ing chapters. We get a series of useful insights into the character of the Australian mechanics institutes. Perhaps the most significant conclusion is that the mechanics institutes should not be judged a failure simply they did not develop according to the British model, a point developed most successfully in the local context in Marc Askew's essay on the Geelong institute.

In general, this collection is rather like the proverbial curate's egg. One would have to be a real enthusiast for the history of the mechanics institutes (or perhaps just a reviewer!) to plough through all 400 plus pages. Given the obvious enthusiasm and hard work that has gone into the book's production, I am sorry to say that I should have preferred a more ruthless selection and editing of the papers. One a more positive note, now that the Australian mechanics institutes are now firmly back on the historiographical agenda, perhaps we can look forward to a monograph from one or more of the contributors?

Colin Divall
University of York, UK

Global Telecommunications Strategies and Technological Changes *edited by Gérard Pogorel* (North-Holland, Amsterdam,1994), pp. viii + 368, AUS $ 137.25, ISBN 0-444-89960-X

One of the major technological changes of recent years has been the development of digital techniques for the encoding and transmission of telecommunications traffic. This has led to a convergence of its technological applications to voice, facsimile, text, and data communication. Companies that were specialist in niche markets, even though these may be national monopolies, now find themselves competing with companies who are now seeking entry into their markets. At the same time, these companies are finding that to retain a presence in the ever-widening growth market they need to expand their market portfolio.

Complementary to these changes has been the expansion of the market from a national to a global market, changes in the nature of that global competition, and an opening up of the regulatory framework in which they operate. State monopolies have been replaced by privatised oligopolies, and even these are now threatened by the group of telecommunication operators whose main business lies outside this market segment, but now see the opportunity to expand their product/market portfolio. Technological developments and the increase in the number of companies able to supply telecommunication-like facilities now make it feasible to supply these without recourse to joint agreements at all. Change of ownership through privatisation and similar forms means that direct representation to national governments, and through them to the international community, becomes difficult to achieve.

Consideration needs also to be given to the major changes in society that now demands the flow of information for activities that would previously have been seen as outside the traditional telecommunications boundaries, ie, banking, EPOS, information databanks. Now we see the increasing use of the telecommunications networks and facilities for entertainment of the traditional video-text and now through the Internet. Multinational firms seek to deal with one major supplier throughout the world, and for that supplier to be able to meet all their telecommunication requirements. This requires that the supplier's organisation structure should also take the form of a multinational itself, which is only possible if its business purpose is wider than satisfying national government concerns.

Thus, the situation that we see emerging are three levels of telecommunication operators.

A number of large major, multi-activity international operators whose ownership has been separated from national governments, more numerous medium-sized operators who will satisfy the requirements of specialised niche markets, and much smaller firms who will seek to be profitable in stagnant markets, or in markets that are in decline but still represent a source of revenue.

It can quickly be seen that on the one hand the radical shifts in technological change requires equally radical strategies for them to be exploited in, and those strategies also require radical technologies for them to be achieved. Radical in this sense is used to differentiate it from incremental shifts in technology or strategy.

The book edited by Pogorel attempts to discuss and resolve many of these issues through publishing sixteen of the 160 papers that were given at the Ninth International Telecommunications Society Conference in France during June 1993. They are grouped in three sections, 'New Telecommunications Services', 'Technological changes and standards', and 'Policies and Operators Strategies', which means that the book will not appeal to just one group of people, nor will it satisfy all the intellectual needs and questioning of any one group. That said, the book does grapple with some of the serious questions and issues of the day.

One of these questions is the inability to construct models of demand for telecommunications (Stoetzer). Demand models for residential consumers are relatively simple. Though there are more residential subscribers than business subscribers, their preference models are similar; social and pleasure activities, though these may alter as 'homeworking' increases.. To construct demand models for business is more difficult. The complexity arises from the fact that telecommunication requirements needs to be analysed as a production function, and these functions vary according to the industrial sector under consideration. To aggregate them is to introduce a high level of complexity. In addition, as Kokuryo discusses, the increasing use of EDI systems by retailers to control their stock, and the development of these systems in manufacturing, brings about changes in business processes and organisational structures. With voice communication there has over time been a structure developed by which consultation on standards has been possible, but telematics has no such framework. This presents problems in setting standards.

