# RESPONSE ABILITY

## ENVIRONMENT, HEALTH AND EVERYDAY TRANSCENDENCE

Frank Fisher

Vista Publications
Melbourne

First published in 2006
Vista Publications
PO Box 82 Elsternwick Vic 3185
Tel: (03) 9523 5623
Email: vistaef@mbox.com.au
Vista Publications is listed on the DEST Register of Commercial Publishers

The National Library of Australia Cataloguing-in-Publication entry
Fisher, F. (Francis), 1943- .
Response ability : environment, health and everyday transcendence.

Bibliography.
ISBN 1 876370 10 6.

1. Social sciences - Philosophy. 2. Reality - Social aspects. 3. Environmental sciences. I. Macdonald, Fran, 1961- . II. Title.

300.1

Printer Arena Printing
2 Kerr Street, FITZROY 3065
Tel. (03) 9416 0232

Editor Fran Macdonald
Layout Design Eva Fabian
Cover Design Sam Fisher
Proof-reader Christine Mitchell
Cartoons Simon Kneebone
Cartoon p.10 Michael Leunig

Printed on recycled paper

# *Foreword*

The future is not somewhere we are going, but something we are creating. We all make choices every day that make some futures more likely and others less likely. It is a fundamental moral duty to be trying to build a sustainable future. If the way we live is not sustainable, we are essentially stealing from our own descendants.

We are more likely to be healthy if we live in a healthy community, and more likely to have healthy communities if we have healthy ecological systems. This principle has been recognised for decades. The Healthy Cities movement, now including more than 4000 urban areas, has put increasing emphasis on the need for healthy environments. There are direct and indirect personal impacts of healthy environments. The natural world does not just give us breathable air, drinkable water and the capacity to produce our food; it also gives us our cultural identity and spiritual sustenance. In the relatively near future, such environmental problems as climate change pose serious health risks for the community. This book shows that personal health and the wider health of our physical and cultural environment are integral. Ultimately, humans, like all species, rely on a healthy environment to survive.

Deciding which trends will help to shape a sustainable future is a complex task. For centuries now, our leaders have behaved as if the economic questions are most important, believing that economic prosperity would solve all social and environmental problems. That strategy has clearly failed. Our unprecedented economic success is not only accompanying, but actually producing, widening social divisions and increasingly serious environmental degradation. Indeed, we can only say that we have economic success because we don't count environmental and social costs. We do this because, in our way of thinking, concepts like the economy, health issues and the environment are distinct and can be treated separately from each other and from ourselves. Therefore, it is our thinking that is the real challenge.

So we urgently need a new approach that addresses our thinking. As this excellent book shows, Frank Fisher has been a leading exponent in this area for decades. More importantly, he has been actively putting his ideas into practice by taking effective action for social change. I welcome this book, which should be on the desk of every thinker and in the shoulder holster of every activist. We should be taking responsibility for our future; this book, as the title suggests, provides us with Response Ability.

Professor Ian Lowe
President Australian Conservation Foundation
Emeritus Professor Griffith University

# Contents

# *Acknowledgments*

Behind this book lies the initiative and faith of Eva Fabian, Vista Publications and her colleague Christine Mitchell. To them I owe gratitude for their work but much more, for their trust and belief in the ideas I've been struggling to define and teach all these years.

To Fran, who edited and presented the work in the book, I owe similar gratitude. Fran and I worked together for a number of years from the late 1980s to the early 1990s, and the enduring friendship we established rests on an extensive common understanding about how the world is put together. I can imagine that the exercise you have in your hands will have been a trial for Fran – finding the time to write the new sections and get them to her has not been easy in this time of transition in my life. She never once complained, simply made more accommodations in her own life. Thanks for that too Fran.

Similarly, thanks to Sam Fisher who designed and produced the cover that won the approval of all of us on the Vista team. We think it's terrific.

For the ideas, discussion and dissent spanning nearly thirty years, go thanks to Alan Roberts and Bill Clarke, the academics who did most to educate me. Bill created the course I "put legs under" by way of a requirement for it in his review of our Masters Program in 1978-79. Alan gave my floundering efforts real form when he commenced co-teaching Science and Systems Theory, as it was called then, in the early 1980s. There were many others who taught with me in "Systems" and its various parallel courses in the social constructions of engineering, energy, health and more recently short courses such as 'Cycle In' (thanks Jim Black!) which provides insight into the social dynamics of the bicycle-rail dual-mode transport option. In particular, economist Frank Little, engineers Bruce Kuhnell, Bruce Field and David Beanland and (to the memory of) epidemiologist/psychiatrist Jeremy Anderson. Many graduates who became close friends, such as Eric Bottomley, Sue Edwards, Robyn Merrick and John Merory deserve special thanks. And then, the staff of the Graduate School, especially its first Director E.H.M. (Tim) Ealey, its second Director Ian Thomas, and Chair of the Board of Studies in Environmental Science, Bruce Morton whose sympathetic support, especially important in the early years, was always there.

This is also the place to thank the hundreds of fellow thinkers and lecturers who supported me with ideas and discussion. At the Australian National University were people like Ian Hughes and Jeremy Evans. At theUniversity of Western Sydney were Richard Bawden and more recently, Ariel Salleh. In the background, and most recently at Swinburne University of Technology, my friend Richard Slaughter.

Writers, mostly unknown to me since I could never travel, were numerous, they are listed in the last pages of this book. Most notable was Humberto Maturana, the Chilean biologist whose seminal work formed the basis of the course from the late 1980s to today (at Swinburne). Thanks also to the many people in medicine, the health sector and the health consumer movement who both kept me alive and assisted in the many "illness narratives" (see resources guide) with which I have been involved. People like David Russell, Chris O'Neill and Craig Blandy (doctors), Ben Shiftan (nurse) and Christine Walker and Evelyn Webster (health consumer advocates).

Finally here, a political friend, the gutsy and thoughtful Green, David Risström. It has always been a great pleasure to share working with you.

Among the two thousand students who went through "Systems" were many who struggled emotionally, as well as intellectually, with what we were trying to do. To all of you, thanks for your patience and hard work, especially to those early students who had to wrestle with the misshapen baby. One of these was Monash physicist Don Hutton, who through his suggestion to bring in Alan Roberts accelerated improvement in presentation immensely, thereby greatly relieving the emotional struggle to which the early students had been subjected. Thanks Don for that and indeed, for decades of support! I am grateful to be able to say that some were able to see the fantastic, liberating spark we believe lies in the insights of

systemic/social constructive thinking and have gone on to apply it to a great variety of work and general life experiences.

Monash University has my gratitude for sticking by the Graduate School as it struggled to bed down what was a quite radical program. Students were so frustrated with our (my!) relatively incoherent flounderings in the first years, that they petitioned the Vice Chancellor to close it and relieve their misery. The (then) Board of Studies in Environmental Science stood by its baby and successfully urged the VC to do likewise. Otherwise however, I am grateful to the University for always making my life so difficult, from that I learned much! These difficulties came in many forms but most of it came through its failure to recognise what it takes to live and work with chronic illness. On the one hand, it would never support me to travel in the face of the discrimination inherent in the *Disability Discrimination Act 1992* (Commonwealth). Three Vice Chancellors rejected my pleas. On the other, the invisibility (to the naïve) of my 'condition', my capacity to cope and to 'be there' continuously, led one Head of School to mutter contemptuously, *You and your mythical disease…*

Thanks finally, Monash, for the rich substrate provided by you and modest seminal motto: *Ancora Imparo: I am still learning!*

To all of you who so-good naturedly helped along the way and who I have not mentioned by name, I apologise for the omission and thank you now.

To Mairianne, Robin, Tim and Sam thanks – for being.

Frank Fisher
May 2006

## *A special acknowledgment*

Thanks to those kind souls who assisted us materially with this book:

Glenyys Romanes, David Risström, Jenny Francis, Carolyn Smith and the CEOs of Swinburne University of Technology's National Centre for Sustainability (Linda Condon), Moreland Energy Foundation (Jim Downey), CERES for the terrific in-kind assistance it has always given (Noel Blencowe and Eric Bottomley), Australian Conservation Foundation, the health centre that has done so much to keep me alive over the past 30 years: North Yarra Community Health Centre, Collingwood Branch (Vera Boston), Cycling Promotion Fund (Rosemarie Speidel) and to Pacific Hydro who believed that the Challicum Hills would be the site of a viable wind farm.

We (the Vista team, Fran and I) hope that the first symbol of our gratitude will be the book you have in your hands.

# Editor's introduction

## About the author

**Frank Fisher, Associate Professor and Director (retired), Graduate School of Environmental Science, Monash University, Clayton**

In 2005, Frank Fisher ended a twenty-seven year association with the Graduate School of Environmental Science at Monash University. During this time, he emerged as one of Australia's leading exponents of a social constructivist approach to resolving environmental and health problems.

Francis Gordon Henry Peter Fisher was born in 1943, the eldest of three siblings, to Hungarian parents on a dairy farm in Gippsland, Victoria. He moved to Melbourne in the 1950s with his family when his father, an idealistic agricultural scientist, took a job with the first Victorian Government department to formally deal with environment, the Soil Conservation Authority.

In 1965, Frank completed a Bachelor of Engineering (Hons.) (electrical power) at the University of Melbourne, then studied and worked as an engineer in Sweden and Switzerland for five years. Back in Australia, he commenced a Bachelor of Arts while working for a transnational heavy electrical engineering firm. A minor thesis in Swedish won him a Swedish Department of Foreign Affairs scholarship, which enabled him to travel back to Sweden to undertake a graduate degree in environmental science, completed in 1976. Following this further period overseas, he returned to Australia and completed the Bachelor of Arts (Hons.) in 1977. The thesis involved the first major survey of socio-economic characteristics of household energy use among 400 households in Melbourne.

In 1978 Frank took up the first lecturer position in environmental science at Monash University in Clayton, Victoria. The next year, he began to teach systems thinking as a compulsory core subject for students of the Graduate School. In 1990 he became Director of the Graduate School and, in 1997, Associate Professor.

In 2005, Frank retired from Environmental Science at Monash University. With his termination payment he has established a new unit at Monash called The Understandascope (after Leunig, one of Australia's most famous and revered cartoonists). The Understandascope creates static, travelling and virtual exhibitions, and courses and in-house seminars that reveal the social constructions of everyday phenomena. The idea is to create easily accessible understandings to assist in 'transforming the world'. In 2006 Frank was also asked to convene graduate sustainability programs at the National Centre for Sustainability at Swinburne University of Technology, another Melbourne university. He currently

teaches there in two graduate courses (Principles of Sustainability and Energy for the Future) with colleague Josh Floyd, and is engaged in establishing higher level programs (e.g. Masters) in inter- and transdisciplinary studies of sustainability.

Beyond these formal roles Frank continues to write and work on numerous committees in the environment, health and education sectors (as listed at the back of the book).

Since he was 19, Frank has suffered from Crohn's Disease, an incurable chronic illness. The disease involves inflammation of the full wall thickness of the intestine. Symptoms vary for different sufferers, but Frank's symptoms, now generated by malnutrition and dehydration rather than Crohn's Disease, include pain, diarrhoea, migraines, heart arhythmia and some fifty kidney stones per year[1]. Over the past forty years, he has had over twenty operations of various kinds and now survives with only one metre (15 per cent) of small intestine. As a result he has spent many months in hospital with attendant delays in work and study.

Frank's assertion, however, is that Crohn's Disease has been an opportunity for his life. It was while convalescing in southern Switzerland (during a four year engineering scholarship there) that he fell in love with mountains and developed a strong environmental awareness. The Swedish Government also prompted his interest in social justice, especially as it applied to chronically ill and disabled people, by attempting to rescind a later scholarship when it discovered he was ill. Over the years he has used his illness to build up resilience to hardship. He even applied for the lecturer position at Monash University from hospital. Community service based on this experience with chronic illness has formed a critical part of his working life (see committees etc. below).

The past twenty-five years have seen all the aspects of Frank's life tied together by the thinking revealed in this book, two wonderful sons, a remarkable teaching career, continued wrestling with Crohn's Disease and the patient care of an insightful and caring wife and, later, an equally insightful and caring partner.

## *How to read this book…*

The book begins with a biographical note. It is, however, not a book about Frank Fisher but a selection of his papers. He is a theorist but also – and even more so – an activist for social change, and so has always had the practical aim of resolving real life problems in the real world. He has demonstrated this through his published writing, his initiatives and projects. This book is another way of bringing his ideas to a general readership in order to illuminate and inspire change.

The papers have been written over the last thirty years while Frank taught environmental science in the Graduate School of Environmental Science at Monash University. They include theoretical articles about the social construction of reality which have been published in academic journals, and many examples of

the application of this approach to practical situations, written for both specialist and general media, conferences and official and semi-official enquiries. Papers have been selected to cover different aspects of the approach and different applications. Each paper, however, was written as a complete entity for readers with no prior knowledge of the social construction of reality. As a result, certain explanations and examples are repeated in the book. Most repetition has been eliminated, but some has been retained for the sake of the integrity of the papers.

Chapter 1: Response Ability lays out, in detail, the theory of the social construction of reality as an approach to analysis and a basis for action. It should be read carefully because it explains complex ideas about how humans derive meaning. These articles are not meant to be read in the sense, say, that a letter to the editor of a newspaper is usually read. In other words, they do not impart bite-sized opinions for a distracted audience. By contrast, they are like a course or lecture series to be studied, digested and reflected upon. If they are read in this way, they will not be difficult. The issues discussed in the rest of the book will then also be clear.

The following chapters apply the theory to specific issues. Chapters 2, 3, 4 and 5 deal with interests about which Frank has written extensively: the teaching of environmental science, energy, transport and chronic illness. Chapter 6 contains a selection of papers on a breadth of environmental issues. These concerns are by no means exhaustive because, as he explains, the social constructivist approach can be applied to any complex problem. Chapter 7 does just that - a 'how-to' guide in achieving social change in any area of concern. It outlines a number of political actions Frank has initiated or been involved with. This chapter does, in fact, contain a number of letters to the editor. These chapters and the articles in them may be read according to interest and in no particular order. Links to other relevant articles are given in the text.

Chapter 8: Personal Fulfillment focuses on the flip side of our socially constructed world: the individual. Frank reveals how he has personally dealt with his doubts and worries, and what lies beyond social construction.

Following Chapter 8 is a section on Frank's publications and committee involvement. Frank's published papers and a small annotated selection of related works by other writers are recommended for those interested in pursuing this type of thinking.

The layout of the chapters and the papers is consistent with the message of the book. That is, it's important to begin with a general understanding or context before moving to the specific. The use of footnotes (included in this book as endnotes) is an example. The articles often contain them. They are a deliberate exercise to demonstrate that each word or concept used in an article is embedded within other concepts, which are the subject of the footnotes. Subsets are embedded within more general systems, which are embedded within greater systems, and so on.

