Prometheus, Vol. 19, No. 4, 2001

Book Reviews

Innovation, Economic Progress and the Quality of Life

Gerry Sweeney (Ed.)

Cheltenham, UK, Edward Elgard, 2001, ix + 182 pp., £45, ISBN 1-84064-603-9

This book is unambiguously about the big issues: this is to be welcomed despite inevitable shortcomings. It arises out of the Six Countries programme, an international network of 'experts', policy-makers and practitioners engaged on research and policy on innovation: the actual book was prompted by the network's twenty-fifth anniversary. The network lies outside government and includes members from the Netherlands, Germany, France, the UK, Ireland and Canada, joined later by Sweden, Austria, Belgium, Finland and Hungary, with France leaving. It saw its main function as organising conferences and workshops: part of a multinational learning process. At it's birth, innovation was not a popular interest, certainly among economists: I remember well a discussion about the poor prospects for promotion of a particular economist who, unfortunately, had chosen to specialise in his research on the 'peripheral' area of innovation. Now things are somewhat different, but Gerry Sweeney does us all a great service by putting together this important contribution.

In his introduction, he asserts that the group was able to establish itself at the forefront of thinking on innovation policy. The world, as he saw it, had shown a general lack of technical progress, at its worst in the US and UK, characterised by a 'marked dearth of the kind of innovative developments which lead to widespread prosperity' (p. 2). This he ascribes to the Anglo-American model being seen as the world's role model, with the inevitable consequence of social disintegration and decline in confidence in a wide range of traditional institutions. We might add today that even Japan seems to be falling into line behind the US. For Sweeney, the book challenges the current euphoria on the economy (by certain dominant groups), although things, as we have witnessed recently, can quickly move on. (I noticed on the day I wrote this, 2 August 2001, that the *Financial Times* carried a large, first page, banner headline, 'Job losses cast gloom as slump fears grow', attributed to news staff based in London, Frankfurt and Washington.) As Sweeney does very effectively, we can pick out a number of significant strands of thought coming from the 12 contributors. Most general is that from Thierry Gaudin, with his claim of a failure of economic policy and the need to replace it with innovation policy which concentrates on creating the conditions for change, rather than

Prometheus ISSN 0810-9028 print/ISSN 1470-1030 online © 2001 Taylor & Francis Ltd
http://www.tandf.co.uk/journals
DOI: 10.1080/08109020110097903

determining what kind of innovation and where. However, for Gaudin, the US is seen as a good model for building a climate for innovation with a technical culture pervading its universities, its strong anti-trust policies and its innovative funding of small businesses: I don't think there is an inconsistency with Sweeney on this because he was talking about the US *economic* model, which both authors detach from the innovation model. Whether this separation of the economic model from innovation is appropriate is another matter.

On the theme of cultural influences, I found the contribution of Aubert fascinating on the anecdotal level. We learn that Finland is the twentieth century's best performer in terms of economic growth in the industrialised world, and it has become such by having 'the most articulated innovation policy' and that this in turn can be attributed to Finnish culture; 'social cohesion, strength of the state, pragmatism of the mind sets, ability to take collective risks and openness to foreign experiences' (p. 22). He argues that this is not usually remarked on, but perhaps, with recent cases like Nokia, this observation is no longer so novel. In contrast, he considers the Russian State as unable to enforce the minimal laws necessary for a market economy to function properly, and, partly as a result, Russia is unable to exploit the huge investment by the Soviet Union in science and technology. Not much supporting evidence is offered on the cultural model, and perhaps it is overdrawn, but I would judge it warrants much more attention. On the knowledge-based economy, Lamberton claims there is a fundamental ignorance: the economics profession needs to catch up with the economy—it is hopelessly obsolescent. He also makes the argument for a fundamental informational inefficiency arising from the fear of the rich and powerful (government and corporation) concerning subversive ideas, which leads to bias in the selection of ideas. Thus, present governance systems (public and private) may fail to meet the public interest. Worryingly, Sweeney argues that territorial production systems with an innovative milieu are all about gaining an advantage over a specialisation and Denis Maillat appears to echo this sentiment. Sounds like communities shutting themselves off with their own system, whereas to meet the wider public interest we should be seeking to feed off each other by creating multi-community, ultimately multi-national, frameworks, of a different nature to those constructed by the transnational corporations. Not to consider such possibilities will lead to social inefficiencies coupled with the cementing of growing inequalities. It was to this purpose that I thought the Six Countries programme was addressed, and to be fair, at other points they do move in this direction, but, for me, not with sufficient clarity.

