which also take the lead in importing foreign programming. And sixth, in these arrangements the ABC was confined to a very modest Public Service role in both radio and TV.

Brown supplies us with a fair amount of detail on the changes in legislation and regulation — both of which, as elsewhere, are complex in detail. The basic pattern, however, is of a very minimalist legislation and of rather ineffective regulation. The picture in some respects resembles the US: for example a radio or TV franchise, once obtained, is very unlikely to be removed; anti-trust style restrictions are the main policy measure. However the great difference from the US is that Australia, with a population less than that of the largest American states, became committed to a super-concentrated media pattern in the 1950s. Since 1960 weak regulation and anti-trust measures have merely had some very modest success in slowing down yet further concentration.

Allan Brown's book does provide much data. Nevertheless it is today more than ever the case that a full understanding of the media requires a very broad perspective. Brown's book lacks information on the Australian film industry. This is a pity because the film industry seems to show media policy being more effective. He also tells us little about advertising or audiences and very little indeed about content. Is the entire Hollywood TV output shown in Australia? He mentions the news agencies, but says little about this important topic.

The Australian political dimension has obviously been extremely important, as it is in all national media systems. The present degree of media concentration, especially with the press dominated by a US citizen (Murdoch), seems, by international standards, to be perverse and inherently unstable.

Finally, Australia appears to be repeating its 1950s television policymaking pattern in a rather similar approach to satellites-cable-and-all-that. The policy initially was to sit back and to observe cautiously 'new media' developments elsewhere. However Australia seems to have moved towards a major entry into the new technologies. Once more there may be unanticipated consequences. The internal ramifications alone may be quite considerable. But the external may be even greater. Telecommunications costs between Australia and New York are likely to fall radically in the next decade. Australia's distance and the presence of Rupert Murdoch in New York will look quite different under conditions of a world telecoms system which is extremely cheap and whose capacity is effectively infinite. Exactly what the implications will be, it's difficult to predict. But Australia might be wise to start thinking now.

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The Knowledge Industry in the United States, 1960-1980 *by Michael R. Rubin and Mary Tyler Huber with Elizabeth Lloyd Taylor*
(Princeton University Press, Princeton, New Jersey, 1986) pp.xvi+213, $40.00, ISBN 0-691-04235-7.

This contribution to the literature in the growing field of information economics is the final instalment in the revised and much expanded version of

Fritz Machlup's *The Production and Distribution of Knowledge in the United States* published in 1962. The earlier instalments, completed before his death in 1983, were *Knowledge: Its Creation, Distribution, and Economic Significance, Vol.I: Knowledge and Knowledge Production; Vol.II: The Branches of Learning; Vol.III: The Economics of Information and Human Capital,* published by Princeton University Press during the years 1981-84. Preliminary research for Vol.IV was published in Fritz Machlup and Una Mansfield (eds), *The Study of Information: Interdisciplinary Messages,* John Wiley & Sons, New York, 1983.

While Machlup's death denied us the other six volumes planned for the *Knowledge* series, Rubin and Huber have now carried out a major task scheduled for those later volumes, i.e., the updating of the social and economic statistics presented in *The Production and Distribution of Knowledge in the United States.* In this new book his co-workers present measurements of the Machlupian knowledge industry for the intervening years when the US Bureau of the Census has conducted its in-depth economic censuses. These 'census years' include 1963, 1967, 1972, and 1977. Estimates are also presented for 1980. An unusual numbering scheme has been adopted to facilitate comparison with the 1962 version of tables. For Chapters IV through VIII tables designated by a roman numeral and an arabic number -unless otherwise marked- are simply updated versions of the identically designated table in the original book. Tables that include alphabetic characters in their designations present either new material or material formatted differently from Machlup.

This book provides a rich database for those wishing to undertake research into the US information economy. Chapter II deals with alternative approaches to measuring the knowledge industry and Chapter III total production of knowledge and the national product. Chapters IV through VIII deal with education, R & D, the media of communication, information machines, and information services. The concluding Chapter IX examines knowledge production and occupational structure.

In reviewing *Knowledge, Vol.III,*[1] I stressed the potential influence on research and teaching in information economics. This update of the database can likewise contribute substantially to the empirical thrust of information economics. I am reminded that the original 1962 volume led Kenneth Boulding to remark that it contained enough dynamite to blast traditional economics into orbit. Perhaps that has not yet happened. Nevertheless, the impact has been considerable. As Stiglitz has claimed recently, if traditional economic analysis reduces to three maxims (nature abhors discontinuities; nature abhors non-convexities; the law of supply and demand), information economics "has cast doubt on all three".[2] While some progress has been made in the treatment of imperfect information, we still need modelling "in which information is continuously being collected and processed and in which decisions, based on that information, are continuously being made".[3] In other words, we need modelling of economies with Machlupian knowledge industries.

Perhaps the most significant finding by Rubin and Huber is the modest rate of growth of the knowledge component of the US economy. The much quoted 29 per cent of GNP reported by Machlup for 1958 increased to 34 per cent in 1980. This contrasts sharply with the extravagant predictions that appeared after Machlup's original work was published.

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.