## *… and why you might wish to read it*

This book is about understanding 'the world as we know it'. That's a commonplace term. To most of us, it means the world we know now. In the future, hopefully it will be different and 'fixed up'. It's the world out there. It's our little part of the world that we don't know well enough because we only know our little part of it. It's the real world, as opposed to our opinion about the world. It exists that way whatever our opinion. That's 'common sense', which is also a commonplace term.

However, once we understand that reality is socially constructed, we see that 'the world as we know it' is the only world that exists. It's the only world we can ever know. In fact, our knowing brings forth the world. This is not a solipsism (a theory suggesting that nothing exists outside the self); it doesn't mean that the world exists only in our imagination. On the contrary, the world is real and powerful. It is the context which distinguishes and reflects us. Without that context, we have no meaning and no way of making meaning. To use one of Frank's examples, a bear roaming its habitat in China is a panda. Taken out of its world and placed in a foreign zoo, it is merely a black and white animal in a cage.

In our interactions with the world, especially in our conversations with other people, we literally construct 'the world as we know it' and it, in turn, constructs us, as we know us. We live in a country that we call a nation that we call Australia. The institutions we create and interact with – our passports, our drivers' licences, our mortgages – all confirm this. That's socially constructed reality. Therefore, we are Australian. That's also socially constructed reality. We speak a common language and we share commonplace terms: 'the greenhouse effect', 'drought', 'recycling', 'disability'. We all know the common sense meaning of these words, but more fundamentally we create the sense of them in common with each other. That's why we *all know* them. They exist entirely within our conversations about them, not out there as objective truth.

And that's not a commonplace, nor common sense. In fact, common sense is blind to this knowing how we know.

Of course, it's not hard to believe that many of our meanings are simply the product of prejudice or vested interests and, therefore, at least suspect as truth. After all, that would be a typical enough view held by both the management of BHP Billiton and members of the Australian Conservation Foundation about each other's definition of the greenhouse effect. But what of more disciplined methods of understanding the world than those we demarcate simply as politics? What of science, the most rigorous method of knowing that western society has yet devised?

Well, as the papers in this book explain, science is no more objective than politics. However, the rigour with which it is practised and the honesty of the attempt at disinterested analysis make it unique. Despite these differences from day-to-day life, science has given us much of our common sense.

Consider the greenhouse effect. Scientific testing enables us to distinguish changes in concentration of chemicals, such as carbon dioxide and methane in the atmosphere over a period of time. We give credit to theories about the causes and likely effects of the build-up of these chemicals if we can see that they have been developed by following the scientific method: repeatable observation, hypothesising, prediction and testing. We should also add, peer review; that is, testing those theories against other scientists' 'common sense'. Science distinguishes the phenomenon known as the greenhouse effect. That is why it is real to us. But scientific 'reality' is knowledge constructed by scientists. Such knowledge may be rational, universal and – what's most important – useful, but it is still dependent on the language, testing methods and interpretations of people.

This doesn't mean science, or common sense for that matter, is wrong or a chimera. It does mean, however, that there is no way to discover some objective 'truth'. We don't *discover* meaning. We *construct* it. This is something science itself now recognises. Quantum physics, which shows reality as a probability rather than a measurable certainty, is the exemplar.

Now, the greenhouse effect is complex knowledge, and there are large areas of uncertainty about it. While there is much global scientific consensus about this issue, its parameters have always been and are still being debated on the level of values. It's not hard to see that agreement about it, particularly at the margins, is political. It is also obvious that any solution one might posit to the greenhouse effect depends on one's particular perspective on the problem. We could say the same thing about other complex environmental and social problems, such as the drought over most of the Australian continent, or the problem of household rubbish.

In a similar way, there are often multiple perspectives on problems which appear at first sight to be personal and individual but which have important social dimensions, such as the nature of a physical disability. For one person, a lame leg is a sign of decrepitude, for another person, it's an ex-warrior's badge of honour. Obviously, the way the person with the lame leg relates to the world, and the way the world relates to that person, depends on one's perspective.

But even the simplest, universally accepted definitions are socially constructed, including the basic chemistry that allows us to recognise carbon dioxide and methane, and the diagnosis that a leg is lame in the first place. This even includes (to use another of Frank's examples) elephants! This is not to say that we make up carbon dioxide or methane or lame legs or elephants, but that we can only see and interpret these things through our existing constructs; that is, through our shared language and thought patterns, including science.

But why is knowing how we know important? Well, it's not just an exercise in theory. An understanding of the social construction of meaning is a guide to taking effective action for social change. When we reveal how real life problems are

constructed, we also reveal how to *de*construct them. To put it another way: if we think of problems as knots, in learning how they are tied, we've untied them.

In these articles, broad social issues, such as energy conservation, transport options and disability rights are deconstructed in this way. Personal issues are also tackled: the fate of our bodies, the purpose of work, and feeling sane and content in a conflicting world. The issues are literally unravelled.

And how does deconstruction work? Back to the example of the greenhouse effect. Burning fossil fuels leads to a build-up of greenhouse gases in the atmosphere. Accordingly, an examination of how energy demand is constructed points to ways to decouple that demand from the use of fossil fuels, which would clearly be a powerful way to reduce greenhouse gas emissions. Similarly, to increase water efficiency, we might question our agricultural and eating traditions. Once we realise our needs for energy and water are socially constructed, we can see that we could construct alternatives; a vegetarian diet as an answer to water-intensive meat industries, perhaps, and buying fresh local food rather than pre-cooked frozen meals to save energy from refrigeration, transport and so on.

This is not fixing the problem; it is dissolving it. The 'fix' is to consider the existing problem in isolation without tackling its social context, to 'make things work better'. For instance, with car pollution, we have the engineer's solution: more efficient cars, even fuel cell cars. The trouble is we still have too many cars which, together with all the associated infrastructure, continue to escalate global warming problems through carbon and heat emissions. And we haven't even begun to work out how to reduce demand for private transport of this kind.

Certainly, there is a role for improving technology. The difficulty lies not in the technical fix itself, but in its implementation. In the car example, improved fuel technology will not achieve much if it is treated as a solution of first resort, without considering the reasons people drive – all the excuses, habits and institutions that compel us to own and use a car. In fact, an efficiency gain can result directly in increased usage by making driving cheaper and more acceptable – environmentally and therefore, socially. In other words, the technology has to be considered in context. No transformation will occur if we simply impose new technology on our old ways of thinking and doing things.

On the other hand, by altering their context, we can alter the very meaning of things like cars and water in our lives. This is because our meanings are constructed through an iterative, dialectical (see definitions in this introduction) process of interacting with the world. Our habits create reasons which confirm the habits, although we are usually blind to this because the reasons and definitions arise at the same time as the practice. We have high-energy lifestyles because we're used to them, we live in cities because that's what we know, and we drive … because we drive.

We also create meaning for other people with whom we interact. We act *in* the world, not *on* it or outside it. Therefore our actions have a more diffuse effect than we can imagine. For example, simply by taking the train to work, we help to create a critical mass to improve public transport. And who is it that lobbies for improved public transport? Public transport users.

Yet there is a difference between understanding that the world is socially constructed and living without that understanding, and this is where Frank Fisher's thinking is crucial. The difference is *responsibility*. Once we realise that we are, like it or not, responsible for our world because we create it, we can make conscious and powerful choices about how we relate to it. That is the whole importance of knowing how we know. Think of the train commuter who has foregone her car because there is nowhere to park at her new workplace. Consider also that she might come to like the arrangement and believe she's 'doing her bit' for the environment by leaving the car at home. If she believes the new travel mode is an accident of circumstance, she is likely to go back to the car, albeit regretfully, if her workplace offers her a parking spot. After all, everyone else drives to work. If, however, she understands that she has been responsible for her choice, she knows she has power in the circumstance. She is free to continue with the option that is congruent with her ethics. She may even choose to create the circumstance in the first place, by switching from car to train commuting in order to take an ethical action, although she knows this will expose her to the discomfort of an unfamiliar experience.

There is an obvious bias contained in the last example, that the ethical action our commuter may be compelled to take is the one that shows environmental concern. This is no accident. An understanding of social construction compels a responsiveness to the natural environment. Environment is context. We adapt to the natural environment, and we adapt it to suit our adapted selves. Accordingly, we are responsible for our interactions with it.

Of course, we are even more responsible for our social environment: the practices, institutions and attitudes that enable us to act in the natural environment. These include social institutions like the legal system, taxes and insurance, and physical infrastructure (the built environment). More generally, they include the systems of expertise, rituals and languages which organise our lives. These structures not only enable but entrench us in the world.

The other side of taking responsibility for the world is taking responsibility for the social construction of oneself. Personal experiences can be transformed through an understanding of our role in creating our own world. Frank Fisher uses his own experience of chronic illness to demonstrate this. While managing the physical symptoms of Crohn's Disease, he has worked to transform its medical, work-related and social domains in order to transcend the limitations of the disease

for himself. By doing so, he has been able to maintain medical independence and a strenuous work schedule while actually increasing his physical fitness. Moreover, by 'coming out' as disabled and working publicly to reconstitute the structures that impinge on people with disabilities, he has provided opportunities for others to do the same. His experience in deconstructing Crohn's Disease has also provided countless insights into changing social structures generally, which he has applied in other areas.

Note that deconstruction is transformative rather than destructive. For instance, it does not undermine the legitimacy of science to say that it is a social construct. Explanations that reveal the structure of problems, even overtly political problems, are not simply polemical. An argument that deconstructs the use of private cars does not entail a demand for the abolition of cars. That, again, would be a technical fix of a sort.

It is clear that this approach begins with an appreciation of 'where we're at', including an acknowledgment of existing attitudes, because this is the existing reality – the only reality – with which we can deal. That's the logic behind the social measures advocated by Frank Fisher. A good example is a user-pays rubbish collection system, a project which he initiated with the Melbourne City Council. 'Where we're at' with rubbish is that we don't see the costs of waste. Councils provide recycling bins, and environmental campaigns extol us for using them, but the underlying mechanism of the waste service discourages us. The householder who puts out his rubbish bin once a fortnight pays the same as his neighbour who puts out a bin every week. A user-pays system would reveal the cost impact as well as householders' personal responsibility for waste. Further, the user-pays system is a legitimated economic tool used for numerous other government services. This is not to say that education is ineffective, although non-reflexive polemics that do not engender a sense of shared responsibility (guilt campaigns) are unlikely to succeed without acknowledging our current position.

For similar reasons, the approach is often gentle and may be seen as tinkering because it does not entail large-scale technical solutions. Compare energy conservation with renewable energy as an answer to the over-use of fossil fuels. Frank Fisher advocates energy conservation as a primary solution and goes so far as to call it 'conservation mining' to give it the status of an energy source. Unlike renewable energy projects (wind farms, including the large windfarm that Frank himself initiated, hydroelectric schemes, biomass energy and so on), conservation activities, such as recycling materials and changing commuting patterns to avoid using private cars, are usually cheap and do not require major infrastructural changes. They are humble. For an individual, riding a bike instead of driving is often associated with low status. For a government, improving the public transport system is not a grand project compared with building a freeway. In fact, humility

is a hallmark of the social constructivist approach because it involves considering one's own role. This is self-reflexivity. Imagine a government that could forgo road building in favour of upgrading public transport. It would first be required to acknowledge past planning mistakes.

Thus, Frank Fisher's explanations of his thinking are themselves reflexive. We are asked to consider not only the solutions he advocates but also the adequacy of the argument he makes for them. Indeed, it's far more valuable to follow the reasoning and come to one's own conclusions than simply to go with the opinion of the 'expert'. The former approach is responsible; the latter is not. Self-reflexive deconstruction may be humble, but it's also empowering.

It is also radical. It is fundamentally challenging to question the technical fix and examine underlying systemic issues. World views are at stake. Consider the axiom that prosperity equals high energy use. Solutions to the fossil fuel crisis that rely on renewable energy are predicated on continued growth in energy demand. This growth is an assumption at the heart of industrial society, and renewable energy does not address it. Conservation mining, on the other hand, would seek to unravel energy demand as a first principle. But who would dare to make this challenge, when increasing energy use means increasing prosperity?

For all these reasons, the social constructivist view is not necessarily popular. 'Deconstruction' itself has a bad name. While it is not usually the expensive solution, it is not often seen as the easy solution either. It is 'common sense' to fix industrial problems by improving technology. It is also useful for governments and businesses to be *seen* to be fixing problems. Unravelling them seems backward thinking. At a parliamentary enquiry into genetic engineering as a way forward for Australian agriculture, Frank Fisher submitted that the new technology would introduce capital-intensive structures which would be difficult to change if environmental and health concerns about genetic engineering proved well-founded. The House of Representatives standing committee was not impressed with arguments that the government should not proceed with the new technology. The committee even appeared not to understand the basic point. In response to the submission that there are non-engineering solutions to the problems for which genetic engineering is designed, the Chairman answered, 'So we are after a genetically modified bike. Perhaps that will solve the problems'. He was being facetious but, at the same time, demonstrating the reluctance of governments to see beyond the technical fix.

It is not just government and business proponents, vested in current industrial structures, who are impatient with the non-engineering solution. Community organisations often advocate technological changes ahead of social and structural solutions too. Campaigns for renewable energy plants take a higher profile than community education for energy conservation. Non-profit community organisations need legitimation as much as anyone else. They need to be seen to be

forward-thinking, even 'cutting edge' – doing things rather than simply undoing things – and promoting 'common sense' and therefore acceptable solutions.

So the social constructivist approach is often relegated to the political fringe. It's so much easier to impose a technical solution. The argument for fuel cell cars, for instance, appears so attractive. The new cars would be welcomed into the marketplace, manufacturers are already spending considerable R and D money on them, and they don't challenge our lifestyles. One could also ask, not unreasonably, just how we can possibly achieve a reduction in private transport use. Pessimism is excusable.

Well, there are three answers to pessimism.

One is that the social constructivist approach is ideally suited to complex problems that appear too hard to influence. By considering the context in which problems occur – transport in the context of privately owned cars, discrimination against people with disabilities in the context of insurance regimes, drought in the context of hidden water charges – we can systemically deconstruct these problems.

Secondly, once we know that we are responsible for the world we live in, we are compelled to take responsibility for the way we've constructed it, even if we are pessimistic about the future. Taking responsibility transcends pessimism because it shows us that we have the power to transform the world, and that is the third answer.

The social constructivist view is the long view, especially in that it values the interconnectedness of people and denies that we are separate from each other. In this sense, consider time in terms of generations rather than an individual's lifespan. Think of what only a handful of generations have achieved for democracy, science, the rights of women, and so on. Further, social systems are not static, and human beings are essentially unknowable. Fortunately, the ways we are and the ways we interact with the world are limitless and therefore impossible to model, let alone predict. Thus, we can never know all possible outcomes of any action we take today.