Gunnar Eliasson offers the notion of a competence bloc to the debate about new ways forward. His is a very different essay to most of the others, it is full of references, no less than 32 of his own, and I have been aware of the general ideas for many years, but I have never fully got to grips with them. It looks to me like some sort of stakeholder concept applied specifically to innovation, with all relevant interests involved and thus seems appropriate. He stresses that policy should serve primarily to facilitate exit (in order to redeploy resources efficiently) because policy-makers generally lack the competence to choose entrants. He also makes an interesting point about Sweden with its large-scale business leadership competence having been acquired in traditional industries and therefore of little use in the new economy, whereas Aubert's account of Finland, with its different culture, may allow us to better understand Nokia's ability to make the move from traditional to new economy. Finally, we need to congratulate Lundwall and

Tomlinson for their rather nice analysis of the use and abuse of benchmarking: 'Sometimes certain management concepts seem to get a life of their own and suddenly they become widely diffused without any obvious explanation'—how true, and how depressing! Their suggestions for intelligent benchmarking look very useful.

In some concluding remarks, Sweeney brings things together under the unifying concept of social capital. Part of this is a textbook treatment of a concept which has received substantial and increasing attention only quite recently. Gerry Sweeney treats it as measuring the coherence of community, 'a capital of wider significance' (p. 145), but he should be aware of commentators as wise as Arrow and Solow who remain to be convinced that the things that are talked of as social capital contain the essential characteristics of other forms of capital. Perhaps he might also be cautioned by the recently expressed view of Anthony Barnett who remains unconvinced that one of social capital's central elements, trust, is as valuable as voice, with voice being more intelligent and active. Nevertheless, Sweeney's contribution to this volume is very large, both in putting it all together and by delivering also a personal contribution which is both stimulating and exciting.

Keith Cowling
Department of Economics
University of Warwick
Coventry, UK

Prometheus Wired: The Hope for Democracy in the Age of Network Technology

Darin Barney

Vancouver, University of British Columbia Press; Sydney, University of NSW Press, 2000, ix + 340 pp., ISBN 0 86840 675 9 (pb)

With its invocation of the Prometheus myth, Darin Barney's clearly written and carefully argued book deals with fundamental questions of politics and technology in relation to digital communications networks. Barney draws on significant figures in the history of political philosophy to offer a critical perspective on the outpouring of millenarian fervour accompanying networked technologies. In his sights are those who uncritically believe in the new network as a force for democracy: 'most of those who see a political revolution among the wires believe democracy to be an unambiguous and unquestionable good' (p. 25). Barney seeks to question the common assumption that 'democracy is undeniably good; network technology is democratic; therefore, network technology is also good' (p. 25).

Barney's method is to return to first principles to redefine central concepts such as technology, cyberspace and democracy. Characteristically, Barney begins by anchoring his discussion in an etymological analysis of keywords, using this to draw out and add emphasis to his larger arguments. The theoretical core of his book, however, is in his exposition of the writings of five political philosophers on the relationship between technology and politics. Four of these theorists are well

known: Plato, Aristotle, Marx, and Heidegger. The fifth figure is the eclectic Canadian thinker George Grant, known for his critique of modern technology, summarised by Barney as follows:

> modern technique colonizes the realms of philosophy, citizenship, and intimacy, and corrodes the virtues of meditative thought, justice, and love residing there. It does so by reducing the imperative to observe and practise these virtues to a mere calculation of comparative advantage (p. 48).

For Barney, much of what we already know remains right and thus useful in the face of the major transformations wrought by network technologies. He is firmly of the view that the resources of our traditions of knowledge, as represented by the five figures he presses into service, are a sound basis for forming judgements about technology.

