek's thought is that he believes that the knowledge-producing function applies not just to markets but to all social institutions — to law, morality, religion and language. Gray concludes that despite the inconsistencies and incoherences in Hayek's theoretical system which have caused him to be largely ignored by mainstream economists, his many important insights retain considerable contemporary interest.

Donald McCloskey's chapter on the rhetoric of economics argues that all the conversational devices of economics, verbal and numerical, can be viewed as figures of speech. Such metaphors can be seen to permeate other disciplines, including mathematics. Given the pervasiveness of the persuasive transmission of information in economics, he argues that there would be benefits from applying the devices of literary criticism to that discipline.

Michael McPherson's contribution is essentially a personal account of an intellectual odyssey — beginning with the three years he spent mastering Rawls's *Theory of Justice*, initially believing that it contained the solution to many of the problems plaguing economic theory, followed by his subsequent gradual realisation of its limitations.

Rawls employed the tools of welfare economics to examine the conditions necessary for a just society. His work also held out the promise of enabling economics to more adequately take account of justice, the distribution of income and wealth, the social formation of preferences and the role of power in determining social and economic outcomes. McPherson eventually concluded that the complexity of the issues involved made it unlikely that a single global theory would suffice but he still maintains that Rawls's effort to reconcile economics and political philosophy has yielded significant benefits.

The final essay, by Daniel Hausman, written from the perspective of a philosopher of science, traces the history of economic methodology and asserts that the currently dominant views on methodology are drastically inconsistent with economists' actual practice. A major source of difficulty is that methodological work in economics has resembled philosophic inquiry but has remained separate from, though constantly influenced by, inquiry within the philosophy of science proper. Hausman argues for a closer interaction but cautions that economic methodologists and philosophers of science have different objectives and concerns.

Given that all but one of the essays were originally presented as public lectures, it is not surprising that they tend to be both readable and accessible to the non-specialist. Accordingly, I would recommend the book not only to economists but to those whose primary interest is in the role of information, provided that they have some background in economics.

REFERENCES

1. Michael Polanyi, *Personal Knowledge*, Routledge & Kegan Paul, London, 1962.
2. G.L.S. Shackle, *Time in Economics*, North-Holland, Amsterdam, 1958.

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The University: An Owner's Manual by Henry Rosovsky
(W.W. Norton and Company, New York, 1990), pp. 309, \$US19.95, ISBN 0-393-02782-1.

The Economies of American Universities: Management, Operations, and Fiscal Environment by Stephen A. Hoenack and Eileen L. Collins
(State University of New York Press, Albany, 1990), pp. vi + 285, \$US17.95, ISBN 0-7914-0028-X.

Henry Rosovsky's book is already well known. It will take a secure place among the durable memoirs of university life. Candid, entertaining, shrewd and at the same time well organised and elegantly expressed, it is a model of its kind. Its consistent flavour could be conveyed by quotations selected almost at random — some headings from the section on "Helpful Hints for Academic Administrators" will suffice: "Never be surprised by anything." (p. 246) "Learn the value of being vague." (p. 248) "Consider that no comment is often the most appropriate reply to a question." (p. 252) "Avoid doing anything you would not wish to see published in a newspaper." (p. 252) "Never underestimate the difficulty of changing false beliefs by facts." (p. 259)

Rosovsky was Dean of Harvard's College of Arts and Sciences from 1973 to 1984. He believes in the American university system and in Harvard's role in defining that system. He begins with the observation that America has produced two thirds of the world's best universities and asks "What sector of our economy and society can make a similar statement?" (p. 29) He admits, but brushes aside, as "not now my concern", the fact that the United States is also home to a "large share of the world's worst colleges and universities" but one wonders by the end of the book whether the "market-place" for higher education, a recurring notion in Rosovsky's approach, is such that if it is to allow the best to flourish, it must also be unregulated enough to allow some of the worst to establish their niche.

Rosovsky sets out to write a positive account of the sources of vitality of America's best university achievements. Harvard's traditions, methods, strengths and weaknesses provide rich veins of experience, anecdote and aphorism, and are energetically mined. The virtues of the system are drawn out, even though unvarnished accounts of breakdowns and dysfunctions are a regular feature of the analysis.

Rosovsky's method is to look at the admissions process from the viewpoint of prospective students, both undergraduate and graduate; at staff selection and the issue of tenure from the viewpoints of staff and the university; at the performance of the departmental and faculty system of organisation from the viewpoints of the administration and the scholar; at the performance of the university as a whole in terms of the judgements of the market. It sounds