This view, of course, does nothing to alleviate one's insecurity about the future, but the good news is that we can transcend insecurity too. If we approach the world as if we are integral to it, rather than in need of protection from it, we can learn to appreciate and work with our insecurities. The work of creating a cohesive society in harmony with its environment is daunting but possible. Unpredictability is a cause for celebration, not despair. This is because, as Frank Fisher says, we are not so much human beings as human 'becomings'.

## Some useful definitions along the way

As the human creation of reality is not common sense, understanding the social constructivist approach means coming to grips with unfamiliar concepts. In his writing, Frank Fisher uses a number of critical terms to help uncover this way of thinking. They include the following words.

### *Dialectic*

Frank defines this word specifically in relation to human thinking in 'Technology and the Loss of Self' (see Chapter 1: Response Ability). In general, 'dialectic' refers to the interdependent relationship between an organism and the rest of nature in which the world and the definition (meaning) of the organism within it arise simultaneously as part of the same process. The panda and the panda's habitat come into being together; one defines the other. This is how reality is created. For humans, all meaning and therefore all reality is constructed within culture and language. There is no objective truth outside language, which is not to say that there is no *truth* outside language… but that is another story addressed in Chapter 8. Dialectical thinking subsumes our most common paradigm, dualistic thinking, in which humans (or pandas) and their environment are proposed as distinct and essentially independent entities. The dialectical creation of meaning can be thought of as an ongoing interaction or dance.

### *Dualism*

Dualism, which we can readily recognise as the 'Western' way of making sense of the world, is the notion that the world exists outside us, independently from us. It refers to the split between humans and nature and related splits, such as that between 'reality' and 'subjectivity' (see 'Dissolving the Stranglehold of the Fix' in Chapter 1).

### *Meta*

This word refers to context. It is a greater generality or system in which the thing being considered is embedded as a subset. Thus, dialectical thinking is meta-thinking of which dualism is a subset. Dialectical thinking explains dualistic thinking, which is our common sense. Metalanguage is a language used to discuss language. Meta-institutions are relatively abstract institutions (for instance, the economy) in which relatively specific institutions (for instance, the sale of goods for profit) arise. We are used to studying the details of subsets – the subsets of subsets. We are less used to studying the context of subsets. We also tend to revere details rather than context. Consider the respect we give to specialists and experts. Now also consider that our reverence for specialists and our tendency towards specialist thinking are two sides of the same dialectical dance.

### *Reflexivity*

When we say that phenomena are observer-dependent, we mean they are reflexive. The action of seeing something defines that thing, and we cannot know something apart from observing it. The following famous example was given by the quantum physicist Erwin Schrodinger. A cat is sealed in a box with a vial of poison and a tiny quantity of a radioactive substance. During the test, an atom of the radioactive substance may or may not decay. If it does, it will break open the vial, release the poison, and kill the cat, but we cannot know if this will happen. Therefore, during the test period, the cat is *both* dead and alive in a possible state. It is only *either* dead or alive when we break open the box after the test period and observe the cat's condition. What is most interesting is self-reflexivity. This is the *recognition* that the things we see are dependent on the way we see them. It is, of course, meta-thinking.

### *Responsibility*

In general, we think of responsibility as accountability. If anything happens, we're answerable for the consequences. Frank Fisher, however, talks about response-ability. Like self-reflexivity, it involves understanding that we are responsible for our actions, in the usual sense, but we are also capable of making a response. If anything happens, it's because we make it happen! That's where the power lies in this approach.

### *System*

As used in this book, the word system refers to the organising principle of complex interlocking relationships. Players (organisms, artefacts, things) in a system always exist in relation to other players in the system, and systems act in relation to other systems and are elements in larger systems still. For instance, living cells are organised in a system called the stomach, which is part of a digestive system, which is part of an animal, which is part of a an ecosystem, which is part of a planetary system, and so on. *Relationship* is crucial to existence. General System Theory is the body of knowledge originally developed by Ludwig von Bertalanffy (1968) to explain the concept.

Fran Macdonald
May, 2006

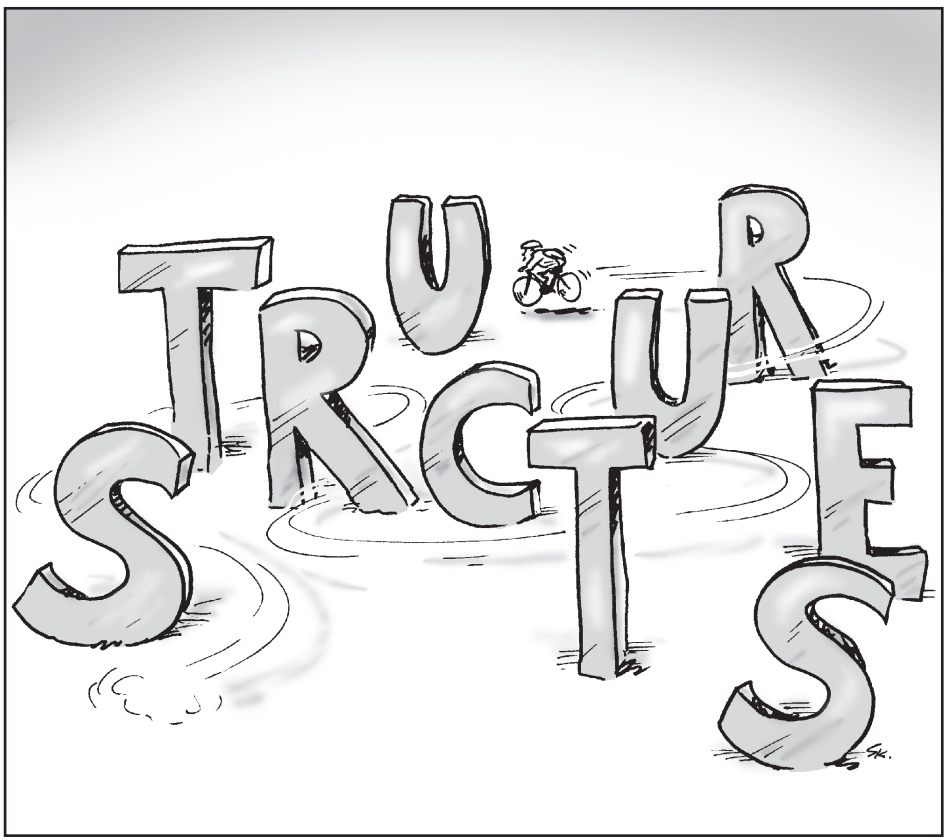
---

Endnotes

1 In a recent breakthrough (to be published in Australian Prescriber) he outlines the way he has finally (2005) found to minimise this kidney-shredding, lithotripsy generating number.

chapter one

# RESPONSE ABILITY



This chapter contains five articles that examine the theory of the social construction of reality.

In 'Dissolving the Stranglehold of the Fix' and 'Ecoliteracy', Cartesian dualism (the mechanistic system of thought of which René Descartes was a chief architect) is assessed as inadequate for resolving complex environmental problems. Dualism is contrasted with dialectical thinking, which recognises that reality, including the theory of dualism itself, is socially constructed. 'Technology and the Loss of Self' places technology at the heart of concern about our relationship to nature and describes the problem of the technical fix. 'Being Precious to Precious Being' offers a liberating alternative to seeing ourselves as separate from nature. Finally, 'Safetynet' provides examples of the role of technology in determining reality, in particular the relationship between technology and safety, with an emphasis on the ubiquitous mobile phone.

The first three articles refer to many other works of social theory. References are useful for a number of reasons. They show that the ideas proposed in the articles are grounded in detailed theoretical research and have a robust philosophical pedigree. They also provide readers with a myriad stepping-off points to pursue their own research interests. For instance, if you want to see how the general ideas have been applied in other areas, you can follow up references on feminism, computers, mathematics, genetic engineering and so on. In particular, the thinking of biologist and philosopher Humberto Maturana looms over these discussions. Frank Fisher's articles pay tribute to Maturana's insights that meaning is a co-operative rather than an individual creation and that, therefore, love and trust are imperative in our interactions with the world.

# *Dissolving the stranglehold of the fix*

Adapted from 'Dissolving the Stranglehold of the Fix. A Role for Social Construction in Dealing with Environmental Dislocation', published in *Futures*, December 1993. It was originally an invited presentation to the 'Fundamental Questions Programme – Ethics and Values Seminar', Centre for Resource and Environmental Studies (CRES), Australian National University, ACT, November 1-2, 1989.

Cartesian dualism, or the capacity to see ourselves as actors in/on the environment, is no longer the rich lode for cosmological development that hurled us into 20th century modernity. In the early 21st century it consistently overreaches its capacity to generate harmonious ways of life and corrupts the human dynamic while still insisting that it is *The Way*. Fortunately, the corruption has bitten some of us so deeply that it has stimulated criticism well beyond the detail of its application. These people recognise:

a) that thought itself can be constructively analysed;
b) that thought is enabled and conditioned by social structure, an interaction which simultaneously enables social structure or brings it into being;
c) that (b) means that thought is itself extensively ramified and deeply anchored in, and profoundly subversive of, social structure; and therefore
d) that recognising that thought itself is socially constructed and that our social constructs are simultaneously mentally formed – in perpetual dance or dialectic – gives us new possibilities to transform the dance itself. Indeed, it can be seen to carry with it an imperative to do so, not just a potential. This is *Response Ability*.

In Cartesian terms, then, we have a way of thinking complementary to dualism, namely systemic or 'dialectical' thinking, which, once properly assumed, will no longer be seen as a complement but as a whole new paradigm or set of paradigms ('meta-paradigm') that simply subsumes dualistic thought and engenders response-ability. It is, as Maturana and Varela have said, 'compelling' (1987).

In this article I illustrate the currency of the notion of dualism, i.e. the legitimacy of such a 'meta' or overarching construct; the corrosive poverty of persisting with this way of seeing in isolation; the new way of seeing that is emerging from attempts to deal with dislocation consequent on its continued application in isolation; and finally, something of its practice in the form of examples taken from my own work.

## *Dualism – a dualistic exposition*

While European thinkers such as Descartes, Bacon and Newton are credited with formal intellectual recognition that humans are independent entities acting on an environment conceived as separate from them, it seems that widespread public recognition that we do this and are therefore responsible for action on the environment is more recent. This way of seeing or of making sense of the world is termed 'dualism' in reference to the fundamental split between man (sic) and nature. Numerous two-sided characterisations arise along with it, such as objectivity (reality/subjectivity); quantity/quality; masculine ('patriarchal')/feminine behaviours; and 'hard'/'soft' science or knowledge – to give science the realm of being it attempts to claim.

The reason for isolating this characteristic of current (dominant) ways of thinking is that it is usefully seen to underlie all other methodologies currently underpinning 'modern' society. Its use-value arises in environmental science (the nascent science concerned with human continuity on earth) in response to the failure of system-specific approaches to perceived breakdown. In the next section we see that approaches to environmental dislocation acceptable to current political realities are entirely inadequate to the nature of the dislocation, except where a limited form of adequacy can be defined and used. The notion of adequacy or appropriateness then becomes of the essence.

## *Dualism and its discontents*

The currency of dualistic ways of doing things is quite fundamental to science and engineering. In addition to ever proliferating subdisciplines and the unavoidable currency of reduction (isolation of and concentration on detail) as a modus operandi for empirical research, basic engineering texts in such areas as thermodynamics and the theory of structures *necessarily* carry admonitions, such as 'assume a constant environment', 'assume an infinite heat sink', '"corrections" of our model for the non-infinite world may be allowed for by assuming linear…'.

In confirmation of the ironies in our dependence on dualism, universities in most Australian States and Territories (except Tasmania and the Northern Territory) have now introduced undergraduate degrees in 'environmental engineering'. Typical then, of the application of science, is abstract modelling (on paper) and construction of isolated entities (devices and processes) for which, given our current ways of seeing, the surrounding environment is indeed difficult to see as anything but infinite, let alone surrounding. In passing, it is also worth noting that in the dualistic context, construction itself becomes another modelling exercise, this time, however, in the domain of materials science rather than in the domain of thought.

The point here is that the nature of empirical science and the technologies now arising from it, necessarily and legitimately focus on what it perceives as the level

of abstractness consistent with its intellectual and material tools of analysis. From this we have the famous 'pyramid of sciences' with physics on top and sociology on the bottom (or vice versa, depending on one's perspective) and no recognition that there may be complementary 'sciences' of inter- and transdisciplinarity between and beyond the layers in the pyramid; that is, no recognition beyond that of perceiving the pyramid and lamenting such powerfully misleading crudities as the 'two cultures' (Snow 1959).

So, the reality we know involves millions of examples of dualistically perceived devices and processes extending in their effect, vastly beyond expectations deriving from the models from which they arose. These models today are simply inadequate to the world they, in their millions of clones and relatives, have created. In addition to simple additive effects of the large numbers and expanded sizes of devices, are the interactive phenomena arising in many domains from the production, use and demise of products. Such phenomena arise in social, political and economic domains just as much as in the biophysical, and they arise as a result of interaction between characteristics of devices and their environment, as well as through mutual interaction of the characteristics of the devices themselves: for example, flammable plastic clothes and electric radiators; cars and freeways in a spiral of traffic infrastructure growth; synergistic effects of carcinogens; and, in the social domain, the environmentally destructive effects of private ownership as the socio-economic 'vehicle' of access to transport, say, in combination with the automobile as physical vehicle.

Dualistic recognition of these macro and system effects, i.e. observations of changes in parameters associated with them and observations of other parameters which may be traced back to them, give rise in turn to dualistic 'solutions'. These involve isolating some 'causative' agent(s) in the phenomenon of concern and 'fixing' it by altering the agent so that its outcome is not what concerned us, or by breaking its chain of causation so that it immobilises in the sense we understood it to be mobile. The outcome of such curative approaches is rarely to resolve the dislocation-inducing dynamic, but *to solve it in terms of the limited problem definition given it* and, in a wider context, to resolve it in space, time, social or national class or, more insidiously, definitional class by defining or redefining it out of existence. These phenomena hardly need exemplification, although I offer numerous examples elsewhere.

Recognising environmental concerns as multivariate, non-linear and complicated is insufficient. For the dualistic tools of thought currently available to us (in systemically compatible social structures, about which more below) use these means to create an impression of sufficiency while not addressing their reflexive (observer-dependent) character. Solutions derived through such analyses eventually and ineluctably bring us back to the raft of displacement outcomes arising from more directly mechanical approaches.

Now, 'the perceptive reader' (sorry) will have noticed that the sentence beginning the preceding paragraph is a non sequitur: how else can we resolve our problems but through the tools available to us and consistent with our problem definition? The resolution, as any good follower of Zen (or, more mundanely, of cartoons and jokes) will know, lies in another plane – in hopping outside the context framed by our problem and looking at 'the trick' perpetrated by its formulation. More plainly, it requires learning to look for *the social construction* of our 'problems' and eventually, of our concerns. Let us now turn to what this might mean.