Barney provides a lucid survey of their ideas in chapter two, 'On Technology', following his introductory chapter, 'Prometheus Wired'. He finds three common premises shared by all five commentators: that technology and politics are intimately linked; that the 'political outcomes of technological adventures are strongly conditioned by the economic, epistemological, and political environments in which they are situated' (pp. 55–56); and that technology conditions political outcomes and possibilities. From this he derives a number of corollary questions addressed in the remainder of his study, including matters of technology and economic practice, the essence of technology and Being, whether technology is an end in itself or subject to political deliberation, and technology's confirmation of or resistance to 'modern priorities of unlimited freedom, material accumulation, and progress' (p. 57).

Before turning to this inquiry Barney provides a helpful overview of the history and uses of networked information and communication technologies, an obligatory ritual in such studies. This discussion is framed as providing an account of the *instrumentality*, or in Aristotle's usage the *techne*, of networks. The endpoint of this treatment, for Barney, is to raise the suggestion that networks are more than just 'instruments', rather that their *logos* needs investigation:

> Networks . . . also constitute environments, or places in which we carry out the practices of living . . . It invites us to consider computer networks *as a technology*: not just what is said about or via networks, but also what networks say about us, about how we live and wish to live as a political community (p. 103).

Accordingly, in his discussion of the political economy of network technology, Barney considers, in chapter four, the mode of production, and, in chapter five, work, consumption and exchange. Here he conducts a trenchant Marxian critique of network technology, demonstrating how an 'intimate relationship' is obtained 'between computer networks and the new way of making profit in what remains an old capitalist mode of production' (pp. 130–31). Barney makes a convincing case that 'network technology is distinctly capitalist in character', arguing this to mean that 'as a technology it is more likely to be democracy's enemy than its saviour' (p. 190). Cyber-capitalism and hyperconsumerism detach 'political hope from economic necessity' (p. 190), creating an impasse for democratic visions.

In chapter six, 'A Standing-Reserve of Bits', Barney turns from Marx to Heidegger, elaborating an argument concerning the 'enframing essence of network technology', and the 'uprooting and calculative practices' inherent in this. Barney here wishes to enter the lists with theorists of online identity such as Sherry Turkle, arguing that technology has deeper effects upon subjectivity and identity than accounted for in postmodern theory. Against the postmodernist interest in the multiple, fragmentary identities performatively created in online spaces, Barney asserts a 'deeper significance of networks vis-à-vis our essential selves'—whether technology is being used playfully to construct 'superficial and fleeting subjectivities' (p. 204) or in more mundane uses such as routine e-mail, web surfing or e-commerce. For Barney, postmodernists are unable to tackle such questions, and hence he calls up the work of Heidegger to show how 'the world as it becomes under the sway of network technology' is transmogrified to a 'standing-reserve of bits'. This is typical of the 'anti-poetic essence of modern technology', to be contrasted with an openness to the mystery of 'that which cannot ever be reduced to, or represented as, bits, and a recognition that therein lies the true essence of Being' (p. 235).

Heidegger's ideas provide Barney with a warrant for questioning the need to 'surrender to network technology's enframing essence'. He elaborates this criticism in the final chapter, 'Government, Politics, and Democracy: Network Technology as Stand-In'. Here his argument is two-fold: firstly, that there is nothing in the technical character of digital media that precludes these from claims of democratic governance and control; nonetheless, secondly, that the technological characters of the world that shape it and are situated in it militate against genuine democratic politics. In a by now conventional move, Barney disputes the myth that cyberspace is ungovernable. He proceeds to consider the pressing questions of network and globalisation, and muses on the fate of cultural sovereignty, where the work of George Grant and the example of Canada prove instructive. In his concluding remarks Barney seeks to put to bed the long-lived idea that digital technology can stand in for the 'genuine arts of government and democracy' (p. 266).

As my précis suggests, Barney's study is an intelligent, wide-ranging yet accessible account of democracy and network technologies. His use of traditional political philosophy as a standpoint for considering contemporary technologies is thought-provoking. Barney is persuasive in his critique of the dominant assumptions in the discourses surrounding network technologies. He adds validation to the debunking work that has been steadily growing, supporting more sceptical assessment of the philosophical bases of digital media.

