An important element of his treatment is the potential loss of experiential knowledge as operations are increasingly computerized. He is critical of the enduring myth that power as well as information and technical capability will be distributed more evenly through industry, offices, bureaus, and society at large. He sees everywhere 'the substitution of data-scanning for information-gathering, of rules and procedures for learning, and of models and calculations for judgment and expertise. In short, the replacement of art with artifice' (p. xiii). This brings 'the elaborate, long-term, collective effects of the possibly irreversible and largely unexamined drive to computerize and network everything and anything whose efficiency or economic performance might thereby be improved' (p. 217). Those who do the re-designing and re-engineering 'seem to have little understanding of the potential vulnerabilities they are creating' (p. 217).

Rochlin ends with an apocryphal story about intertranslation of English and Russian. In the process the English 'Out of sight, out of mind' came back after double translation into and out of Russian as 'Invisible idiots'. The computers grow more and more invisible and they are 'idiots, having no information other than what has been supplied them and capable of doing no more than what was programmed into them. And they are no more capable of understanding or predicting indirect or long-term consequences than were their designers or programmers. They require constant, intelligent, and informed monitoring' (p. 218).

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A New Economic Paradigm? Innovation-based Evolutionary Systems

Kevin Bryant and Alison Wells (Eds)

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This booklet is edited and partly written by the Director (Bryant) and a member (Wells) of the Science and Technology Analysis section of the Australian Government's Department of Industry, Science and Resources. It is aimed at, according to an explanatory note heading a list of the department's publications at the back of the booklet, 'informing discussion on policy issues relating to matters of science, innovation, research and technology' (p. 103). The booklet has succeeded admirably in this objective, in this reviewer's opinion, and in doing so has provided readers with a useful and lucid introduction to the growing field of 'evolutionary economics', a school which now has its own journal[1] and has spawned a spate of titles in recent years.[2]

Yet, as the question mark in the title suggests, 'evolutionary' economics is arguably *not* all that new a discipline, at least in a number of respects. It is in any case not strictly a new economic *paradigm* but rather a collection of theoretical positions loosely pivoted around the notion that the 'economy' is a *path-dependent* entity, much influenced by historical circumstances—an idea which of course dates back at least to Marx and later to such important theorists as Joan Robinson, as in her seminal paper 'History Versus Equilibrium'.[3] As Elias Khalil, himself a major contributor to the field, has written: 'The advanced alternative to the equilibrium approach—what has been dubbed recently

"evolutionary economics"—is not a coherent paradigm. It is rather a "movement" that contains differences as wide as those that separate the long-recognised non-mainstream traditions in economics'.[4]

The editors of this booklet in fact fully recognize Khalil's point, and as well as discussing a range of 'evolutionary' views, they make some original contributions of their own to the field. Thus Bryant, in his chapter (chapter 4) entitled 'Evolutionary Innovation Systems: Their Origins and Emergence as a New Economic Paradigm', coins a novel phrase—'systemic economics'—to designate the particular type of evolutionary economics that he finds most helpful in explaining the processes of technological innovation. Bryant explains that some such new name may be required to differentiate a style of evolutionary thinking proposed by, most notably, Richard Nelson and Sidney Winter (as in their influential book *An Evolutionary Theory of Economic Change*,[5] and which is characterized by an 'holistic systems' approach in which the economy 'can be seen to operate at several largely self-supporting hierarchical levels within different spheres', such as 'commercial innovation systems (consisting of firms) and science systems (consisting of universities and other public research organisations)'. In none of these instances are systems fully isolated, Bryant is keen to emphasize—there are 'important intersections and interactivity in all cases' (p. 78).

Earlier in his chapter Bryant argues that while the suggestion that economics might draw on specifically *biological* analogies had long ago been put by such writers as Thorstein Veblen[6] (1898) and Alfred Marshall[7] (1919), it was Nelson and Winter who were 'the first to suggest a practical way of constructing a theoretical model of evolutionary economics that could be intimately related to research findings on business behaviour' (p. 66). Their idea was that a firm's *routines* could be compared with the role that *genes* play in living organisms: they are a persistent feature of the firm and determine its possible behaviour; they are 'heritable' in the sense that activities generated by the firm (such as the building of a new plant) have many of the characteristics of the parent company; and they are selectable in the sense that firms with certain routines do better than others, so that 'their relative importance in the population (industry) is augmented over time' (p. 66).