## *The dialectical complement*

Consider the work of a surgeon. S/he operates on a small part of our bodies and at a particular level of abstraction – the latter meaning that in one instance large-scale work may be done, in another (micro-surgery) small-scale. Whatever the scale as perceived by us, the macro-scale of the organisation of the body-in-environment cannot be interfered with. Somehow the surgeon and her assistants must preserve the capacity of their patients-in-environment to reintegrate once the surgical incursion is complete and the 'umbilical cords' of the 'life-support systems' are cut – the point being that the surgical crew rely on nature to do this reintegration.

To emphasise this point let us dwell a moment on the meaning of the ironically named 'life-support' systems. In surgery as presently constituted, the nature of surgical intervention is so violent as to itself push our bodies beyond the limits of their capacity to remain organised for life. While 'nanotechnologies' are rapidly reducing the violence of surgical incursions by raising their precision (subtlety), the current mode of operation is forced to rely on external means to maintain bodies temporarily excised from their environments. The possibility of changing the structures in which bodies find themselves, to thereby facilitate their own cure is, in 'Western' medicine, only in its infancy.

Take another example to which it is easy to relate. I have an auto-immune gut disease, have lost half my small intestine over twenty-five years and 'survive' courtesy of a continuous stream of pharmaceuticals. This concerns me at many levels, but the most fertile concern has been that connected with the meaning of being partially but continuously constructed by a steady stream of drugs. My problem here was the perennial one of 'what it feels like to be a bionic man'? Once I was able to recognise that personhood was an organisational state related to and interdependent with what are currently understood to be sustainable resources, I was much liberated. A revealing parallel may be found in a whirlpool sustained by the water, passing through it. The water, in other words, enables it to exist but is not it. What we perceive in, or isolate from, the water is a state or organisation in it – another level of being. Moreover, we become conscious of it once our capacities to perceive it are adequate to it and, indeed, the critical perception of these capacities themselves is a state of being of yet another dimension, requiring still more mature adequacy.

Such self-reflexive attempts at explication (hardly, ex-plan-ation) are the stuff of the dialectical comprehension required to complement the current explanatory power of dualistic understanding. It is an initially irritating and even frustrating procedure, and I can imagine that readers who have made it this far will already have experienced this emotion about convoluted and obscure constructions that I have already used. In part this is because I myself am not all that familiar with the ideas. But, we shall see that, in a real sense, it is unavoidable because the nature of dialectical or systemically (self-)aware thinking always bears with it such turns upon itself. They are its essence, and at this distance i.e. without an opportunity for personal communing (one-to-one discussion), these words are its only bearers. Until we develop familiarity with this new form of discourse, they become critical. Interested readers may care to consult the works of the late psychiatrist R.D. Laing, who consistently used a dialectical approach (for example, *The Voice of Experience*, 1982).

To transcend the restrictions and dislocations in dealing with clearly defined problems within the domains of legitimate, disciplinary expertise, we must recognise the legitimacy of two new domains and also that of our capacity to construct-in-culture, all three. In addition, then, to disciplinary knowledge, we can also think in terms of inter- and transdisciplinary knowledge. While the legitimacy of these domains at present barely exists, that they exist must be respected on the grounds that without them we could not recognise, let alone synthesise (however implicitly) disciplinary knowledge itself.

While the work of psychologists, philosophers, linguists and anthro-pologists has long concerned itself with the social construction of reality, recent work in biology is providing the most explicit arguments yet for the appropriateness of such understandings of the way knowledge is constructed. Bear in mind that legitimation in such a conventional sense refers to what is most understandable to dualistic intellects: Newtonian physics is most understandable, i.e. acceptable, biology next, and sociology least. So if we can show that something, albeit well accepted in say sociology, has biological roots and relevance, we bring it closer to broad acceptance. The magnificent irony in our present case is that acceptance of the dialectic basis of knowledge by biology is bringing the construction of biology itself into question. Much the same occurred to physics, already some time ago, with the advent of complementarity (the dual–particle/wave–theories of the nature of light), and later with the new understanding of subatomic phenomena in general (quantum physics).

What Maturana and Varela, in *The Tree of Knowledge: The Biological Roots of Human Understanding* (1987), show is that consciousness is a self-constructed, self-maintaining set of interlocking models of reality that guide, interactively, the functioning of the organisms which embody them. In various complex ways, having everything to do with the existence in their societies of 'like-minded' creatures,

individual organisms build their realities. Those realities, then, are functions of the biological construction of their brains, the nature of their objective environments, the tools available to them to mediate their interactions with the environment (including their 'built-in' tools, such as arms and senses) and their kindred societies, i.e. their cultures.

In the case of humans, culture plays an overwhelming role. From and in culture we have observed language which, as Mumford (1967, 1970) and others have pointed out, takes precedence in front of all other characteristics we can associate with the development of our sapience. Recognising the role and construction of language is crucial to developing a working familiarity with social construction. It brings with it a requirement to understanding two critical concepts that appeared in the first sentence of the preceding paragraph, namely, the notions of self and of *interaction*.

Taking the latter first: in language, or to use Maturana's term, in 'languaging', we are involved in the creative construction of meaning by an interactive and an iterative (repeated, self-reflexive steps) process. Given our potential for it, language enables us to erect coherent structures of meaning which at the same time permit language itself to expand, thereby indefinitely extending the potential for further meaning. Meaning, and therefore our recognition of self, are not entirely a construction of language. Hence Maturana's term languaging which incorporates notions of action into concept formation, i.e. meaning, is that which can be realised or translated into action and that which we may want to do this to – that which can be vested with purpose. The locus of this capacity to create meaning is self and the work of Rom Harré and Elizabeth Scarry among others make revealing complements to that of Maturana.

To put flesh on these bones, consider the process by which two people construct understanding, meaning and knowledge with, about and in each other. The process begins by presuming the same language and languaging procedures and quickly advances in a dance during which numerous physical, psychological and social impediments to communing are cooperatively overcome. During the process which may last minutes or years, a mobile but nevertheless coherent image of the selfhood of each person forms in the mind of the other. Now, my explication of the dance as 'overcoming impediments' reflects part of my own dance with the idea of communication, and can easily be seen in 'more positive' terms as a mutually supportive activity in which the impediments are interpreted as steps to greater coalescence-in-mind of the two.

Despite the shortcomings of my explication it may, by now, be clear that the mind of each person actually overlaps that of the other and, of course, that of all those who constitute the two individuals' culture. Hence, Maturana's famous little paper, 'The mind is not in the head' (1985). Further, in common with all knowledge,

*Used with permission, Michael Leunig*

the construction of self that we make, both of ourselves and the selves of others, is a floating construct interdependent on/with others. Consider the Leunig cartoon on the next page.

To return to the 'biological roots of human languaging', we can perhaps see that recognition of the social, iterative and floating nature of language, and therefore of meaning, implies *a languaging basis of (human) biology*. Accepting this implies that biology, and generally science, are built from and in contemporary social constructs. Planck (1936) and Whitehead (1926) understood this over half a century ago and they were quickly followed by other great thinkers on the consequences of the 'new physics' such as Heisenberg (1971) and Schrödinger (1992). Despite the stature of these thinkers their ideas fell on unreceptive cultures. Half a century later the dance is about to begin.

At this point it is also appropriate to return to the reason why 'holistic' medicine has taken so long to gain credibility. It is not of course, sufficient to point the finger at dualistic world-views that provide no intellectual means to our surgeons to be physician first, even while 'wielding the knife'. The contradiction that doing this would imply arises from the existence of 'meta' (more abstract) structures which are built on and therefore reinforce the dualistic world-view which requires a surgeon to be a surgeon. Consider the numerous social constructs acting on the surgeon-patient dyad: we have the self-supporting expectations of each about each other and the vested

interests of surgeon and surgical infrastructure, going well beyond monetary interests. Infrastructure here includes the institution of the profession that supports surgery and so, to a lesser extent, professionalism itself through its claim to a special share of the world's wealth – not to mention the currently well recognised unidimensional constraints of insurance and medical 'care' schemes.

The means by which all these come about gains further support from other social constructions, such as patriarchy and its associated conventions of market rationality, efficiency and hierarchical structures of 'management' (domination?). Consistent with all these are the negative personal consequences of severing connections with one's profession, let alone those of changing one's world-view.

Until the basis of our physical and social construction of ourselves shifts beyond dependence (beyond 'capitalising') on creating and isolating (making scarce?) some commoditisable characteristic, there will always be sanctions to impede changes that question its legitimacy and are consequently subversive or even seditious. Since this shift too is a dialectic, it will only occur through some individuals unilaterally altering the way they work, thereby revealing new sources of legitimacy while temporarily exposing themselves. The personal consequences of such exposure can also be turned into a 'growth' experience for the individual, which ultimately is the only hope we've got.

## *Dialectical practice: wondering (sic.) in morphogenetic fields?*

With such immensely ramified support for the existing dualistic world-view, how do we begin to realise the new world-view without co-option? Moreover, with only the dualistic tools of language available to us, can we actually transcend the very structures with which we grow up? Did, in the first instance, I succeed in my attempts to illustrate dialectical thinking above despite dualistic expression and interpretation?

Whether or not I succeeded in my attempts to convey something of the dialectical way of seeing ourselves-in/as-nature I am confident, precisely because we are self-reflective organisms, that we have the capacity to transcend the dualistic procedures that characterise present behaviour. Thus, the exercise in transcendence I am seeking is an exercise in 'mental bootstrapping' to a more abstract or generalised way of knowing. It is not a call to spirituality nor an attempt to 'resacralise nature' as Drengson (1984) and others have put it. Nor is it an attempt to 're-enchant the world' as Berman (1982) puts it. Which is not at all to say that there is no place for these approaches, only that I believe the immediate environmental goals of these forms of transience are accessible through the more prosaic means of recognising the social construction of mind and its material products.

At Monash University, since 1979, we struggled to get across a facility based on dialectical thinking. All postgraduate environmental science students (some 50 per

year) were required to consider the social construction of science and to introduce themselves to notions of system as developed through the work of general system theorists (e.g. von Bertalanffy, Bateson, Wilden, Levins and Lewontin, and, notably, Macy). While the work of historians, philosophers and sociologists of science can introduce students to the 'deconstruction' of science as it is currently practised, and general system theory may give an introduction to the 'mechanics' of dialectical thinking, there is little opportunity in the literature to see the ideas of social construction applied to mundane questions of environmental dislocation. To this end I use the example offered by Thompson, Warburton and Hatley, entitled *Uncertainty on a Himalayan Scale. An Institutional Theory of Environmental Perception and a Strategic Framework for the Sustainable Development of the Himalaya,* based on a study carried out for the United Nations Environment Programme (UNEP) (1986). I also use papers of my own, such as 'Bicycling out of the greenhouse, a problem of substance: on the social resolution of environmental problems' and 'Soft cyclists in hard streets: through the social dynamics of traffic to safe cycling and so, to a safer world' (the latter article is included in Chapter 4), which, among other things, explain the place and use of example.

In other articles, I describe examples of what I believe to be socially viable programmes based on recognition of the social construction of conventionally perceived environmental concerns. The social approach seeks to recognise and alter social structure so that the dynamic of concern finds a new homeostasis. While this procedure ultimately lies in the domain of the essentially unknowable – for we are always integral with both it and the dynamic of concern, and cannot climb out either – we have no option but to act. The action we take, however, can be divergent or convergent in its consequences, and acceptance of systemic interaction as the nature of being would, it seems to me, inevitably lead to convergent or minimal proposals.

In conclusion I demonstrate something of the real efficacy of the macro- and micro-changes to social structure that I am advocating. An example of such a macro-change is Equal Employment Opportunities (EEO) legislation. In the terms commonly associated with public enactment of the community's will, such legislation appears to be largely a failure, for it is difficult to define and the consequences of attempts at enforcement are even more difficult. However, the existence of such legislation must be judged as successful, worth the effort and worth emulating in similar cases because it acts to legitimate public education. Its existence provides both a seal of public approval for the idea of EEO and the administrative (bureaucratic structural) infrastructure to see that funds are channelled into realising it through educational means and, importantly, through changes to related institutional structures which facilitate its progress in these institutions.

At a micro level my 'bike rail' commuting plan (described in 'Lessons from an Award' in Chapter 7) attracted attention, and a Victorian Energy Award, because

it gave rise to micro-changes which facilitated this immensely energy-efficient alternative to automobile commuting. These ranged from provision of vandal-proof cycle parking boxes and education of station personnel to recognise the legitimacy of bikes at railway stations, to a programme to provide optimised 'commuter-plans' to users of public transport. [1]

The profound lesson in such micro-issues is that of change through action. The fact that one is here, actually in, and representing another reality, does more to provoke change than any writing… and, this ancient wisdom applies as much to structural change as to changes within structure. ■

Endnote

1. In 2006, this is now a real proposal due to be realised, in Melbourne in 2007.

# *EcoLiteracy*

Adapted from 'EcoLiteracy and Metaresponsibility: Steps to an Ecology of Mind', published in 2005 in *Systemic Practice and Action Research,* 18, 2, 133-149.

## *Introduction*

'Meta' is an increasingly common prefix which refers to context. Which context? Well, that's up for definition but often it means as much context as you can imagine. Metaresponsibility refers to the context of responsibility which includes the frameworks that enable us to define it. If ecoliteracy is our aim and ecology is the study of the natural systems around us while literacy refers to the intellectual frameworks that enable us to do the studying, we have the ultimate in physical and intellectual contexts. Ecosystems are the living creatures around us, their physical supports (energy flows and physical structures) and the sustaining relationships (information flows and structures) that interlink them. Surprisingly perhaps, literacy, not *ecos,* is the primary concept. Among environmentally concerned people ecosystem would appear to take precedence over literacy, for without it there's no life and literacy is an outgrowth of that. Look again at this last sentence and it will be obvious that without an understanding of English we would not have been able to read it, much less understand what 'life' in that sentence refers to. So literacy is primary. Indeed, the system that is language has given rise to the idea of ecosystem. The failure to recognise this in the mainstream environment movement has led me to transfer what charitable resources I have to other areas of social change, such as health, welfare and education. In these domains Bateson's *Steps to an Ecology of Mind* (1973), 'deuterolearning' (learning to learn) or metaliteracy in contemporary jargon, are well advanced (viz. Sacks' *The Man who Mistook his Wife for a Hat* (1986) and others).[1]

If we accept that language is the basis of the thinking humans have devised for themselves these past few millennia, it is not difficult to accept that embedded in it will be a raft of *ways of making sense of the world*.[2] These ways of thinking or models are themselves the intellectual light that enables us to see. However, while they illuminate a particular spot, the very attraction of the illumination they provide restricts our focus. Our *interest* to see is diverted by the very illumination that enables us to see, and without curiosity about the rest, we do not see it. In common with most activist groups, the environmental movement is seduced by the illumination its activism provides. Activism provides results, it develops political constituencies,

legitimacy and power and is therefore seductive. The context of activism is restricted to immediate green goals. Questions about what green might be, who determines it and what its intellectual frameworks might be are not given much thought outside academic (graduate) environmental studies. In marked contrast to the health/welfare movement there are no meta-organisations in the movement which explicitly make it their business to pursue issues of context. The consequence is contradictions, such as the one illustrated in the Hazelwood Power Station example below. Further, the more powerful we feel a model to be, the more interesting it is. The story about the limited logic provided by the street light above the drunk searching for his lost car keys illustrates this well. He'd dropped his keys somewhere beyond the street light, but the illuminated spot was the only place that attracted, or made sense to, his eyes and so he looked there. Other ways of 'seeing', such as touch didn't occur to him! This paper illustrates the diversity of views and therefore possibilities for action that arise when we learn to allow contexts to exercise themselves upon us.