Yet I felt a limitation was his lack of engagement with contemporary theoretical debates. One of the problems I discern is that Barney takes the ideas gained from his chosen preceptors and applies them to instances of digital technologies, without adequately recognising debates about these notions. This is not so much evident in the case of Marx, whose contemporary inheritors in the political economy school such as Robert McChesney Barney relies upon, but is certainly a lacuna in the case of Heidegger. Barney adopts the mystical, religious, and pessimistic overtones of Heidegger's ontology, but is untroubled by the need to engage seriously with more critical appropriations of Heidegger by other theorists of technology (even by post-structuralist thinkers such as Jacques Derrida). In addition, I felt Barney swept aside rather than properly interrogated postmodern thinkers, and did not recognise the range of ideas brought to the discussion of democracy and technology by scholars from science and technology studies, media and communications studies, and the

emerging field of Internet studies. Notwithstanding this, Barney provides a thoughtful, general introduction to a difficult subject, and I would certainly recommend *Prometheus Wired* as an important contribution to the literature on democracy and technology.

Gerard Goggin
School of Humanities, Media and Cultural Studies
Southern Cross University

Voice and Vision. A History of Broadcasting in New Zealand, Volume Two

Patrick Day

Auckland, Auckland University Press in association with the Broadcasting History Trust, 2000, NZ $59.95, ISBN 1 86940 2332

This is the second and concluding volume in a comprehensive history of broadcasting in New Zealand sponsored by the Broadcasting History Trust. It covers the period from the 1950s to the present, including the introduction of television in the 1960s, and the gradual transformation of a national public broadcasting system with commercial elements to a fragmented commercial system with residual public service elements. The history is primarily political and institutional, concentrating on government policy and the rise and fall of the various state broadcasting organisations, though program content and the wider social impact of broadcast media receive some incidental attention.

The history of broadcasting in New Zealand follows broadly similar lines to those in other Commonwealth countries, being a response to similar technological developments and similar trends away from government monopoly and control. There are, however, some interesting local variations. One was the longstanding acceptance of advertising in public broadcasting, a practice which began with radio and continued into the television era. A public system could therefore accommodate the advertisers' demand for air-time while usefully supplementing the income derived from the taxpayers (via a licence fee). In this way, New Zealand retained a public monopoly of radio, first imposed in the mid-1930s, until the late 1960s. Privately owned television was not finally introduced until 1989.

Meanwhile, governments continued to experiment with varying approaches to the institutional control of broadcasting, moving from a government department under direct ministerial control, to a statutory corporation, to a state-owned enterprise required to return a dividend. Along the way, the 1970s Kirk Labour government experimented with separate, competitive statutory authorities (a brain-child of Roger Douglas, then a junior minister, testing his wings as a radical reformer). The years are marked by continuing tension and regular public scraps between ministers and broadcasting authorities as politicians tried to control news and current affairs and broadcasters sought to establish a culture of critical independence. Much of the overt controversy centred on *The Listener*, a widely-read weekly magazine owned by the broadcasting corporation, whose editors had openly criticised government policy, including broadcasting policy.

The main elements of the present structure were introduced in the late 1980s as part of the radical restructuring of the New Zealand state sector and bear the stamp of those wider reforms. One obsession of the reformers was to clarify institutional objectives. Public television and radio were separated into two state-owned enterprises (TVNZ and RNZ), each required to return a dividend to the government. Like other public enterprises, they were not expected to be profitable and at the same time serve wider public goals. The function of providing public-interest broadcasting, including home-grown and minority-interest programs, was therefore given to a separate organisation, 'New Zealand on Air'. This organisation, which does not itself make or broadcast any programs, has had control of the licence fee income which it allocates to a range of activities, including two RNZ radio stations (one primarily news and current affairs and the other classical music), various Maori language broadcasting initiatives as well as home-grown programs for mainstream television. Whether this separation of functions has produced better public outcomes than the more standard alternative of requiring cross-subsidies in the public interest or applying local quotas, is, as Day suggests, highly questionable. Indeed, one of the changes promised from the newly elected Labour–Alliance government has been a revisiting of TVNZ's wholly commercial orientation. In the end, however, lack of resources and New Zealand's small scale condemn its television services to heavy reliance on overseas output. Radio, on the other hand, has been much more successful, with a deregulated market providing a wide range of community stations to add to the national, publicly-funded stations.

