## **BOOK REVIEWS**

## Wayward Technology by Ernst Braun

(Frances Pinter, London, 1984) pp. xiii + 225. £15.50 (hb), ISBN 0-86187-288-6.

Autarky is a word Ernst Braun likes to use. Occasionally it refers to economic autarky at the national level, but usually it means personal autarky for the individual. It is one of Braun's theses that technology is best able to satisfy autarkic needs. The driver of a motor car is apparently independent of communal transport. Watching television is self contained entertainment. The deep freeze appears to provide autarky in food. The dependence of all these devices on a great deal of organisation behind them is not what matters to the individual. The individual has the impression of freedom from dependence on others. "Which is all very well," comments Braun, "except that the other side of Man's nature desperately needs people and when this need gets the upper hand, they are not there — they have all gone into their own little self-contained high technology boxes" (p.95).

The argument is characteristic of the book and of the man. Braun is a scientist, a physicist, by training, and a humanist by inclination. As he ranges widely across the field of the interactions between technology and society, his philosophy is never that of the technocrat or the technological optimist or the scaremonger. Always it is that of the urbane, civilised intellectual. His treatment of technological innovation is unencumbered by economic theory. His discussions of contemporary fears about technology, and of technolgy and social goals, is not marred by sociological jargon. But he is more than an amateur in the field. He is not just another scientist who, towards the end of his scientific career, takes up his pen to give the world the fruits of his reflections. Until recently he was head of the Technology Policy Unit at the University of Aston in Birmingham, and as such he was active in research and teaching in the field.

I can't help taking his book to some extent personally. Largely overlapping in time with the early days of the TPU — that is, in the sixties and early seventies — I was involved in setting up a somewhat similar department in the University of Manchester. The temptation to compare is made irresistible by a book from Manchester, also published in 1984: *Science, Technology and Society Today*, edited by Michael Gibbons and Philip Gummett, Manchester University Press. This modest little volume is perhaps more down to earth. It is explicitly designed for teaching, as indicated, for instance, by the fact that each of its concise little chapters is followed by 'questions for discussion'. Every one of its eleven chapters is by a different author. Braun, on the other hand, gives us a personal vision in an extended statement. It is well informed and, within its limitations (little on the biological as distinct from the physical technologies, or on the developing as distinct from the developed countries) it is amply supported by illustrative examples. The book is the product of too much knowledge, experience, research and reflection to be ignored.

Two decades after those stirring, innovative days in the sixties, what has become of the new discipline we thought, or at least hoped, and in our rasher moments claimed, we were creating? Please do not apply the most demanding criteria. There have been no world-shattering discoveries, few conceptual breakthroughs, no great explanatory frameworks, no powerful theories formulated either in mathematical or in verbal symbols. We did contribute to a more careful and critical analysis of the process of technological innovation and the role of science in it. Not enough, though, to undercut the market for 'I believe' statements that happen to suit the political purposes of the persons who make them. Braun's formulation is not likely to have any more impact on that market than earlier formulations have. Braun distinguishes three modes of science-technology interaction: the 'instruments; the 'innovation bond', via scientific inputs to product or process innovation; and the 'common pool bond', the most elusive of the three, which works by joint use of a pool of formal and informal knowledge.

Probably the most important effect of those educational innovations of the sixties has been on teaching. They have facilitated a lot of good worthwhile teaching of a wide range of students. The numerous references in Braun's book to materials from SISCON, the UK inter-institutional Science in its Social Context project, are symptomatic. The effects are now felt far beyond the limited number of departments overtly devoted to the field, in the UK and elsewhere.

Braun begins his book with a chapter on the rise of industrial society, giving a simple guide to a field that has been well mulled over by distinguished historians. There are 16 tables in this chapter with data on such things as the breakdown by origin of the gross national product, the production of coal and the import of cotton, the growth and distribution of the population. They refer mostly to the UK. The data are of the kind which are fascinating to those who are fascinated by such information. But they are a false clue to the nature of the book as a whole. Its emphasis is not statistical. Rather, it is pervaded by a gentle humanism. On technological innovation, Braun ends by agreeing with Keynes that there might not be much of it if it were done only as a result of cold calculation (p.69). On technology assessment, he suggests that it is perhaps more important to travel hopefully than to arrive (p.118). On government policies for technology, he concludes that their efficacy and effects remain elusive (p.163). The idea that technology is controlled by the market, with individuals trying to optimise their own positions and the purchases adding up to the best common benefit, he describes as "a cosy image" which is "clearly a romantic fantasy" (p.190). This kind of mellow scepticism suffuses the whole text. I have to agree with it, though there is a part of me that would have it otherwise. Is it good for people to be brought up on a diet of gods that failed? Might it not be better for the young, and perhaps even for their elders too, to believe in one that hasn't failed yet?

The treatment is discursive and the book should not be judged by what seem to me to be occasional lapses from strict rigour. Braun says that "technology itself thus has several cyclic factors in its very nature" (p.49). He does not in my view prove that they are inherent in technology rather than in the social system. He says that "technology can do nothing for social, spiritual, cooperative, visionary and artistic man" (p.198). This grand, not to say grandiose, oversimplification is amply refuted by other passages in his own text. He claims that "every worker in a highly automated factory is crucial" (p.108). Is overmanning then made inconceivable by automation? He says, "no leisure activities without massive technological underpinning" (p.213). For someone who repeatedly cites Gershuny, it is strange to ignore the possibility of continuing to go for walks, play string quartets, read books and cook dinner for friends.

Ultimately, I think, Wayward Technology should be judged as an essay. Scholarship and pedagogy are there in the background, but they are not dominant. I hope it is not too pretentious for me to say that this book is an attempt at belles-lettres. Some people, I know, find it difficult to accept the notion that lettres can be belles when the subject is technology. I find no such difficulty. My three word summing up would be a phrase which literary critics use of books that don't rank as quite serious enough to deserve the full scholarly treatment: 'a good read'. In using this phrase, I am aware of the danger that some may misinterpret it as damning with faint praise. That is not what I intend. Not at all. There are not many books on technology that can truly be described as 'a good read'.

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Knowledge: Its Creation, Distribution, and Economic Significance, Vol.III, The Economics of Information and Human Capital by Fritz Machlup (Princeton University Press, Princeton, N.J., 1984) pp. xix + 644, \$US 50.00., ISBN 0 691 04233 0.

This is one of the great economics books of the 1980s. Let me quote from the foreward by T.W. Schultz because I thoroughly agree with him:

In breadth and depth, this is a unique book in economic scholarship. The historical roots of the ideas are richly documented. The analysis is based on theory and evidence. What is said is lucid. The advances in the economics of information, and in human capital, are presented clearly both for economists and for intelligent general readers who are not concerned about the technicalities of economics . . . .

The hallmark of the work of Professor Fritz Machlup is in its comprehensive scholarship, in relating each of his specific studies to the general core of economics, in seeking the linkage between theory and evidence, and in his command of the art of writing. I think of Alfred Marshall, Joseph Schumpeter, Jacob Viner, and Harry Johnson for a corresponding set of talents.

Machlup was a pioneer of information economics, although he himself stressed the strong roots to be found in old writings. This volume, completed before his death in 1983, is the third in the revised and much expanded version of his work, *The Production and Distribution of Knowledge in the United States*, published by Princeton University Press in 1962. The earlier work inspired much of the empirical thrust of information economics. This Volume III can be expected to influence greatly research and teaching in information economics.

Volume III of *Knowledge* examines in clear and elegant prose the roles of knowledge and information in economics. Part One analyzes the effects of