Some linguists analyse how models change with time and with intellectual fashion. The study of language in general, *meta*linguistics, gives us general models about language, such as those devised by the likes of Noam Chomsky but also those of the systems biologists, such as Maturana and Varela, Levins and Lewontin, environmental scientists Thompson, Warburton and Hatley, and others, which illustrate aspects in the development of thinking. Their hypotheses about language, i.e. their *metalanguages* help us understand the psycho-social processes of thinking or 'languaging' as Maturana and Varela call it, thereby dramatically improving the way we model our activities.

A recent *metamodel* is science itself, another is mathematics, and both comprise many detailed models about reality that help us see in ways undreamed of before. Euclid, for example, enabled us to predict and plan travels on a flat earth. His geometry was inadequate on spheres, however, for which we had no terrestrial feeling. A couple of thousand years later, Riemann, who suspected that we lived on a sphere, devised geometries to suit. The 'fact' that his maths worked for sailors helped reinforce the new idea that we did indeed live on a giant sphere. His models 'worked' and so the metamodel of a spherical earth and all its associated human systems became the *dominant paradigm* or *common sense*.

Biology and ecology are based on numerous intellectual models. These range from models about micro-organisms and their functioning to models about how they come into being and change (Darwinian natural selection). Pasteur, Lister and Semmelweiss gave us a new model of disease which in turn gave us our habits of washing hands before eating and today's armoury of microbiological controls. As a model of disease we now know that it is no longer adequate by itself. Various micro- (and even nano-) organisms fit beneath the milliorganisms of Pasteur and company while the environmental diseases we are familiar with in industrialised

and today's excessively *sanitised* society all need other models. In these latter cases accepted science tells us to include long gestation periods, thirty years in the case of mesothelioma: asbestos-induced cancer, and 'probabilistic occurrences' whereby only a proportion of exposed people contract a disease, such as mesothelioma on exposure to the causative agent! Public health models are beginning to accommodate these insights but many people, e.g. young smokers and mothers of precious single children, are still unable to do so.

The public accommodation of science depends on still another model, the way knowledge itself becomes legitimate or accepted. In Australia we have the complex but potentially inclusive structures of representative democracy. Science has known of the dangers of asbestos for eighty plus years. Sweden acted on this knowledge in the 1970s, whereas Australians are only publicly accommodating it now. We know that science develops by continuously devising and testing theories. We also know that it is piecemeal, developing by a myriad small steps and an occasional leap of imagination that transforms whole bodies of understanding, such as the double helix did for genetics. We have, however, great difficulties in accepting the political nature of the development of theory and are impatient with the requirement for proof, rigour and honesty in science. There is no public training in the nature of scientific process let alone the wider *epistemological* process by which thinking in general, and scientific processes in particular, develop and are maintained and defended. Indeed from my thirty plus years in university I know that there are many scientists who do not understand them either.

Current knowledge about the biosphere appears to be strong and to lend itself well to business opportunities and public priorities. The very strength of that knowledge means that we are also developing powerful new metatheories, such as the *Gaia Hypothesis and General System Theory.* These force us to look at the detailed knowledge in a different light. Gaia suggests that the biosphere may itself be an integrated self-organising system with limited tolerances which if breached could begin a process of unravelling. Further, some of our most famous biologists are questioning the way we use biological knowledge. Their work crosses into the domain of the politics of understanding which is developing what we might call meta-understanding. Our own Charles Birch has done this in a well-known series of books and twenty years ago in the USA Richard Levins and Richard Lewontin wrote their classic, *The Dialectical Biologist* (1985), while Dorothy Nelkin was writing *Dangerous Diagnostics: the Social Power of Biological Information* (1989). The upshot of this work leads to generalised questions about the systemic efficacy of our new biotechnologies, which in the public domain of the 'market' have only been narrowly assessed, and therefore, new health related metacommittees, such as research and bio-ethics' committees and the National Office of the Gene Technology Regulator (see also Perverse Incentives below).[3]

My concern, as both a citizen and an environmental scientist, is with the billions of potentially well-intentioned wealthy people who have the means to act in environmentally harmful ways but have few intellectual, structural and, therefore, emotional resources to critically assess and give priority to environmental consequences.

It seems to me that a capacity to see the contexts behind things is one of the most liberating skills a person can have. In a democratic society with so many specialised interests and activities to be monitored, the function of the concerned citizen would be well-served by developing it. Eventually this would mean that ecoliteracy would become synonymous with education, just as literacy itself is thought to be of the essence of education. Today we have the option to introduce ecoliteracy into environment courses from primary school onwards.[4] We might also lobby the media to require it in its editorial and opinion pieces.[5]

Many newspaper staff already have such knowledge, it is part of a journalist's armoury, but editorial priorities no doubt inhibit them from extending their analyses in this way.

What follows are a few examples of where ecoliteracy might take us. They focus on aspects of the contexts of the issues chosen. The aspects are allowed to suggest unusual and transcendent directions conducive of dematerialisation, responsibility-taking (involvement), development of citizenship and any number of divergent opportunities that could lead to new definitions of wealth and new social systems. The footnotes add additional unusual dimensions to the extensions in the primary text. They are intended to assist anyone seriously attempting to replicate the approach.

## *Urban commuting*

No currently foreseeable technology can give us environmentally benign personalised automobile transport – not even small fuel-cell powered vehicles. This is because they are polluting in use but also because the infrastructures that manufacture, market and deliver them, plus the infrastructures that enable them to move where we want them to go (roads, garages, police, ambulances), are also polluting and energy intensive.[6]

In the sense we are developing it here, ecoliteracy would have us look for the social and intellectual frameworks that require travel to satisfy them. So, where does *travel demand* come from and what needs does it appear to satisfy? Books with names, such as *Driving Passion* (there are various!), indicate that the connection with our vehicles is complex and important to us; it goes way beyond providing access to work, school, shops and entertainment. Separating the non-transport needs our personally owned vehicles provide from their capacity to provide urban commuting is a beginning. (This issue is discussed in more detail in Chapter 4: Transport.)

Returning to the demand, a rapid, frequent, passenger-friendly but non-personalised or *public* transport system is expensive. Consider the structure that enables payment. Currently in Melbourne public transport is paid for from consolidated revenue without most of us recognising it. Ticketing infrastructure does little more than pay for itself, because it has to pay for the benighted 'smart' ticketing machines and their maintenance, fare policing, fare avoidance and the difficult-to-estimate alienation of patronage generated by the ticketing system itself. If the context of public transport were understood to be the entire urban population rather than just its current users we could levy all income-earning residents annually and drop ticketing entirely. (The idea of a public transport levy is explored in 'Tax, Not Tickets' in Chapter 4.)

Looking to wider priorities served by public means of filling urban transport demands, consider exercise. The gaps between termini and public transport connections present an admirable regular source of exercise. The journey to work becomes an *opportunity of life*. Such exercise, however, is not a wealth generator for it detracts from the driver-only commuter car system, which is perhaps the greatest wealth generator ever devised.

Billions of individuals seeking to own their own cars and then being constrained to use them make for a powerful growth engine. For the individual and the environment, driver-only commuting constitutes a massive drain of resources and a massive destroyer of natural(!) capital. While savings on the health dollar and enhanced well-being are difficult to quantify, improvements to community infrastructure, such as public transport would also generate wealth, albeit of a different kind.

'EXERCISE IS NOT (OF ITSELF) A WEALTH GENERATOR.'

*Fitness saves medical expenditure and enhances productivity.*

The intellectual models or social constructions underpinning this statement involve the difference in perception, to society and its economic structures, between earnings and savings. In principle earnings achieve status more readily than savings. They are more readily accounted for and are seen as proactive and entrepreneurial (associated with expansion) rather than reactive and conservative (associated with contraction).

THE ENVIRONMENTAL PROBLEM IN A NUTSHELL.

It is instructive to remember that the primary artefact of wealth generation, cities, formed at crossings and interchanges of *public* carriageways! Well-patronised mass transit is always going to be a more effective user of environmental resources per person kilometre, not least because it too will benefit from technical advances, such as the fuel-cell.

Motorists cannot *see* the connections to the trains the cyclist is pedalling between, cannot see the absence of parking costs and times, cannot see the collegiality of life on a bicycle and cannot see the fitness, let alone the *reduced* pollution to which the cyclist is subject. All are metaphorically as well as

literally, invisible and worse, contradictory. New ways to make them visible must be found. This is an exercise I have been involved in now for thirty-five years.

## *Energy matters*

Energy *conservation* is our cheapest and most socially and environmentally benign energy *source*. Conservation can be *mined* just like coal! If we could see this, it would become exciting as an opportunity and would be reflected in our economic and regulatory structures. (Energy as a social construct is explored in detail in Chapter 3: Energy.)

## *Waste matters*

One of the environmental scientist's major tasks is finding and gaining acceptance for indicators that help people recognise environmental concerns and priorities. This is never more clearly demonstrated than with the public's involvement in the waste it generates. Household waste disposal is paid from municipal revenues that are usually collected as lump sums from rateable properties, rather than households, mostly without itemising the detailed services paid for. There are, therefore, no indicators of waste disposal accessible to ratepayers let alone to householders. Fifteen years ago I successfully proposed to the City of Melbourne that it look into correcting this lack, in order to assist householders minimise their waste generation. A team from Monash University subsequently set up a Pay-by-Weight Waste Minimisation study that ran for four years with 1000 householders in the suburbs of the then greater City of Melbourne. Via the means of regular itemised and illustrated bills it did indeed result in extensive reductions in household waste and a transfer of part of the residue to recyclables. (See 'Bin Sins Trashed' in Chapter 7: Taking Action.)

Recycling presents its own problems. These arise because recyclables are numerous in type and shape (cf. non-standard container sizes, materials, colours etc.) and therefore are a pain to separate for everyone. Also, recyclables are virtually without value to everyone until sorted, cleaned and bulked. Once they reach a manufacturing process as raw material, the energy embodied in recyclables by

BREATH OF LIFE

I have recently noticed a growing number of cyclists pushing their way to health.

But how healthy is it to breathe deeply in heavy traffic? Surely, the harder cyclists push, the deeper they inhale the poisonous car emissions. I can't help thinking I am a lot healthier sitting in a car with the windows tightly wound up to keep these fumes out.

Name withheld, Gladesville, N.S.W.
Letters, *The Women's Weekly*,
17 June, 1981.

… even after taking the increased respiration rate of cyclists into consideration, car drivers seem to be more exposed to airborne pollution than cyclists.

Rank, Folke and Jesperson, 2001,
*The Science of the Total Environment*,
vol. 279, pp. 131-136, Elsevier.

separation and collection exceeds (with rare exceptions viz. aluminium) that embodied in equivalent 'virgin' materials. As we've already seen, this can only be sustained because we discount the metabolic energies ('good exercise') we use for household separation and the remaining transport and processing energies are cheap. Aside from the occupational health and safety issues, these 'inefficiencies' are rapidly transforming recycling into a 'waste mining' exercise carried out by robots on unseparated rubbish. The downside of this is that householders will be even less involved with their waste than at present, where at least one member of the household retains the opportunity to reflect on the amount and composition of the consequences of their way of life – as they pursue the tedium of separating their rubbish.

Toxic waste presents a different set of social stressors. While minimising its production must always be a top priority, the waste that is here today must be dealt with. Highly toxic waste is usually dealt with by high temperature incineration. Dedicating a facility to the task means sitting it on someone's property and next door to others. It also means paying for the facility by making it work (the investment thing again!), which raises a contradictory pressure to the pressures seeking to minimise toxic waste. Technically we could overcome these problems by using existing high temperature furnaces that are still operating in the middle of the very metropolitan areas that produce the waste. In Melbourne, an example would be Newport Power Station, a single large gas-fired generator on a roomy site with all land and water transport immediately available. The problems are industrial and commercial, not technical. Newport Power Station is now privately owned and so an interest would have to be created to make the complex modifications worthwhile.[7] This could of course be done.

Low level toxic waste presents less tractable problems. It is often very bulky (contaminated earth say), very diverse and while 'low level', may still be quite nasty (building materials, such as asbestos). The expense of separating the toxic component from the harmless but voluminous matrix (e.g. soil) in which it is embedded can be very expensive. A cheaper option is thought to be long-term immobilisation by secure storage or 'sequestration'.[8] Again, siting is problematic and now we are looking for large scale, secure and essentially permanent storage again, close to the source of the waste.

A linear assessment of secure processing procedures would suggest a country site far from anyone. *Realpolitik* would suggest that we deal with these wastes right next to Parliament House directly under public and political gaze or, joking aside, at a site accessible to transport and emergency services and close to constant public mindfulness. If at all possible the site should be one that can be monitored for as long as it takes to find a way of permanently detoxifying the wastes. It should also be one that minimises the investment in the site and its equipment so that (again)

we are not inclined to keep it going to pay for itself. Nevertheless, it has to be a long-term proposition. However, it should be a long-term design constituted to encourage ways of dealing with the wastes that permanently immobilise them or convert them to non-toxic industrial feedstocks, i.e. interest in them must be created and maintained.

These are an almost impossible set of priorities which will inevitably yield to the social constructs available to us in democratic societies. The issue can be resolved by extensive bi-partisan political consultation in which all of the public is involved, thereby side-stepping inadequate consultation as a means to politically lambast governments and their *responsible authorities*. It is easy to demonstrate that the issue is important, politically sensitive and not the 'fault' of current governments (wastes are inevitably the 'sins, or ignorances, of the fathers'). The exercise for governments is to sell it as such in order to generate the constituency that will permit the necessary expenditures. Their success depends on their capacity to marshal their communities' education and marketing armoury – a task that is surely not beyond them.

## *Essential services' matters*

New Year's day 2004 (not to mention Boxing day 2004!) gave us another reminder of the vulnerability of essential services. Santos's Moomba gas plant suffered an explosion limiting gas supplies to NSW and SA. THE AGE in Melbourne editorialised that we might 'heed the lesson' of Longford (even more severe gas explosion, Victoria 1998) and Moomba, which for THE AGE is the,

> *… need for an integrated national energy grid, including the proposed $3 billion, 2900 kilometre eastward pipeline from the North-West Shelf…* (8 January 1989, p.A10).

