

experience with videotex to serve as a sufficient guide to public videotex policy.

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Mining and Australia edited by *W.H. Richmond and P.C. Sharma*
(University of Queensland Press, St. Lucia, 1983) pp. xiv + 320, \$24.95 (hb), \$14.95 (pb), ISBN: 0-702-21742-5 (hb), 0-702-21752-2 (pb).

A generation ago the distinguished British scientist and author, C.P. Snow, postulated the notion of a cultural schism in economically and technically advanced societies. The essential idea was that modern society was sustained economically by the intellectual contribution of a scientific minority, whose corporate doctrine and scholarship was incomprehensible to the cultural traditionalists and social scientists representing society at large. In the Australian context the scientific-humanist cultural schism was well-developed in Snow's time. More recently, it appears that in this country another group has developed whose scientific culture is essential to the national economy and national wealth, but which is poorly understood in the wider community. Australian mineral engineers and scientists support an efficient and productive industry which mobilises the natural wealth of the nation. However, there is only a superficial public appreciation of the role of the mineral industry's technical operations, its social and wider impacts, and its national economic and political significance. There would certainly be a pervasive view among mineral industry professionals that there are public misconceptions about the nature of the industry, its relation to societal needs and interests, and its role in meeting individual and community aspirations.

Against this background, the publication of a book by social scientists and liberal arts scholars about the Australian mineral industry should be regarded as a positive and significant step. It signals the prospect of some reconciliation between a vigorous and enterprising industry and an increasingly reflective and cautious society. Since the recent development of the mineral industry has been impeded by the intervention of various non-technical groups, any publication encouraging public knowledge of the industry is to be welcomed. The assumption implicit in this statement is, of course, that any humanistic discourse on the mineral industry would be based on solid data and rigorous analysis, with a conscious rejection of subjective value judgements.

Mining and Australia consists of ten essays by seven academics with interests in liberal arts and the social sciences. Most of the essays were developed from lectures presented in a University of Queensland Division of External Studies course entitled 'Perspectives on Mining'. The restricted representation of disciplines in the volume suggests to this reviewer that the latter title would have been preferable to that chosen. In spite of this reservation, the scope of the effort is still ambitious. It seeks to present analyses of the historical and current roles of the mineral industry in the social, economic and literary development of the nation. It also considers particular issues which have been prominent in the politicisation of mineral resource utilisation in recent years.

The book is presented in two sections. In the first, background information is presented to provide the foundation for subsequent elaboration, analysis and discussion. The first chapter consists of an elementary exposition of economic geology, and a description of the major mineral provinces of Australia. Chapter 2 is an historical account of mineral prospecting and discovery, mining and mineral processing, and financing of mineral ventures. There are, in this chapter, a few minor errors in a compressed treatment and restricted review of a rather large body of information. In Chapter 3, the current constitution of the mineral industry is described, on a mineral-by-mineral basis. For each mineral product, comprehensive information is provided on a company's share of total national output, and of the proportional Australian ownership of the company.

The second part of the book is concerned with the analysis and interpretation of socially oriented information. In Chapter 4, the issue is the pattern of population and urban development in Australia, and the way in which this was influenced by mineral extraction and processing. It is shown that the early mineral finds in Victoria were responsible for the generation in the colony of an urbanised society, from the dispersed pastoral pattern of pre-mining times. Since the formation of stable population centres favours the development of manufacturing and service industries, and the institution of educational and cultural programs, it can rightly be claimed that the discovery and working of mineral deposits effected a step transformation in the style and quality of living in colonial Australia. Some would argue that this trend continues in remote parts of the country. There appears to be one major misapprehension in this chapter. Contrary to what is suggested in the text, virtually all metalliferous mineral projects in Australia, except for iron ore and bauxite, conduct some beneficiation process at the mine site.

The discussion of the effect of mineral resource recovery on population in remote areas is continued in Chapter 5. The main subject considered is the modern Bowen Basin coal mining communities. Demographic data are presented which distinguish the new towns from the older rural towns in terms of age structure and mobility. The pejorative description of the new towns as 'outback suburbias' is unfortunate, even if well established in social science. It fails to accept that the suburban way of life is sought by most Australians, including those living in remote areas. Indeed, the provision of a pleasant suburban living environment would now be regarded as an essential precursor for the development of a stable and satisfied community at a mine site.

Chapters 6 and 7 deal with the current role of mineral production in the Australian economy, and the role of government in managing the effects and benefits of a buoyant mineral industry. In Chapter 6 the industry's major contribution to the nation's international earnings is documented. The author then proceeds to argue, following the Gregory hypothesis, that the gratuitous accumulation of wealth from exports by the mineral industry is not necessarily of universal benefit to the Australian economy. Since this notion challenges both accepted wisdom and the axioms of a profit-oriented economic philosophy (and is probably intended to), a more quantitative elaboration of the supporting theory would have been in order. Certainly it would be difficult to sustain such an argument in tough economic times, when stable real income and real growth are required to support the direct services and benefits now established and expected in our system.