The story of New Zealand broadcasting is interesting and Day has told it well within the confines of an institutional history which requires a comprehensive chronicle of all the major events. The narrative includes thoughtful comment and analysis along the way and will provide useful ammunition for those with more ambitious theoretical agendas. The book has excellent notes and indices and is most handsomely produced.

Richard Mulgan
Australian National University

Managing in Uncertainty: Theory and Practice

C. Zopounidis and P. M. Pardalos (Eds)

London, Kluwer Academic Publishers, 1998, xiii + 540 pp, £136.00,
ISBN 0-7923-5110-X

This book is a collection of papers given at the 6th International Conference of the European Association of Management and Business Economics, which was held in Crete during September 1997. The theme of the conference was 'Managing in Uncertainty' and the papers purport to present a set of operational tools together with some theoretical papers and some with a practical interest. There are 35 papers in the book, which have been organised into three themes dealing separately with finance, marketing and management. As might be expected from a

conference of economists, the papers deal with both societal level issues at a macro-level and with issues affecting individual firms at a micro-level. There is a balanced selection of each type of paper.

The Finance section of the book is organised into four parts. The first is concerned with country risk assessment and this part commences with Zopounidis, Pentaraki and Doumpos providing a survey of the statistical and multi-criteria decision aid methodologies which have been applied in the assessment of country risk. Siriopoulos and Asteriou examine the relationship between political instability and stock market development in Greece to find a strong negative relationship. Calvo, Jainaga and Castellanos apply a variety of statistical techniques to construct a simplified index of country risk and identify the four most important observational variables. The second part deals with quantitative techniques in business economics and Aluja presents a new framework to study uncertainty and develops a theory of order and associated algorithms to deal with this uncertainty. Floropoulos, Spathis, Kousenidis and Negakis examine the reasons for economics students choosing their course of study to conclude that the principle reason is concerned with employment prospects. Dimoticalis, Zontos and Skiadas examine chaotic oscillations in real time economic time series data and use forecasting models to conclude that short-term forecasts can be produced with considerable reliability. On the other hand, Tselentis and Dounias use neuro-fuzzy windowing to examine exchange rate forecasting to conclude that there are problems in picking exact future values. Diakoulaki, Mirasgadis and Papayannakis explore the attribution of costs to the environmental impacts of energy production through the use of fuzzy logic. Gomez and Casal research mergers of savings banks in Spain to find legal influences on such mergers. The third part of this section is concerned with portfolio management techniques and two papers are produced. Varga briefly surveys empirical investigations of the distributions for stock returns to reject the stable law hypothesis, while Michalopoulos and Zopounidis present a case study of the Athens Stock Exchange and investigate the use of artificial options as an investment strategy. The final part of this section is concerned with multi-criteria analysis in credit card assessment and contains a single paper in which Zopounidis, Pardalos, Doumpos and Mavridou consider credit card applications to argue that techniques, including multivariate data analysis and artificial intelligence systems, could be used to improve real time application evaluation. This part of the book therefore deals with a wide range of important issues for business management.

The second section of the book deals with Marketing Issues and also contains four parts. The first section is concerned with advertising techniques and consumer policy. Here, Palacio and Santana review memory-based advertising techniques and compare the relative merits of each to demonstrate that recognition is a valid technique for measuring advertising effectiveness. Talaya, Pacual, Lara and Vazquez consider illicit advertising in Spain in the context of Spanish and European law to address issues concerned with advertising ethics and self-regulation, while Talaya, Lara and Suplet research the relationship between store image and private label products in Spanish supermarkets to argue that there is synergy to be gained from the coordination of the management of these two issues. Torres, Vazquez, Mejias and Vazquez report upon their empirical investigation into the importance of the shop window for small shops and conclude that it has an important influence in marketing communication and upon the types of purchases made by customers. The second section collects papers dealing with artificial intelligence, multi-criteria analysis and marketing decisions. Matsatsinis, Hatzis and