For over twenty years in government submissions, articles, letters and talk-back radio I have attempted to illustrate that there is another metalesson to be gleaned from the contexts of 'disasters' such as these.

All of what we think of as essential services are vulnerable and occasionally break down. Were we to see it, these occasional but not infrequent dislocations present us with the opportunity to deal with them through the construction of social capital rather than through material capital works. Generalising to all infrastructure, it would mean creation of a civil defence association in which all adults were enlisted to train and act in the event of dislocations to essential infrastructures. (See 'Not Forgetting the Gas' in Chapter 7.)

The internet is fortunate, it gains immeasurably from those who seek to hack into its bowels. They keep the system and its users on their toes. All its users understand this and take precautionary action, ably assisted by professionals who make a good living from the trade and, of course, often were themselves hackers in former lives.

For many, these situations are so full of ironies and contradictions that they can barely contemplate hackers without apoplexy. But again that cognitive dissonance, as the psychologists call it, represents a failure to recognise how our society, as currently constituted, functions. That represents a failure to pick up on societies' metastructures or an insensitivity to their metasystems . While it does seem sad that a proportion of us derive satisfaction from challenging the system, it is worth reminding ourselves that the very strength (wealth!) of democratic societies is based on those who are able to derive satisfaction from dissent or, better, are able to see the importance of open and public critique and have the guts to pursue it. A large part of our social capital is based on precisely the accommodation to such stirrers, and the more robust the basis of our social capital, the more robust the society based upon it.

## *Perverse incentives*

To conclude, imagine a government inquiry into any of the issues we have discussed and making a submission based on the contexts I have sketched. Invariably the submission would be thrown out as being 'beyond the terms of reference'.[9] Two blatant examples are:

(1) the incapacity of governments to consider the difficulty which fossil-fuelled electricity generation (both nuclear and coal/oil/gas) has in generating more electricity than the energy it costs to mine its fuel, manufacture and maintain its infrastructure, dismantle it and its wastes after its useful life is over and then to make good the environmental damage caused by the whole process. This implies that proposals to install new fossil-fuelled power plants, mine fuel for them or any associated activities should fail environmental impact examination. That they don't is a function of the narrow definition of what governments will permit as acceptable environmental costs. Therefore the life-cycle energy equation I have relied upon a number of times (see partricularly the articles in Chapter 3: Energy) is simply not acceptable to the terms of reference and can be ignored.

(2) Australia's *Disability Discrimination Act (1992)* in which ss. 46.1 and 46.2 explicitly permit insurance companies to exclude the chronically ill (*second class* lives) from various insurances. Thereby discrimination against an increasingly large proportion (aging!) of society becomes legal. Recourse to the Human Rights and Equal Opportunities Commission is futile because its terms of reference do not enable it to monitor transgressions of some informally defined 'natural justice'. It monitors existing legislation including of course, our governments' responsibilities to international legislation, treaties, etc. (See 'A Discriminating Act' in Chapter 5.)

Terms of Reference (ToR) are deliberately formulated to restrict input. Usually unwittingly, this means excluding questions and discussions about the wider social

(i.e. philosophical, political, economic, constitutional etc.) and environmental implications. This is no 'conspiracy'; ToR are essential. It is simply dictated by the limits of government and indeed of any investigation. Therefore, it is up to the political process, not the bureaucratic process, to change it. In other words there is no use complaining to government departments about such matters, the appropriate place is parliament and the political parties. Indeed, this issue, of primary concern to ecoliteracy educators, could be a (if not the) primary concern of Green parties. But, since Greens are trying strenuously to appear conventionally responsible and conventionally attractive, taking up this issue within the political process would make them appear abstruse and irrelevant at best. Thu, one of the most important perverse incentives in my struggle to have the approach advocated here recognised is easily uncovered by using the approach on itself; and as we have seen it is still too obscure to be recognised by our political infrastructure.[10]

More accessible are the many mundane perverse incentives that appear now that context-sensitive understandings are becoming more common. In the context of a government inquiry then, it is usually well within ToR to recommend that the responsible authority undertake to investigate the many mundane contradictions that arise because we are now imposing a new set of priorities on a mechanism set up to deal with something that was a narrow priority many years ago. A well-known example was water and electricity rates that made each unit cheaper the more one used. This is an example of 'Cheaper by the Dozen', one of many common metaphors that we can now understand to be profoundly misleading.

To end on a positive note, let me draw to readers' attention the area of human concern that is making such thinking part of its 21st century practice all the way down to undergraduate education. It is the health and welfare sector. We now have extensive infrastructure set up to transform all associated practices from hospital emergency department practice to health infrastructures' most powerful management committees and their quality and safety committees. Every medical school has its department of 'social and preventive medicine' where the notion of 'preventive' medicine unashamedly includes the study of the prevention of curative medical incursion, as well as the more obvious prevention of disease.

Few of us would miss a beat at mention of this. Put the professions of engineering or economics into the name, however, and we have 'social and preventive engineering/economics', which for most of us verge on the oxymoronic. Perhaps they shouldn't. Maybe in the future they won't. But today even engineering/economics with a social conscience has a hard time surviving engineering/economics' faculty curriculum committees. In practice today, an 'error' in a hospital is no longer seen as a failing on the part of a member of staff but of the system of which the staff member is part. Very much part of that system is the training of individuals and their basis of involvement. Systems must allow for the normal human experiences of exhaustion,

frustration and, where possible, even the deliberate manipulation (criminal intent) that real staff members experience by virtue of being real! Nor does this imply replacement by robots, no matter how sophisticated, because robots will never be able to imbue patients with the 'unbearable lightness of being' so necessary for recovery.

And so on …

Context awareness offers a raft of new options. Indeed it may well provide a myriad rafts – to a broader, richer and more equitable range of sustainable futures than we can imagine from a position based in today's limited Cartesian frameworks. ■

Endnotes

1 I have the good fortune to work, as a consumer representative on numerous medical and health related committees where such thinking is de rigeur, e.g., Melbourne Health's Quality and Safety committee, charged with dealing with what Ivan Illich called iatrogenesis, doctor-caused disease.

2 These intellectual ways or models are socially constructed, i.e. they are put together by communities of people doing what is natural for humans: acting, observing, theorising/modelling and testing theory on each other, i.e. in the practice of each others' imaginations and then in the 'real world'. The testing in discussion is the overt and fun social bit. However, our thinking and language are themselves social, created by our forbears and passed on to us by our contemporaries.

3 At the end of 2003 I gained the agreement of one of the two Therapeutic Goods Administration product approval committees to monitor social contexts of the devices it considers for approval.

4 I have now written the environmental science section of a year 10 school science text (forthcoming, Nelson Thomson, 2005) from the perspective mentioned here.

5 The decades of work by Australian philosopher Laurie Splitter and his Philosophy in Schools Programme (A.C.E.R.) illustrate the teachability of this stuff at even primary school level. To some extent, letters columns in newspapers and 'talkback' on radio, already serve this function. However, the letters columns' primary function is to publicise the greatest variety of comment most of which, for the very reasons that concern me here, are highly specialised and therefore exclusive of context. This limited focus even applies to ABC Radio National (to the chagrin of a few of its presenters)!

6 Roughly as polluting and as energy intensive as the lifetime of fuel put through the vehicle.

7 An additional interest would have to be established to enable industrial involvement. Toxic waste at a power station may involve a new union not normally associated with running a power station and there would be valid occupational health and safety problems of the kind normally isolated to a dedicated toxic waste handling site.

8 The idea of carbon dioxide as a 'toxic waste' (to be sequestered) springs to mind – perhaps we should think of carbon dioxide this way!?

9 I have twenty-five years' experience of this in many areas of my work as an environmental scientist and as a representative of the status of the chronically ill and disabled.

10 I have approached the administration of our national Upper House of parliament (Department of the Senate) to consider creating a new mechanism to publicise 'beyond ToR comment' to inquiries – so far to no avail.

# *Technology and the loss of self*

Adapted from 'Technology and the Loss of Self: An Environmental Concern', published in 1989 in *Environments, A Journal of Interdisciplinary Studies,* vol. 20, no. 2, pp. 1-16.

## *Introduction*

Human activities are no longer consistent with the environment in which they are conducted. The capacity to 'operationalise' our theoretical models into machine form has outstripped nature's capacity to provide a permanent home (ecos) for them. While our capacity to do it locally is not new, it is only recently that human artefacts have gained a capacity to destroy the viability of the biosphere as a whole.

Lagging behind this capacity somewhat is the development of concern about it; today's environmental movement. From some twenty years in the movement and over a decade sifting through hundreds of applicants to Australia's oldest and largest Master's degree in environmental studies, it is clear to me that the concern of the majority in the movement is not with cultural structures, but with drawing attention to the 'problematique' (Club of Rome, 1974 and 1975) and with raising the efficiency of existing technical and economic procedures to deal with it. In caricature we may isolate these approaches as two 'generations' of environmental concern. First, the whistleblowing or awareness to breakdown phase and secondly, concern with the social and technical structures that appear to be immediately behind the breakdown. These latter are concerns about political and economic priorities and the efficiency and impacts of the techniques used by them; in particular of the technologies or hardware they use.

The result of the successful pursuit of these concerns is that the industrialised world now has a wide range of environmental protection legislation and its operationalising bureaucracy and attendant industry. These mechanisms set aside 'wilderness' for preservation, impede the release of pollutants, bring major projects under public scrutiny and promote public education. Nevertheless, while these means achieve a certain success in their own terms, breakdown continues to manifest itself in ever more variegated forms, ever further beyond the reach of existing political, legal and economic measures. Compare present responses to toxic waste disposal or atmospheric pollution, let alone to genetic engineering. All mainstream responses are of a shift-to-another-means kind, none suggest that we might seriously question how we arrived at these problems nor that such questions might in turn expose structures amenable to change.

Beyond the mainstream, however, this question is being seriously investigated and a third generation of environmental activism is casting around among thinkers in many areas for clarification of the underlying structures of thinking and knowing that give rise to our present ways of doing things.

The primacy of technology in the culture of the so-called 'developed' nations makes it a useful means of access to what Borgmann has called 'the character of contemporary culture' (1984); we all have immediate and continuous experience of it. It embodies the character of its host culture and through observations of our interactions with it we might investigate hypotheses about our understandings of ourselves-in-nature.

In this paper, the hypotheses are twofold. First, that our present understandings of ourselves-in-nature and of nature itself, is of organisms of machine form isolated but interacting in nature. Secondly, that the practical outcome of this understanding is self re-inforcing, enhancing our dependence upon machines by subverting our capacity to see ourselves differently. In the first part of the paper various dimensions of the technological subversion of meaning are sketched. In the second part, discussion is abut the extensive recent writings on the development of self and personal meaning that arise in interactive relationship with 'nature' and which have no meaning outside this relationship. Nature here is in quotes to emphasise that we cannot know it independently of personal meaning in the process of becoming (development). The concluding section looks at what techniques consistent with such understandings might look like.

In common with other writers (see later) concerned with the development of such a 'new way of seeing', I believe that it is through critical recognition of the cultural construction of our techniques that we might begin to unravel them fundamentally. Without cultural comprehension, first and second generation environmental activism lead to a concatenation of unintentional irresponsibilities. Isolated problems are 'solved' by transferring them from one spatial, temporal or social context to another. Thus 'dilution is (still) the answer to pollution' according to the Smithsonian Institution as late as 1987 (Wernick); we leave our toxic and radioactive wastes to succeeding generations ('sins of the fathers being visited upon the sons') and we shift problems to poorer or less densely populated areas, particularly in the 'less developed' countries. Worse, and this is the essence of the critique to follow: problems are transformed in terms of the subtlety of their implications. For instance, from the products of metabolic combustion (horse and human manure) our transport now relies on those of internal combustion (of petroleum products) and may come to rely on those of nuclear fission, fusion and even on the not-so-benign, large scale solar technologies.

## *Technology and the subversion of personal meaning*

Technology, as it concerns us here, is the realm of artefacts. An artefact is a purposefully designed and/or used device. Its essence is an expression of purpose which may or may not be clear to its users (for a case where it is not, consider the socially divisive bridge designs of Robert Moses analysed by Winner 1986, pp.22-23). It is a quantitative expression of a particular perception of how to do something and of that something's environment. It is not, of course, restricted to the designer's expressions alone; those who interact with it also impress their own perceptions and purposes on it. Therefore a technology is more correctly a set of potentials for doing things.

In the case of a spade the ostensible intentions of the designer are relatively clear. Even here, however, without more intimate knowledge, one usually does not know which type of soil or 'spading' duty a particular design is suited to. Nor does one necessarily know why the spade was made from the materials it uses, let alone how or under what conditions it came to be made (was it expressly made to 'capitalise' on the market for spades, is the wood in its shaft from a rare tropical species and will its plastic handle degrade quickly if left in sunlight?) In practice, it might find uses having nothing to do with spading, and we have not begun to question the cultural structures it enters, such as why it must be privately owned and how this imperative affects its design and use. Calling even a spade a spade, then, is no straightforward task, let alone knowing what to call a computer programme or a product of genetic engineering (on computers, see Weizenbaum 1976; Dreyfus 1979 and Winograd and Flores 1986; on genetic engineering, see Yoxen 1983 and Suzuki and Knudsen 1988).

In the following observations on the loss of meaning inherent in aspects of present day technologies and our interactions with them, I shall not be considering the much discussed losses inherent in the consequences of pollution and resource use, nor the more straightforward social consequences of altered employment, equity and training they cause; nor the consequences of the various financing, legislative and political mechanisms involved. The concern in this section is to demonstrate something of the losses to personal meaning and control implicit in the character of contemporary technology and its infrastructure. Nor will the putative benefits to personal control offered by technology be discussed; for they are foisted on us daily and it is simply presumed that we know them. In the final section, however, I shall describe a general but inverted 'benefit' to be derived from present technological developments.