Similar problems exist in developing a pan-European network. Previously a regulatory framework has existed that has resulted in a path-dependency framework that has meant the process of developing a telecommunications framework has been similar throughout Europe. Now, however, the success of any emergent telecommunications framework is reliant upon its ability to exploit the new opportunities it creates, eg home banking. With a multiplicity of operators it is questionable whether diverse solutions to telecommunications problems can coexist simultaneously. The solution is for large operators in national countries to merge their interests, or to collaborate with each other, and thus to impose their standards on the rest of the industry (Ciborra).

This leads the papers to turn to the economic issues of telecommunications. Is telecommunications a natural monopoly or not? The argument for Antonelli turns on whether you consider the important factor is economies of scale or the 'subadditiveness of the cost function.' That subadditiveness is defined by economies of scale at various levels, which means that the supply of telecommunication services can be through a network of competition, clubs and regulatory agencies. These networks are created through factors of chance combined with systemic forces that are seeking new markets. This leads to a conflict of standards as actors in these networks have different views of the future (Swann). One such example is the current interest being shown over Internet and the information superhighway. One such view envisages access to such networks as a common feature of everyday life; another as restricted to an elite.

Fransman highlights this conflict of 'worldviews' of the telecommunication operators

through his case studies of AT&T, BT and NTT. His conclusion is quite interesting: 'Although these beasts are operating in an increasingly similar global selection environment, their visions, strategies, and chosen competences are, as we have shown, significantly different.' He then posits the question of whether these differences will remain functional, or will aid their growth in an increasingly difficult environment. The answer, for him, lies in the future.

What then can we make of such a book. First, being a collection of papers its advantage is that it lays out some of the various issues that need to be considered in this important area of telecommunications, but that breadth is also its disadvantage. It is a book that has appeal to a multiplicity of disciplines, without concentrating upon anyone. You need to be an economist, know something about monopoly and competition policy, an organisational theorist, well-versed in strategic thinking and have some awareness of the technical background of telecommunications and its developments outside the traditional voice and text market. In addition, being a sociologist would help. However, the book's strength lies in its empirical base. Throughout the papers there are many case studies of the development and application of telecommunications to new areas, and to new markets. Some of those are in Eastern Europe, others in retailing and reorganised manufacturing industries. Many of these case studies are in depth, and are based upon extensive interviews with senior managers in the industry, but there is a weakness. Case study analysis of people who are already in the sector is with those whose mind-sets are already in a path-dependency mould. It is the 'newcomers' to the industry who are most likely to possess the imagination to see the potential of telecommunications, and sometimes that is along time being accepted (I write this review on the day I read of Arthur C Clarke, the well-known science fiction writer, being conferred with a honorary degree from Liverpool University by satellite to his home in Sri Lanka. He was the first to propose in 1945 the use of geostationary satellites to carry broadcast signals around the globe. Now we think of it as commonplace).

The book has something for everyone in. Not being at the conference I am not able to judge how successful the conference was, or how typical of the papers those selected are. Thus, all I can say is that they do represent a good cross-section of some of the issues that policy makers, strategic thinkers and managers will have to deal with in the future, and for that we must thank the Editor.

Albert Richards
School of Management, UMIST, Manchester, UK

Framing Technology: Society, choice and change *edited by Lelia Green and Roger Guinery* (Allen & Unwin, Sydney, 1994) pp. xxxvii + 214, $22.95, ISBN 1-86373-525-9.

Discussions of technology and of its impact on society are considered by some to be the legitimate preserve of a technological elite with a specialised knowledge of a narrow field and, in some cases, a vested interest. *Framing Technology: Society, choice and change* sets out deliberately to challenge such a perspective and takes a broad view both of technology and of its effects. This is strikingly illustrated by the breadth of contributions, from such diverse fields as media, economics, information systems, medicine, management and sociology. In the introduction, Lelia Green offers a working definition of technology which "includes ways of doing things as well as the machinery with which they are done." (p. xxviii). Judy Wajcman in the first chapter suggests a three-layered definition of technology