mechanics, became ever more entrenched in neoclassical economics. The evolutionary support to the optimising model of rationality seems to be very significant in this context, as does the march of the optimizing model into whole new fields of economics in this period: the economics of the family, crime, politics, bureaucracy, etc. In other words, this has been a period where the rational choice model, far from being in retreat, has run amok.

I suspect that there is a deeper reason for the resilience of the old machines, so to speak. The rational choice model of optimizing may be, as Mirowski suggests, a hollowed out version of individualism, but it is a model still capable of giving an interpretation of the motives to individual action, and these in turn form the basis for policy statements. A science like economics, that professes a concern with policy, has got to have a model of individual agency that allows judgements about how different outcomes affect the agent; and this requires a model where the agent is affected by or attaches meanings to the outcomes of actions. An algorithmic account of action does not allow this. You can't get semantics from syntax, is the point here that philosophers of mind like Searle make, and it won't go away. Hence, neoclassical economics would have to turn its back on policy if it embraced cyborg science for its models of individual agency. Of course, this makes Mirowski's preferred choice for how economics-the-cyborg-science might develop rather shrewd, because it avoids the direct challenge to the rational choice model. But will an economics than preserves the rational choice model while treating institutions as algorithmic constraints on action really be a cyborg science?

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Antoin E. Murphy and Renee Prendergast, eds., *Contributions to the History of Economic Thought*: *Essays in Honour of R.D.C. Black* (London and New York: Routledge, 2000), pp. 328, $115, ISBN 0-415-21552-8.

This volume is a fitting tribute to one of the outstanding historians of economic thought in the post-war period. After a brief Introduction, there is a lengthy interview with Black in which he talks about his career and why he approached the subject in the way he did. It is followed by an analysis of Black's work by A. W. Coats. Part II contains two reflections on the discipline of the history of economic thought by D. P. O'Brien and Bernard Corry. Part III reflects Black's work on classical economics with three essays on *The Wealth of Nations*, by Donald Winch, Andrew Skinner, and Pedro Schwartz. Part IV reflects his work on marginalism, with essays on the Jevonian revolution (Margaret Schabas), Jevons and Gossen (John K. Whitaker), and Shadwell (Ian Steedman). The remaining two parts are entitled "Into the archives" and "Abstraction and relativitity." The first of these is justified by the importance Black has attached to archival research, and includes work on the controversy between Cairnes and Cliffe Leslie (Tadhg Foley and Tom Boylan) and the Emigrant Irish Savings

Bank during the Irish Famine (Cormac O'Gràda). The second is more wide-ranging and covers Burke (Renee Prendergast), Menger on institutions (Charles Hickson), and John Law (Antoin Murphy).

Editing a *festschrift* is always a compromise between competing aims. One wants to include work by people most closely associated with the honoree, to include essays that reflect the most important work that he or she has undertaken, and (the criterion to which publishers attach most importance) to produce a collection that is coherent. Sometimes the result fails to achieve one or more of these aims. In this case, however, it succeeds on all three counts. Most of the essays are by people who have worked with Black at some stage. Some are part of the relatively small community of Irish historians of economics (on both sides of the border), and others have been part of the broader group of those involved with the *History of Economic Thought Newsletter* and annual conference over the past thirty years. The topics covered also reflect well the range of Black's interests, particularly classical economics and Jevons. The volume also serves as a reminder of the important Irish contribution to British economics throughout the nineteenth century. Though not usually thought of as an economist, let alone admitted into the conventional economic canon, Edmund Burke, the subject of Prendergast's essay, was an influential figure in the emergence of classical economics. Towards the end of the century, Cairnes and Cliffe Leslie, the subject of the essay by Foley and Boylan, provided an even more important Irish input into British economics.

Black is best known for his *Economic Thought and the Irish Question*, 1817–1870, which established him as an authority on classical economics. Though he expressed some sympathy towards the relativity of economic ideas, his work was not motivated by any historiographic doctrine. Like many of those coming to the history of economic thought during this time, he spent a period in the United States at a time when such mobility was still much less common than it later became. There he was influenced by Viner's attitude toward scholarship. The principle underlying Black's work was the traditional historical one of paying close attention to original sources in an attempt to build up a picture that was sufficiently detailed and well-documented to enable one to reach reliable conclusions about the questions he was trying to answer. In his inaugural lecture at Belfast, he defended this lack of interest in what he considered fashions by arguing that neither absolutism nor relativism was, in general, correct. This perspective gives his work an air that could be considered "old fashioned," and the manner in which it is expressed can even appear slightly naïve. However, the historiographic values that underlie his work are arguably the ones that matter most. His historical work, however, is anything but naïve and constitutes a lasting contribution to our understanding of nineteenth-century economics.

It has become fashionable to argue that economic ideas must be understood in their social and political context. This has been presented, under various labels, as a new departure at variance with "traditional" history of economic thought. Black's work, illustrated in this volume and in his recent collection of essays (1995) shows very clearly that it is an illusion to think that there is anything new in doing this. He has always viewed economic ideas against the background of the economic and social history of the period in which they were

developed, and in the context of the period's political thought. So much so that at one point he realized that if he were to continue with his work on Irish economics he would have become an economic historian rather than an economist. This is one of the reasons he gave for deciding, around 1959–1960, to work on Jevons rather than Cairnes (p. 12): he wanted to remain an economist. Refusal to follow fashions can be a strength rather than a weakness, and in this case it was definitely a strength.

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Roy Weintraub, *How Economics Became a Mathematical Science* (Durham, NC and London: Duke University Press, 2002) pp. xiv, 313, $18.95, ISBN 0-8223-2871-2.

Roy Weintraub invites us to be wary of any book that frames the history of twentieth-century economics as a story of increasing mathematization (p. 42). Is he undermining his own account? No, the point is to get beyond the one-dimensional view that makes mathematics itself timeless—a tool and resource for economists that preserves its essential character even as it makes progress in proving theorems and solving problems. His achievement, an impressive one, is to historicize thoroughly the relationship between mathematics and economics.

Traditionally, mathematics was a science in its own right, engaged in deriving truths about space, motion, force, and probability. In the later Victorian world of the Cambridge mathematical Tripos examination—Alfred Marshall's England—mathematics was closely allied to physics, as it had been until recently in most of Europe. On the Continent, however, the physical ideal of mathematical truth had begun to break down by mid-century. Early in the twentieth century, David Hilbert would enunciate a quite different interpretation of mathematics, as a discipline that reasoned rigorously from axioms, proving theorems whose validity was a matter of self-consistency and not of physical truth. By the time of Bourbaki, an oddly impersonal collective author composed mainly of graduates of the elite Ecole Normale Supérieure that, beginning in the 1930s, developed what in America would become famous as the "new math," mathematics was defined in terms of a rigorous logic that made no contact with nature. Physics is everybody's prototype of a mathematized science, but, following Weintraub's distinctions, it has not in recent times been a mathematical science. Bourbakist mathematics, with its new and highly demanding conception of proof, was rather