But as Bryant goes on to point out, a key *difference* between the Nelson and Winter model and the current Darwinian understanding of biological evolution is that routines can, unlike genes, be *changed* by the 'organism' (the firm) in question, so that 'evolution' in this case is more akin to (Jean Baptiste de) Lamarck's idea of inheritance of acquired characteristics than to Darwin's theory of natural selection of chance variations.[8] As Bryant succinctly summarizes Nelson and Winter's model: 'If a firm experiences difficulties in its business environment, this should trigger it to question whether its routines are still appropriate. As an adaption to its environment the firm will learn new routines, or unlearn old ones. If it fails to adapt and change (evolve) in this way—if it maintains old routines that are inappropriate to the circumstances—it will decline and perhaps disappear' (p. 67). Bryant's point is an important one which, intentionally or not, underlines the *limitations* of insights from 'evolutionary' theory for economics. Economics is replete with evolutionary language, and 'evolutionary' economists are frequently all too ready to claim Darwinian authority for their views, in the apparent hope that they might thereby be infusing the latter with some kind of 'natural law' status—quite apart from the common usage of catch-phrases like 'survival of the fittest' in economic rhetoric. Notwithstanding these cautions, this booklet is recommended as a helpful introduction to the various modes of thinking that have been collectively termed evolutionary economics, especially for its specific focussing on the innovation process in business behaviour.

Notes and References

1. *Journal of Evolutionary Economics* (Springer Verlag).
2. See, for example, K. Boulding, *Evolutionary Economics*, Sage, Beverley Hills, CA, 1981; G. M. Hodgson, *Economics and Evolution*, U.K. Polity Press, Cambridge, UK, 1993; U. Witt, *Evolutionary Economics*, Edward Elgar, Aldershot, Hants, 1993; L. Magnussen and J. Ottosson, *Evolutionary Economics and Path Dependence*, Edward Elgar, Aldershot, Hants, 1997.
3. J. Robinson, 'History versus equilibrium', in J. Robinson, *Collected Economic Papers*, Vol. 5, Oxford University Press, Oxford, 1979.
4. E. L. Khalil, 'The Janus hypothesis', *Journal of Post Keynesian Economics*, 21, 2, 1998/9, pp. 315–41 (335).
5. R. R. Nelson and S. G. Winter, *An Evolutionary Theory of Economic Change*, Harvard University Press, Cambridge, MA, 1982.
6. T. B. Veblen, 'Why is economics not an evolutionary science?', *Quarterly Journal of Economics*, 12, 1898, pp. 374–97.
7. A. Marshall, *Industry and Trade*, Macmillan, London, 1919.
8. Perhaps, though, the distinction between Darwinism and Lamarckism is not so clear cut in human social evolution. For example, Darwinian natural selection can be seen to operate on 'varieties' of economic behaviour, however generated. See John Nightingale's chapter in J. Laurent and J. Nightingale (eds), *Darwinism and Evolutionary Economics*, Edward Elgar, Cheltenham, UK, forthcoming.

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Information Liberation

Brian Martin

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Information Liberation sets out to examine the relationship between information, information producers and information media. In particular, it focuses on the informational dimensions that establish and maintain empowered and disempowered social groups in their opposing positions. In exploring this dimension of information, Martin maintains that information is power. More to the point, and following in the footsteps of Lord Acton, Martin states that power (and thus, information) tends to corrupt. However, unlike Acton, he argues that grass-roots responses can allow those who are activists for social justice and equity to achieve their goals. Specifically, he states that; 'Challenging information-related systems of power is one avenue for social change' (p. 5). This route to social change is placed as another 'third way' option that provides an alternative to market economies and centralized state control.

The contribution that this book makes is not easy to place in the academic landscape. Martin makes no academic pretensions; rather, his contribution is in relation to activist needs. Indeed, the academic literature is characterized in *Information Liberation* as being frequently superfluous to the needs of activist social reformers. Evidence is provided to show that the complex outputs of Academe are, on some occasions, useful to activists despite being misunderstood and despite sometimes being wrong. Yet even when they are accurate—but impenetrable to the lay reader—they are often of little use. Furthermore, it is not only the research that academics publish but the institutions and research processes surrounding them that are inhibitors to their usefulness in social change. The