The losses are presented in four increasing levels of generalisation, as follows:

1. *Loss of direct or material control*

   The loss implied here concerns a loss or exclusion from the meanings (workings) purposefully, i.e. known to be, built into devices. It comes about in two ways, that

is, through design itself, and by way of the social context in which the devices are used. Later, I shall show that these are not independent; designs and the devices in which they are manifest arise interactively with their social contexts.

a) A selection of directions by which design trivialises and suppresses the meaning inherent in everyday practices involving machines:
   i) Active or deliberate suppression of meaning through:
      - Cowling or boxing-in mechanisms for streamlining purposes. Streamlining may be for physical reasons (as with an aircraft engine) or, and these are the present concerns, for production, marketing and maintenance purposes. Compare design concepts, such as 'fool proof', 'user-friendly' and built-in maintenance 'facilitation' practices, such as 'discard-after-use' and 'replacement sub-unit'. In the latter procedure, the sub-unit is either discarded or returned to 'head office' or a specialised repair shop for re-constitution; thereby centralising the expertise (meaning) contained in it (see 2. further on).
      - Restriction of user-access to the face ('interface') or output of technological processes. In addition to overt cowling, this can happen by centralising processes leaving only an 'access module' (terminal) open to the public. In apparent contradiction to this, today's 'powerful' personal computer (PC) has taken the place of time-sharing arrangements on powerful centralised main-frames. However, in subtle ways and in common with other devices of this kind, such as automatic teller machines and do-it-yourself petrol bowsers, the PC is still an 'access module' to the centralised expertise and infrastructure that enables its software and its 'high technology' hardware to gain viable access to our homes. In practice, access to the meaning of the PC is little greater than to that of a distant main-frame (see also b) on complexity and the last section on the character of technology).
   ii) Inadvertent trivialisation of meaning through:
      - The plethora of technological forms for every mechanisable function conceivable and acceptable to the market. Commitment by producers is to what will sell rather than what will do, which in turn reflects something of consumer expectations of products (see Scitovsky 1976, Hirsch 1977 and Leiss 1978).
      - Accessibility of artefacts by virtue of their cheapness and uniform distribution. In part both are a function of large markets and the latter especially is a function of the subsidy provided to rural distribution by large urban population (market) densities.
      - 'Easy' and authoritative disposal of waste products and spent or derelict artefacts.

- Miniaturisation and plasticity of form. The latter refers to standardisation and the use of standard components in a variety of devices. Of special note here is the capacity to generate 'customised' devices apparently built to suit individual needs. Aside from what this says about the interpretation of individual needs (later), this is possible through the increasing rationalisation of procedures to facilitate interlocking, for example, LEGO pieces and the great variety of forms open to the LEGO builder who accepts the interlocking procedures implicit to the game.

  Artefacts that fall under these four characterisations are rendered ephemeral by them, hence the trivialisation.
- Complexity. Many or most contemporary artefacts are complex in one way or another. In that we recognise this and in that complexity is only understood at one level, it is threatening – requires effort, may make us feel inadequate and the thought of overcoming it may be felt to lead to a pandora's box of implications we may simply not want to pursue. The response to complexity raised in the last section enables us to come to grips with it by recognising the higher levels of abstraction or generalisation into which it fits. Few have the capacity to do this today.

In addition to these relatively straightforward inadvertent mechanisms of suppression, is a deeper outcome of the distancing implicit in the techniques with which modern technology is now involved. It is the inadvertent suppression of methodology itself and I shall illustrate this with a few brief examples.

To rationalise the transfer of measurement to machines the metric system is now virtually universal. At the time the process began it was thought simpler to convert humans to this rationalised system than to convert machines to the various older, culture- and geography-specific ('organic') forms it was to replace. We had the common situation of instrumental/utilitarian rationality swamping the organic, direct identification built into earlier systems of measurement by dint of history (the foot, the stone (14 pounds) etc.). It is not easy to identify with 1/40,000,000th of the circumference of the earth (a metre).

The metric system did facilitate the automation of fabrication process, such as cutting (lathes), milling and drilling machines. These now operate by 'numerical' control, an encoded and therefore essentially wear and error free means of directing and monitoring a machining process. In doing so, involvement in the measurement process is concentrated in (arrogated to?) the numerical control, i.e. the hands of the designers or, more generally, the manufacturers.

There is, however, an ironic twist to this tale. The very universality, cheapness and smallness of today's microprocessors mean that units in any coherent system of measurement can now be accommodated.

Another example is that of word processing which has the potential to erode learned writing skills by, again, arrogating them to the machine. Note that to those with the skills, word processing can be 'liberating', while it is only to those without them that it is potentially disabling.

Automatic transmission in a car automates gear changes to the car and its designers. Manual gearing allows drivers to automate gearing to themselves, making them more insightful and therefore independent in their relationship with the car. In addition the car is cheaper, more efficient and less demanding of maintenance. Calculators do the same for our understanding of arithmetic processes, not to mention the potential for subsuming methodology of that generalised 'thinking' machine, the computer (on mathematics see Davis and Hersh 1986; on computers and the subversion of meaning, see Roszak 1986, Barrett 1986, and Searle 1984).

b) A selection of directions in which the social structure associated with technology suppresses and trivialises its design and the risks associated with them:
   - Maintenance (breakdown) organisations which obviate the need to experience breakdown directly, i.e. to get involved with mechanisms.
   - Separated production and maintenance has the potential to undermine public understanding of the essentially inseparable relationship between them. The rift reduces pressure to design for durability, accessible maintenance dismantling and/or re-use. The rise of intermediary organisations (such as consumer associations) that seek to bridge the gap can actually work to further remove involvement by consumers in production in that they formalise and therefore, again, concentrate consumer responsibility in themselves.
   - Pressure to sell acts to shroud risk associated with devices, the need for maintenance, product longevity etc.
   - Quantification and digitisation of risk and technique add legitimacy but impede access by those not versed in quantitative techniques, to the basis of the formulations used.
   - The rate at which devices are rendered obsolete (and at which capital is discounted) determines the extent of concern with robustness and maintenance. Obsolescence in itself is unavoidable. However, its presence demands systems to deal with the obsolete.
   - Bureaucratically erected standards and monitoring give an impression that the implications and risks of technology are being dealt with and, indeed, are amenable to bureaucratic control. Again, the need for personal involvement is obviated.
   - Legitimation structures and the sheer pressure of the necessity to produce and be seen to produce in the controlling bureaucracies, renders access to

them difficult. Legitimation structures include, naming (Environmental Protection Authority), access to legislative and regulation procedures, geography (situation in The City say), architecture (imposing) and economic and social barriers, such as changes for service and requirements to fit various preconditions prior to gaining access (the requirements of 'Freedom of Information' type legislation which nominally permits access to government documents; also, the procedures for gaining effective access to a particular decision-maker).

2. *Loss of day-to-day control*
   In addition to the issues listed in 1b) above, two nominally contradictory currents arise in the development and control (the politics) of technology:
   a) Concentration of technological expertise in the hands of technical specialists.
      The more intricate our devices and procedures become the more we are constrained to find the appropriate specialist for the job. Such 'specialisms' range from the purely mechanical to the 'mechanics' of finance, marketing and risk and damage handling, such as insurance, fire and medical expertise.
   b) Dispersion of technical expertise as the number of specialisms and specialists grows.

To trace the technicalities (alone) of today's devices, we might need to approach specialists in a dozen or more countries let alone individual firms, for most large machines (even cars) involve numerous components sub-contracted to others. Weizenbaum (1976, Chapter 9) and Brooks (1975) have, in quite different ways, detailed the consequences of this phenomenon in the construction of computer programmes. Tracing the methodology behind a particular piece of software will involve hunting for authors in both space and time. Anyone who has tried to solve a technical problem with equipment originating on the other side of the globe can attest to this.

In the long run these difficulties are the basis for a new breed of specialist characterised by insurance agents, consumer advocates, consultants of various kinds and the environmentalists. These people purport to cover and assess whole areas of expertise and in consequence they too are becoming specialised, distant and inaccessible (the *professionalisation* of environmentalism).

3. *Alteration, subversion and the illusion of dominance*
   In a particular way, bounded by the ways we have learned to relate to it, technology has a capability to extend our insight into nature and ourselves. Consider the microscope or television. If we involve ourselves with these devices without an understanding of their social and epistemological meaning, the very 'power' of the insight they offer can be profoundly disempowering (on TV, see Postman 1987). They have a capacity to trivialise both our understanding of nature and

the meaning of the relationship we have with it. In European cultures at least, this can give an illusion of dominance over nature (see Merchant 1983).

Consider the effects of speed (motorised transport) on our perceptions of distance, the environment around distance and what it takes to move through our earthly landscape. While speed tends to collapse 'natural' space and trivialise what lies in it, it has the same effect on artefactual space or the perception of the infrastructure necessary to permit it. There is voluminous indirect documentation of these changes, in the 'doctoring' of 'the view from the road' by planners and geographers (see Appleyard *et al* 1964); in the political difficulty in raising cash to pay for road maintenance, and at the micro level in assessments of how long it takes to walk or climb a distance one has only ever motored through before (see also Pirsig 1974).

Consider further, the implications of an automated urban water supply and sewage for our understandings of water and what it takes to get it, and what it takes to dispose of it (let alone to *use* it). Again, the presence of the technologies suppress questions about wider meanings of water and sewage. For instance, what happens to distant or underground environments when we tap our urban water from them? To return to my first example one might, facetiously, ask that technology build a macroscope which would allow us to see context. We will see in the next section however, that this is a contradiction in terms, for context is an abstraction about our interactions in nature/ourselves. Technologies only 'help' us by default; by bringing an awareness to us about what it means to live *without* an awareness to context (see last section).

4. *Loss of self-outcome of a world without context?*

The enormous proliferation of mechanism and its apparent success or staying power has led to its use as a metaphor or model for virtually all conventional explanatory purposes (see Descartes 1975 (original 1637) usually credited as the first formal account of the mechanistic world view). Thus, aside from its use to construct actual machines, we use it to construct procedures (technique) and, further still, to explain phenomena in general whether perceived 'in nature' or in our social constructions. Even the notion of clearly delineable problems and consequently clearly delineable, and therefore marketable-as-a-package, 'solutions' derive from this model.

Among the phenomena amenable to mechanical modelling are people, societies and environment in general. We ourselves are perceived as mechanisms and our being and its relationships to all else are thought to be essentially delineable in this way. While the 'behaviourism' of B.F. Skinner (1971) which embodies this view, has been strongly criticised, the day-to-day reality of even the most generalised sciences of psychology and sociology still reflect the ascendancy of the mechanistic view (see Lilienfeld 1978 on the social uses of systems theory).

The upshot is that our humanity is stripped of its interdependence with nature and therefore, as we shall see, of its access to self-definition.

An example of such thinking is the portentiously titled, Touring Test for Artificial Intelligence. If a tester at a computer terminal is alternately connected to a person and a computer and then cannot discern the difference, the computer is said to exhibit artificial intelligence (Evans 1980, Chapter 14). Unwittingly Weizenbaum (1976) developed just such an 'artificial intelligence': ELIZA, a 'psychiatrist', 'who' reacted to 'her' clients so realistically that they sought to 'be alone with her'. Weizenbaum became world famous because he recognised the unwitting trick perpetrated against ELIZA's human clients. They involuntarily suppressed their normal and usually subconscious judgments about what constitutes a human and severely limited their everyday understanding of intelligence into the bargain. Such deceit is practised in numerous mundane contexts. A 'thank you' on a terminal or cash register slip demeans the nature of politeness by being essentially self-administered (we trigger it). At best it lacks the direct quality of such sentiments and at worst it corrupts the notion of the *consideration* of the giver. As a machine response, politeness becomes merely a form trading on a similarity to genuine sentiment, to create a particular behavioural environment; in a word: manipulation.

## *An interactional approach to the construction of meaning*

The obfuscation of meaning set out above must be understood in a context of the potential science and technology offer us were we to develop them in a context recognised as *both* culturally and environmentally interdependent. Thus, none of the foregoing is to be construed as damning of technology *per se*, only as damning of the idea that technology might be recognised *per se*! I shall suggest that there is no reason to eschew even mega-technologies such as the road network, only to construct and use them within in an interactional or dialectical way of knowing that incorporates us actively.

In terms of environmental concerns, scientific understanding alone is not enough. We are always developing new insights about old processes and simultaneously developing new processes about which insights are only projected. Herein lies the fundamental *non sequitur* in both environmental and technology assessment. Our priorities in respect to environmental control reflect old insights based on old awarenesses to old damages. A successful development in these terms is one that realises its own 'blueprint' and, provided we can constrain its environment through force or selective perception, we accept its success. Nature and nature's organisms are not like that. Not because they are too complicated to model precisely, but because the idea that models of nature can be applied in nature as nature is a fundamental (and self-destructive) misunderstanding.

At the risk of being criticised for pushing yet another area of specialisation, I shall attempt to illustrate the drift of thinking that asserts the construction of meaning and therefore of self from an embedded, interactive relationship with nature. My intention in doing this is to show that the success of the mechanistic world view rests in the hidden presumption that nature will reintegrate itself around our incursions. Then, should we use pharmaceuticals say, for some purpose, the presumption is not that we are attempting to reconstruct ourselves chemically, only that we are trying to shift the particular balance we represent to something we consider more favourable. I shall return to this example later.

The world view to be described replaces the present accounting approach to nature with an extended capacity to act responsibly *in* and *as* nature. In this view, nature ceases to be seen as a species of artefact or resource to be tooled by us, and we no longer need to wrestle with whether or not we are our brother or sister's keeper in terms of environment and society. We can now recognise ourselves as actors in nature mutually constructing and being constructed in it.

The use of words to describe such a world view have themselves the same problem as technology. With the present world view we can see them as discrete descriptors of something rather than as models representing our culture's attempts to create meaning from what our senses and intellects provide for us in a developing way. Thus, calling nature 'it' as in the last paragraph is not to imply that nature is an isolated entity but that we, or I, in my attempt to involve you my reader, am using an existing expression having currency to us both to develop an idea. The 'it' then is part of our continuing act of becoming. In this sense we also do not have 'world views' nor 'models', only a continuing kaleidoscope of changing intellectual formulations to what our senses, structured through our culture (especially language), provide for us. We are these formulations, our selves are constituted in them, each generating a unique pattern of being-in-language (as culture) (see references to Maturana and others below). Culture-as-language enables (*is*) this (*our*) dimension of being.

To illustrate these obscure sentences I shall proceed by explaining a number of terms used to characterise the underlying ideas by those working with them.

## *Dialectical*

Used to characterise thinking that recognises itself as a series of formulations, in language, of perceptions of reality. Reality in turn arises for us through our interaction with it. Our perception is a relationship arising in the interaction of our biologically and culturally based beings with the 'objects' of our perception. Therefore, no 'phenomena' can be *known* as such because they are always individual constructs-in-language (in culture). Culture enables the knowledge we attain and ensures a large proportion of commonality between our understandings, but it is only with artefacts designed-in-culture of which, within the particular culture, it

can be said that we *know* them in some kind of absolute or objective way. Otherwise 'all nature', as Turner put it, 'is second nature' (1984).

## *Causality*

Arises as a means of explaining an abstracted sequence of events perceived via the agency of some purpose. Again, it has no absolute meaning. In part the Cartesian idea of the 'reality' of cause and effect began to be unwound by physicists early in the twentieth century. Among those were Planck (1932), Schrödinger (1958), Heinsenberg (1958) and their more recent followers, Bohm (1980) and Capra (1977), who pointed to the place of the observer in constructing observations.

From this we can see that only mechanical devices (or nature abstracted in this way) can be 'operationalised' causally, in that they are material manifestations of our theoretical models. However, as soon as they breakdown their natural basis becomes evident and until our capacity to explain extends to include the mechanism of the breakdown, they are removed from our 'knowledge'. In understanding the break, however, we do not understand the nature from which our artefact is realised, only that part of it sufficient to reconstitute our device for its original and implicit purpose.