Other economic topics of interest include foreign ownership and control of companies involved in mineral production, taxation of profits of mineral producers, and the need and scope for government action in pricing and controlling mineral exports. On the question of ownership, it is difficult not to accept arguments in favour of increased Australianisation of natural resource companies. How this is to be achieved, in a population for which the saving and investing proportion of income is low, is not obvious, while the attendant risk of delaying resource development may frequently be difficult to justify. In the discussion of taxation policy, the topical question of a resource rent tax is considered. The rationalisation of such an impost on mineral production is not well presented. It appears to this reviewer that it may merely be a vehicle for an extra Federal levy on mineral producers, which scarcely justifies the measure. In the discussion of government activity in relation to prices received for mineral exports, the need for some co-ordination of auditing of mineral marketing often appears obvious. However, recent experience in attempts by producers to control the international petroleum market must lead to a healthy scepticism about the effectiveness of government or cartel control, or intervention, in any mass commodity market. Perhaps more subtle measures, yet to be devised, are appropriate.

The environmental impact of mining has been a public interest issue for about 15 years. Very few mineral producers now would not accept the need for an active environmental program for control of excessive external impact of their operations, and for reclamation of mined areas after exhaustion of a deposit. In reading Chapter 8, one must take note of the fervour with which the discussion of mineral production's interaction with the natural environment is presented. However, this reviewer believes that, in general, the environmental issue is overstated in relation to other technical and social aspects of mining. Contrary to what is suggested in the text, the proportion of Australia's land surface adversely affected by mineral working is clearly insignificant. In addition, activities such as the development of tracks for mineral prospecting have not been demonstrated to have any long term, adverse effect on the nominally fragile environment of Australia's mineral provinces. The case studies of reclamation practices at selected mines support the observation that environmental concerns are now properly addressed in mineral production operations.

Chapter 9, devoted to 'The Uranium Decision', is particularly germane to the renewed debate on uranium mining in Australia. The way in which public interest has been mobilised, the number of political and social factors introduced properly or improperly to the debate, and the apparent appeal to emotion over logic, indicate the scale of problem to be resolved if valid decisions are to be formulated from such debate. Some examples of tendentious information presented in this text are the relationship between prospective Australian production of uranium and nuclear weapons programs in other countries, and the problem of terminal isolation of spent fuel wastes from power reactors. On the first issue, it is not logical to link Australian production of uranium to any weapons program, since this country has no monopoly on uranium resources. If Australia is not a producer, it can have no influence on the uranium cycle. On the other hand, if Australia is a producer, it can take positive steps to control the distribution and use of uranium in a productive and acceptable way. On the question of nuclear waste isolation, the

feasibility of subsurface isolation of nuclear waste is now demonstrated and accepted in the relevant science and engineering communities. What is required now is public appreciation of the principles, if not the scientific detail, of the isolation methodology. Neither of these issues is explored at any length in the text. The positive part of the presentation is the extensive and informative discussion of the evolution of government policy, and its implementation, in various expressions of party political and national interest. However, one is left with the feeling that there is still significant scope for scientific contribution to the decision making process related to uranium, and in formulating a more valid and rational policy than currently exists for uranium production and utilisation.

The final chapter of the book deals with the treatment of the mining theme in Australian poetry and prose. The discussion reinforces the ideas developed in earlier chapters, that early mining established in the national culture attitudes, images, conventions and language itself which persist in current times. The reviewer's assessment of current literature related to mining and its social ramifications is that it is more assertive and obviously didactic than that of times past. It is not necessarily more effective in promoting reflection on the human condition.

It was noted initially that a real need, in current times, is the creation of bridges of recognition and understanding between the traditional culture and the new scientific culture. The book under review will certainly promote an awareness among scientists and engineers, particularly those in the mineral industry, of the social, political and cultural concerns pervading the wider community in which they operate. As an exercise in the application of a range of academic disciplines to a significant industrial and social enterprise, it is also a successful effort. However, from the point of view of intellectual rigour and objective analysis, the book may be criticised by readers with backgrounds outside the social sciences. The book represents good value. It is well illustrated and referenced, and well presented in all other respects.

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Incentives for Innovation in Australian Industry Report by the Australian Science and Technology Council (ASTEC)

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Faced with increasing competition in domestic and export markets from developing economies, many established industrialised countries are investing in new technology and innovation to help them hold their own in international markets. Various factors underlie this new policy emphasis and include problems of unemployment, the need for new industrial infrastructure, concern at the over-burgeoning influence of multinational companies and, possibly, just contagious panic. Various alternative approaches to promoting innovation have been suggested. In Canada the theme has been 'threshold' firms; in Sweden technology transfer; in the UK and US the roles of defence R & D and small firms have increased importance. In Australia there has been a