Samaras use artificial neural network techniques to gain a new perspective on marketing decision support systems for understanding the relationship between the features of a product and the preferences of consumers. Matsatsinis and Samaras report upon the use of inductive learning algorithms to understand consumer preferences and to develop market penetration strategies for new products. Tigka and Zopounidis argue that artificial neural networks can be used to solve multiple criteria decision-making problems and outline areas for future research. The third part of the marketing section contains two papers concerned with franchising in business development. Altamira and Fernandez study the growth of franchising in Spain to determine the factors affecting the level of associationism of franchisors. Castilla and Mejias report upon data from a variety of countries to argue that franchising has become one of the most important commercial formulas in the entire world. The section concludes with two papers concerned with forecasting techniques and performance. Zontos, Dimoticalis and Skiadis investigate the performance of various models in market planning and present a new model which is claimed to estimate market potential of new products and forecast market penetration for all stages of the product life cycle. Mandaraka and Legal use empirical research on performance measurement in Greek manufacturing industry to conclude that organisational changes are necessary before an integrated performance measurement system can be successfully implemented. In this section, a variety of important issues are also explored with new developments presented and areas for further research identified.

The third section of the book is generically entitled Management and contains four diverse sections, the first of which is concerned with multivariate data analysis in risk management. Here Papadimitrou, Papadimitrou and Hadjiconstantinou present the outcomes from their research among mayors and presidents of municipalities and village councils in Thessaloniki into perceptions of risk. Papadimitrou, Konstantinidis and Michaelidou consider the various elements of risk in decision making within the city of Thessaloniki. Junco and Jiminez examine uncertainty in the business world in terms of leadership style and motivation. Reklitis, Mandaraka, Mourelatos and Papagiannakis use multivariate techniques to examine the relationship between the culture of an organisation and the innovation process to find a positive correlation between such culture and innovative behaviour. In the second part, cooperative behaviour is explored and Alcami argues that cooperative agreement is a way to reduce uncertainty for the managers of SMEs while Garcia and Ortiz argue that cooperation is a beneficial alternative to confrontation when facing the threat from a continually changing environment. Vargas considers the third (or social) sector of the economy and introduces the concept of a democratically run participation enterprise based upon cooperation. The next section is concerned with total quality management. In the two papers in this part, Millan, Hidalgo and Sobrino explore the implementation of TQM programmes in Spanish companies, while Ruiz critiques traditional budgeting and activity-based costing to argue that ISO9000 norms for measurement will result in better measurement for the introduction of a total quality system. The final part contains three papers under the heading of managerial decisions in business performance. In the first Barroso, Casillas, Galan, Moreno and Vecino look for the factors affecting change in top management of a company when recruitment is conducted externally and question some of the findings of previous research. Diez, Pineiro, Redondo and Barreiro investigate changes in patterns of part-time working within the European Community and the reasons

behind those changes. In the final paper, Cruz, Fernandez and Cruz analyse the reasons for unknown losses within Spanish retail companies. This diverse section contains a number of papers dealing with a range of important business issues and is arranged in a logical order to link papers together through the sections.

This is an interesting collection of papers addressing a variety of themes which are of importance to both managers and academics. Every business, management or economics researcher will find something of interest here, although given the range of coverage most readers will find significant parts of the book outside their range of expertise and interest. The book has been ordered in a manner which is logical so that similar papers are grouped together although each of us may find several distinct groups of papers to be of interest. The book has an index of authors but no index of contents within papers. This makes it harder to locate the relevant papers for a particular piece of research and the reader is required to scan the titles and turn to them to see if they have relevance for a particular issue. A comprehensive index would have made the book more useable. An alternative approach would have been to group all the abstracts together at the start of the book but this has not been done either. Instead, the editors provide a very short editorial introduction which outlines in detail the objectives of the European Association of Management and Business Economics and provides a very brief mention of the contents of the papers within the book. It would have been helpful for the editors to provide a more detailed overview of the contents of the book and to highlight some of the themes arising from the conference. This would enhance the appeal and usability of the book. As it is, the book provides some interesting and useful research but any particular view or technique is not easily accessible and the reader is forced to plough through a large part of the book to find the thing that (s)he is looking for. This, to my mind, is the most serious drawback of the book which will prevent a much greater use of its contents. As it is, however, the book contains a wealth of research which will have appeal to both organisational managers and to researchers.

