The statement that Machlup's original findings "provoked very little further serious research" until 1977 (p.5) can be challenged (on the basis of research done in Australia, West Germany and the United Kingdom), as can the attribution (p.6) of the material in the OECD, *Information Activities, Electronics and Telecommunications Technologies: Impact on Employment, Growth, and Trade,* 1981 to a study "conducted" by the OECD. Although published in 1981, the OECD project was carried out in the mid-to-late 1970s and drew quite heavily upon inputs from the individual countries. Its significance lay in the combining, co-ordinating, and standardizing of those inputs and its initial comparative analysis. It is perhaps worth adding that although an Australian measure of the primary information sector as percentage of GDP was given in the OECD report (Table I.8), Australia had not participated in the project. The percentage given for Australia for 1968 and used by Rubin and Huber is not comparable with those for other countries. On the basis of a recent update by the OECD,[4] the Australian statistic for 1969 is 24.8 per cent, equal to that given by Rubin and Huber for the US in 1972. In terms of the percentage of information workers, the comparison is Australia, 39.4 per cent (1971) and 41.5 per cent (1981) and the US, 41.1 (1970).

A final comment concerns the costs of research. We hear often in the context of R & D policy debate that social science research costs less than research in the 'hard' sciences. The generous funding required to support the Machlup knowledge project gives the lie to this assertion. The project received finance from the Earhart Foundation, the Exxon Education Foundation, the Ford Foundation, the John and Mary R. Markle Foundation, the National Endowment for the Humanities, the National Institute of Education, the National Science Foundation, the Alfred P. Sloan Foundation, and the Spencer Foundation.

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Science and Technology Policy in the 1980s and Beyond *edited by Michael Gibbons, Philip Gummett and Bhalchandra Udgaonkar*
(Longman, London, 1984) pp.xxvi + 346, ISBN 0-582-90200-2.

The main focus of this book is on British and Indian science and technology policies. It brings together papers prepared for a workshop held at the University of Manchester under the financial sponsorship of the (UK) Social Science Research Council and the Indian Council of Social Science Research.

In the introduction, the editors provide an excellent overview of the main issues and contributions.

Although its main focus is on the UK and India, the book will also be of interest in other countries because many of the science and technology problems considered are important in all countries and some comparisons are noted. Also the UK and India provide useful contrasting cases, the former being a more industrialized, economically developed country whereas India is predominantly agricultural and less developed. Again, the Indian approach to science and technology policy is a centralized planned approach whereas in the British case, science and technology activity is decentralized and not centrally co-ordinated. The contributions therefore, throw light on the general debate about whether the development and applciation of science can best be achieved by a *laissez-faire* approach, or by overall direction in line with specified objectives.

Papers have been organized around three themes. The first set of papers deals with the content of science and technology policy in India and the UK and the institutional structure in which it operates. The second set specifies policy instruments that may improve the analysis of, or the planning of, science and technology policy, and the third set deals with international issues such as technology transfer, nuclear and global disarmament and science and technology policy in the New International Economic Order.

It may be useful to indicate more precisely some of the subjects considered in individual chapters. Apart from the overview of science policy and organization in India and the UK, topics considered in particular chapters include: the role of basic research; science mapping for strategic planning; indicators of output of technology; innovation policies; appropriate technology in rural areas; the political process in policies for the control of biotechnology research; self-reliant development and technology; transfer of deep sea mining technology; the impact of technology collaboration agreements in India; technological development and the international competitiveness of industry; problems of British nuclear disarmament; global disarmament and development; and science and technology in the New International Economic Order. It would indeed be an unusual person who would not find some of these subjects, and the contributions dealing with them, of interest.

The background of the contributors varies by discipline and affiliation. A few contributions are mathematical in nature, but most are not. Some contributors are from government but most are from universities and research institutions in the UK and India.

The editors expressed the view that one of the most important issues raised by the studies was who should control scientific developments. Doubts are raised for instance about Michael Polanyi's view, expressed in the *Republic of Science,* that the allocation of funds for scientific research is best left to scientists themselves. In criticism of Polanyi's view, it is argued that "the growth of specialization in science now operates to reduce significantly the effective flow of critical comment. It appears that in the contemporary practice of science, evaluation is carried out by an oligopolistic peer-review process (Martin and Irvine) which has a manifest effect on the rate and direction of scientific activity" (Gibbons *et al.,* 1984, p.xix).

It would be invidious in a short review to select any particular contribution for special comment but those having a particular interest in the relationship between technology, ecology and the environment will find the contribution by Surajit Sinha of particular interest. It seems that rural dwellers in India are frequently more aware of the overall effects of the use of new technologies in their environment than are technologists themselves, who may have very little knowledge of local conditions. In this context, Indian rural movements such as *Mitti Bachao Abhijam,* 'save the soil campaign' and the Chipko movement to save trees and promote ecological growth and conservation are considered. The contribution can be interpreted as one against dictatorship in application of technology by professional scientists and technologists. The contribution by Yoxen on biotechnology policy will also be of interest to the environmentally aware. It illustrates how, in fact, there is very limited control over biotechnology research such as that associated with recombinant DNA. I stress, however, that each contribution has a number of interesting points to make.

The book provides useful points of view about science and technology policy in the 1980s but as far as I can see does not really make predictions beyond this, even though 'beyond' is mentioned in its title. Nevertheless, it is clear that many of the issues touched on by the authors will continue to be debated beyond the 1980s. In conclusion, the book should be a useful acquisition for any library.

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The Economics of Information Technology *by Paul Jowett and Margaret Rothwell.*
(Macmillan, London, 1986) pp.xiv + 108, £27.50, ISBN 0-333-39421-6.

Dr Paul Jowett is the joint author (with David Butler) of *Party Strategies in Britain: A Study of the 1984 European Elections.* Margaret Rothwell is a lecturer in economics at Oxford Polytechnic. Despite protestations to the contrary, the book is more about the importance of having the right people and the right procedures for allocating public funds in place than about applied economic analysis.

Information technology is also perceived as a bit of one thing and another. If I understand the matter right, the Japanese are a proven commercial threat because of the prowess they have shown in computer hardware, especially in relation to internal computer memory devices. However, they are now to be feared because the Japanese Government is investing heavily in 'artificial intelligence' and 'fifth generation' computers which are essentially new software developments.

To explain all this, the first chapter provides a background to the information technology race. Emphasis is placed on the way technology developments in the past were influenced by governmental outlays.

This chapter prepares us for the argument of its successor. Because the Japanese Government has demonstrated competence in the industrial policy