David Crowther
University of North London, UK

Science and Technology in a Multicultural World: The Cultural Politics of Facts and Artefacts

David J. Hess

New York, Columbia University Press, 1995, xii + 350 pp., US $9.98, ISBN 0 2311 0197 X (pb)

Through the exploration of technototemism and postmodernism right through to native peoples' resistance struggles, ethnoknowledges and non-western medicine, Hess's book gives a theoretical framework for not only historical case studies but also an insight into science and technology through a concerted effort for STS researchers to, as Hess states, '. . . think more culturally about their own work' (p. 259). Cross-cultural comparison of knowledge systems as well as social structures is

a neglected field of mainstream Science and Technology but it is now more than ever a field which needs addressing. It is a field that various authors such as Helen Watson-Verran, David Turnball, Arnold Pacey and especially David J. Hess have focused upon at one time or another in their conferences or research papers. Hess's 1995 published book *Science and Technology in a Multicultural World: The Cultural Politics of Facts and Artefacts* deals with '. . . temporal, cultural and historical material and how culture is embedded in science and technology',[1] as well as offering vivid examples of theoretical frameworks used in the study of cross cultural comparisons of knowledge systems. It is this author's intention to briefly delve into each chapter of this book, and, using material derived from research work done by Watson-Verran and Turnball as well as Pacey, analyse some of the theories associated with the field of cross-cultural comparisons.

David J. Hess graduated from Cornell University with a Ph.D. in anthropology in 1987 and is now the Interim Department Chair of the very famous STS Department at Rensselaer Polytechnic Institute.[2] Since his graduation, Hess has published six single author books, 21 articles and three edited volumes,[3] all of which deal with his specialty and research interests of anthropology and the social studies of science and technology.[4] Most of his recent work is on his passion for anthropology and the social studies of medicine, especially dealing with alternative medicine and cancer research.[5] Hess's studies of anthropology and sociology influence his work through the use of terms from these fields, in particular the term 'culture' and his explicitly anthropological use of it throughout his book. Hess uses culture as an encompassing term for '. . . total learned knowledge, beliefs, practices . . .'[6] and further comments that culture '. . . permeates and includes *all* social institutions and practices associated with a given social unit, including the polity, economy, social organizations . . .'.[7] The use of culture in this way differs from a strictly sociological standing like that of STS theorist Arnold Pacey who describes culture as '. . . values, ideas and creative activity. . .'.[8]

The first chapter of *Science and Technology in a Multicultural World* introduces the reader to some key principles in the field of cultural analysis in science and technology such as social constructivism, cultural relativism (p. 2), culture as associated with power (p. 9) and society (p. 10) and power and politics (p. 12). Chapter two builds on these principles as well as introducing and giving detailed explanations of the terms cultural construction (p. 18), reconstruction, and technototemism (p. 21). Technototemism resurfaces in chapter three, where Hess discusses the period of the Scientific Revolution. This is a brief investigation into the Scientific Revolution but more importantly provides a '. . . framework for developing critical readings of history' (p. 16). Chapter four expands in its exploration of culture and power relations across time, discussing aspects of temporal cultures of postmodernism and '. . . the emergent global society', as well as the idea of the '. . . boomerang of technototemism' (p. 114).

Chapter five investigates the field of scientific and technical communities and suggests that instead of being considered transnational organisations, they should be considered supranational organisations. Hess works through several case studies to provide an insight into how different these communities are when principles of communications and national social structures are compared (p. 160). Chapter six discusses non-expert groups' reconstruction of science and technology that in turn challenges the expert groups. Hess's critique, in chapter six, of a technocentric viewpoint and his discussion on construction and reconstruction of science and technology by experts and non-experts alike is very thorough and reinforces his

point that '. . . technology is reconstructed as it passes from those who produce it to those who use it' (p. 173).

Chapter seven explores indigenous knowledge and non-Western medicine; his reaffirmation that by studying non-Western technology, one can understand that these technologies and medicines can be used to '. . . resist the ideology of development . . . in the name of civilization' (p. 210). Chapter eight examines indigenous perspectives of cosmopolitan technology and development and introduces discussions of resistance struggles and grassroots development, and finally, chapter nine concludes the book by discussing possible educational reforms connected with multiculturalism.

The use by Hess of totemism in chapter two and its relation to class, race and gender enables a clear analysis of science and technology and its individual components like that of culture and politics instead of just the technical. This follows along the same lines as Pacey, who also suggests that in talking about technology or its derivatives, technics or technical, care should be taken '. . . about its human and social aspects'.[9] Technototemism is a central theme to which Hess returns to regularly in his book and he defines this term as '. . . the co production of technical and social difference . . .' (p. 21). Addressing the analysis of power struggles, Hess's key reference is to Latour, Callon and colleagues and their actor-network theory. Although this theory is one of many central in understanding and analysing most science and technology case studies, Hess explains that he is in fact troubled by the fact that actors who become part of this network theory carry their own histories and thus are already embedded in existing social structures (pp. 52–53). Watson-Verran and Turnbull also point to the fact that the actor-network theory embraces some concepts but is not 'all-embracing' as is suggested by Latour and Callon.[10]

Chapter three suggests that the popular version of the Scientific Revolution is inevitably told in intellectual terms and that society and culture is filtered into the background and not given due consideration (p. 63). Hess also suggests that the Scientific Revolution can be approached in terms of class, gender and colonialism instead of the pure reproduction of the story. A valid point that Hess makes is that in rereading and reconstructing histories such as the Scientific Revolution, that STS researchers must be aware that in reassessing and trying to legitimise their stance in fact they will be '. . . reconstructing their societies and their stories' (p. 86). He also goes on to discuss the well-researched topic of China and its role in the Scientific Revolution and the way it has been written out of the common story told of this period (p. 63). As Hess points out, China was considered more technologically advanced than its Western counterpart up until the sixteenth century and that in many cases, inventions and discoveries that were made in China were transferred to Europe. The fact that '. . . technical infrastructure . . .' was borrowed from China which enabled some of the science and mathematics involved in the Scientific Revolution to occur, means that the place of China as well as other Asian influences such as Japan in this period should be elaborated on and not written out to favour European and Western standards.

In his analysis of chapter five, Hess concludes that '. . . the general ideology [is] that science and technology are supracultural and therefore somehow outside society and culture' (p. 117). This chapter elucidates to the fact that background research within scientific and technical communities should be '. . . used to provide a framework . . . rather than a template . . . into which the cases are forced' (p. 160). This chapter deals specifically with Japan, the structured systems of its

universities as well as its social and organisational structures. The detailed analysis of Japan's traditional vertical structure of organisations (p.147) as well as discussing patrilineal and patrilocal formation of Japanese society (p. 148) is an excellent reference for cultural analysis as well as his discussion of the vertical structured nature of all cultural domains within Japanese society.

The discussion of the main themes and terms of technototemism, Scientific Revolution and Japanese society provide a good basis of background reading for an introduction to these terms, periods and cultures. Hess's use of vivid examples to illustrate his point of view is excellent throughout the book and enables a very clear understanding. Hess's agreement with Watson-Verran and Turnbull's common perception that '. . . Western "rationality" and "scientificity" is the benchmark to which all "others" are evaluated',[11] is also a key point which as this essay has pointed out is an issue which needs to be readdressed in all STS research. Cultures outside of Western ideology, instead of being considered pragmatic or primitive, should be judged on their own merits from within their own context instead of evaluated from the exterior with Western ideologies of society, culture, science and technology.

Notes and References

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8. A. Pacey, *The Culture of Technology*, Basil Blackwell, London, 1983, p. 5.
9. *Ibid*, p. 4.
10. H. Watson-Verran and D. Turnbull, 'Science and other indigenous knowledge systems', in S. Jasanoff *et al.* (eds), *Handbook of Science and Technology*, Sage, London, 1995, p. 117.
11. *Ibid*, p. 115.

Juris Graney