## *Process and structure*

Illustrating the interdependence of these two concepts offers another means to understanding the approach developed here. The famous formula $E=mc^2$ recognised the definitional basis of process (energy) and structure (mass). It is possible, however, to illustrate this in more mundane terms.

Consider how the rocks (structure) that shape a waterfall (process) can also be thought of as process in a larger view of the waterfall. Instead of viewing the fall through a time framework of seconds, we might view it through years, by taking a snap-shot once a year for a hundred thousand years. When the pictures are strung together as a film the rocks would be seen to fall or become a process (of erosion) within the larger structures of geomorphology in which the water is part (its erosive 'agency' is structural). What has changed is the conceptual illumination we bring to our perceptions – here, primarily a shift in time frames. Similarly, if matter itself is 'viewed in a light' of X-rays, the contours we perceive may change dramatically just as the ionosphere appears hard to 'short-wave' radiation and, the earth's atmosphere appears hard enough to deflect an incoming satellite back into space if it approaches at too shallow an angle ('belly whacking' from a diving board).

To assist in understanding present considerations of meaning and the development of self, a number of concepts arising from recent work among biologists will be helpful.

Central to the thinking of Maturana and others mentioned below are the General Systems concepts of self-regulation or homeostasis and its allied ideas of self-production (autopoiesis) and formative causation (morphogenesis). These words describe the capacity of living systems to preserve themselves in certain states of organisation. While living systems are open to what are identified as matter, energy and information (see below), they are closed organisationally. That is, they exhibit a capacity to recognise and sustain organisational coherence (homeostasis) and to consistently go on producing themselves (autopoiesis), which includes developing and controlling their shape (morphogenesis) and reproducing and repairing themselves.

Inherent in these capacities of living things is a capacity to respond to changing conditions by altering the characteristics nominally used to define their particular homeostases. This implies a 'meta', or higher level homeostasis; a homeostasis of homeostases. On this basis Maturana and Varela maintain that the:

> *… view of animal life as selfish is doubly wrong… first, because natural history tells us… that instances of behaviour which can be described as altruistic are almost universal. Second… because the mechanisms we put forward to understand animal drift do not presuppose the individualistic view that the benefit of one individual requires the detriment of another. Indeed… the existence of living organisms in natural drift* [both in development of their lives… aging and in development of their forms] *is not geared to competition but to conservation of adaptation, in an individual encounter with the environment that results in survival of the fittest. Now, we as observers can change our frame of reference in our observation. We can consider also the group unity which individuals are a component of. In doing so we see that the group necessarily conserves adaptation and organisation in its realm of existence* (1987, p.197). (My emphasis and brackets.)

The human potential for language has in turn given rise to meaning and the notions of meaning (notion!), self and mind. In common with other processes occurring between individuals, language is a mutually recognising activity. Cells, for example, are able to exchange various chemicals because they are recognisable to each other and, in that they are exchanged, the chemicals facilitate the maintenance of the partners involved in the exchange and help to define the partners' existence. Similarly people exchange language to facilitate their existence. However, language also constitutes a consensual domain (Maturana 1978, p.47) which allows for a patterning of mutually orienting behaviours. Thus, as Winograd and Flores put it,

> *A language exists among a community of individuals, and is continually regenerated through their linguistic activity and the structural coupling generated by that activity* (1986, p.49).

Further:

> *The basic function of a language as a system of orienting behaviour is not the transmission of information or the description of an independent universe about which we can talk, but the creation of a consensual domain of behaviour between linguistically interacting systems through the development of a co-operative domain of interactions* (Maturana 1978, p.50).

Meaning and knowledge then, are generated within a like-minded community, such that while:

> *Reality is not objective,… neither is it individual:… cultural differences do not represent different modes of treating the same reality, but legitimately different cognitive domains. Culturally different men live in different cognitive realities that are recursively specified through their living in them The question of solipsism [that discourse deals only with our subjective thoughts and feelings] arises only as a pseudo-problem, or does not arise at all, because the necessary condition for our possibility of talking about it is our having a language that is a consensual system of interactions in a subject dependent cognitive domain, and this condition constitutes the negation of solipsism.* (Maturana 1974, Cognitive Strategies, p.464, quoted in Winograd and Flores 1986, p.52.)

If we accept this, information must not be confused with what is measured as 'bits' of data in an electronic 'communications' system. Information is that which changes the form of consensual behaviours in language and cannot be determined quantitatively. Consider von Foerster's observation along the lines that a person who maintains that something is boring is actually saying that s/he is boring (sic) (Pers. comm.).

> *Mind (and knowledge) therefore, is not in the head, the mind is in the behaviour.* (Maturana 1985, pp.308-311; see also Bateson 1979.)

Turning now to the self, the understanding of meaning as an interpretation of consensual activity arising in language allows Maturana (1988) to state that:

> *For a living system in its operation as a closed system there is no inside or outside, it has no way of making the distinction. Yet, in language such a distinction arises as a particular consensual co-ordination of actions in which the participants are recursively brought forth as distinctions of systems of distinctions. When this happens self-consciousness arises as a domain of distinctions in which the observers participate in the consensual distinctions of their participations in language through languaging. It follows from this that the individual exists only in language, that the self exists only in language, and that self-consciousness as a phenomenon of self-distinction takes place only in language. Furthermore, it also follows that since language*

*as a domain of consensual co-ordinations of actions is a social phenomenon, self-consciousness is a social phenomenon, and as such it does not take place within the anatomical confines of the bodyhood of the living systems that generate it. On the contrary, it is external to them and pertains to their domain of interactions as a manner of coexistence* (p.63).

*As a result, reality arises with self-consciousness in language as an explanation of the distinction between self and non-self in the praxis of living of the observer. Self, self-consciousness and reality exist in language as explanations of the happening of living of the observer. Indeed, the observer as human being in language is primary with respect to self and self-consciousness, and these arise as he or she operates in language explaining his or her experience, his or her praxis of living as such* (p.81).

With those insights behind us, let us return to the business of control. We have seen that meaning arises in recursive interaction between people in language. We have also seen that self and selfhood arise in the development of meaning in an individual. Where our access to meaning is restricted, our access to self determination, the means to construct our selves, diminishes.

The control I am concerned with in the first half of this paper then, is not that of domination but simply that of,

a) retaining and enhancing access to meaning and selfhood, and
b) through the practice of a) to develop an articulate sense that meaning and selfhood imply a capacity to *care* or to be *response able*.

To explain how this ethic is implicit in the dialectical basis of understanding they have developed, Maturana and Varela conclude their book, *The Tree of Knowledge*, as follows:

*The knowledge of knowledge compels… because, when we know that we know, we cannot deny* (to ourselves or to others) *that we know* [This] *implies an ethics that we cannot evade, an ethics that has as its reference point the awareness of the biological and social structure of human beings, an ethics that springs from human reflection and puts human reflection right at the core as a constitutive social phenomenon. If we know that our world is necessarily the world we bring forth with others, every time we are in conflict with another human being with whom we want to remain in coexistence, we cannot affirm what for us is certain (an absolute truth) because that would negate the other person.* [Coexistence implies that the other's] *certainty… is as legitimate and valid as our own because, like our own, that certainty expresses [the other's] conservation of structural coupling in a domain of existence – however undesirable it may seem to us. Hence, the only possibility for coexistence is to opt for a broader perspective, a domain of existence in*

> *which both parties fit in the bringing forth of a common world. … A conflict can go away only if we move to another domain where coexistence takes place. The knowledge of this knowledge constitutes the social imperative for a human-centred ethics* (pp.245-246). (On evolution by co-operation, see also Axelrod 1984.)

Finally,

> *… we can expand our cognitive domain… through reasoning, through the encounter with a stranger, or, more directly, through the expression of a biological interpersonal congruence that lets us see the other person and open up for him [sic] room for existence beside us. This act is called love… without [it] there is no social process and, therefore, no humanness* (Maturana and Varela 1987, pp.245-246) (parentheses mine).

While this section was primarily based on the work of Maturana and Varela, I do not wish to give the impression that they are relatively lonely exponents of the dialectical view of meaning. At most they are among the most articulate exponents of the ideas known to me. It may be illustrative for those unfamiliar with these ideas to recognise that they have coexisted alongside mechanistic science in the modern western tradition for virtually all of the last century. Supporters of the ideas come from all areas of intellectual work and are now manifest in a veritable avalanche of thoughtful books, papers and even periodicals devoted entirely to them and include, *Revision, Co-Evolution Quarterly, Resurgence, Journal of Transpersonal Psychology, In Context, The Trumpeter* and *The Deep Ecologist*.

Examples of this tide of dialectical writings will be found in the secular works (sacred writings have long included a dialectical orientation) of:

***Physicists***

Planck (1932), Schrödinger (1958), Heisenberg (1958) and more recently Capra (1977), Bohm (1980), Lovelock (1979) and Prigogine, actually a chemist, who with Stengers wrote *Order Out of Chaos* in 1984. Each work has generated a spate of comment and interpretations and spawned virtual cult followings.

***Philosophers and sociologists of science***

Whitehead (1985, original 1926), Polanyi (1958 and with Prosch, 1975), Habermas (1979), Berger and Luckman (1967) and Mulkay (1979).

***Psychologists***

Jung (1958), Fromm (1976 and 1968), Frankel (1963), Maslow (1966) and Rogers (1980).

***Feminists***

Keller (1985), Merchant (1983), Daly (1979), Grimshaw (1986), Caldecott and Leland (1983) and Cheney (1987).

*Other social theorists*
Illich (1973 and 1977), Bateson (1973 and 1979), Boulding (1961 and 1985), Baudrillard (1970), Morin (1977), Wilber (1983); and futures and urban studies theorists, such as Satin (editor, *New Options* newsletter), Slaughter (1988), Le Guin (1976 and 1986), Sennett (1971 and 1974) and Jacobs (1965).

*Biologists*
Waddington (1977), Levins and Lewontin (1985), von Foerster (1984), von Glasersfeld (1984), Sheldrake (1981) and in particular, ecologists such as Leopold (1949), Worster (1977) and Livingston (1981).

Recently, two additional areas of thinking have gained extensive multi-disciplinary adherence. These are General Systems Theory and deep ecology:

***General Systems Theory*** (mentioned above)
von Bertalanffy (1968), Wilden (1980 and 1987), Meadows (1982), Jantsch (1980), Salner (1986), Beer (1980) and Vickers (1983).

*Deep Ecology*
Populated by representatives from a wide range of disciplines, this new philosophy is entirely consistent with dialectical understandings. It asserts that nature is intrinsically valuable – which is consistent with Maturana and Varela's 'ethic'. That is, nature is of the essence of our development (in language). Consequently we are constrained to be responsible in relation to that which we recognise as nature. Being responsible implies acting elegantly or appropriately. Workers who pursue this theme are Naess (1974 and 1985), Berman (1982), Shepard (1982), Devall (1988), Berry (1983), Evernden (1985), Snyder (1983) and Drengson (1983).

## *An interactional approach to technology*

Half a century ago, in a short *cri de coeur* entitled, *The Abolition of Man,* C.S. Lewis wrote:

> *… if anyone age really attains, by eugenics and scientific education, the power to make its descendants what it pleases, all men who live after it are the patients of that power. They are weaker, not stronger: for though we may have put wonderful machines in their hands we have pre-ordained how they are to use them* (1996, original 1944).

This bleak reality suggesting that we can lose control of our technologies has been filled in variously by Mumford (1967/70), Ellul (1964 and 1980) and Winner (1976). While recognising that 'the steel does indeed draw the iron to it', many other writers are content to sketch in the social construction of our relationship with technology stopping short of seeing it as having an unstoppable dynamic of its own.

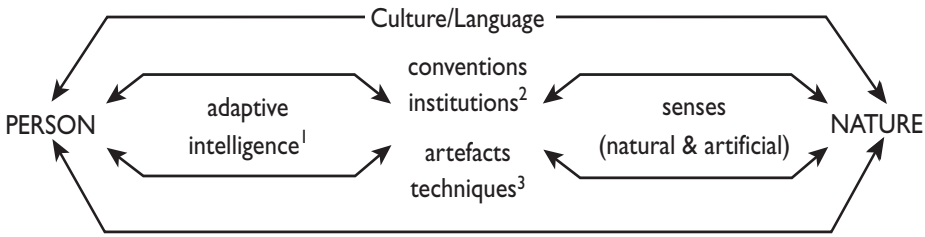
In addition to those already mentioned, a selection of the many recent works on

technology showing an awareness to the directions taken here are those of Borgmann (1984), Stanley (1978), Jonas (1984), Dreyfus and Dreyfus (1986), Vanderburg (1985), Heidegger (1977), Ihde (1983) and of course Schumacher (1973) and his followers, such as Carr (1985).

Within a dialectical view of the world, technology, as a subset of technique, is a mediator of desired natural phenomena. It is an explicit product, a crystallisation, of particular understandings of both 'nature' and people and therefore is – at least in origin – quite culture-specific. On the face of it, technologies have no meaning beyond the purpose originally vested in them in their culture of origin, although, as with the coke bottle in the film, *The Gods Must be Crazy,* the original meaning can be 'recreated'.

In a mechanistic world-view, technique resides in the dualistic gap between people and nature (Figure 1, below). It can, however, be used to facilitate closure of the gap and when it does this, it is 'appropriate'. The notion of appropriate technology today is a bridging device between dualistic and dialectical technologies, between a world of independent mechanisms and one in which our tools are recognised as us. Technique in such a world view enables the person-nature relationship to drift, to establish some new (enhanced!?) homeostasis. It also has a potential to 'disappear' in practice, in the same sense as I am not conscious of my hand writing these words or you are not conscious of your eyes reading them.

*Figure 1. An Interpretation of the Mediation of Phenomena (adapted from Olson, 1976).*




Notes:

1 Abilities required to 'master' the artifacts, techniques, etc. of the culture.

2 Formal institutions but also legal, political, economic and other frameworks.

3 Artefacts = hardware; techiques = operationalising procedures (in a limited or mechanical sense; in a wide sense, all four aspects are technique).

- All concepts selected for display in this model are 'as conceived' for the purposes of this paper. Their isolation under the nouns used, is of-course itself an artefact with no intended reality outside the context of this paper.

To arrive at such a state should be no simple feat in a culture such as ours where we seek to make meaning explicit. The disappearance or harmony with its environment attained by a technique-in-culture must be multi-dimensional. That is,

the community in which it exists must understand it technically, environmentally, socially and epistemologically, which means that in addition to knowing 'how it works', we must know conceptually how it 'fits'. Thus the stick Polanyi's (1969) blind person uses to feel obstructions with (s/he feels them at the tip of the stick, not where stick meets hand!) must be replaceable in a continuous or sustainable way and its social implications for both blind person and the rest of us must also be known. At a quite unidimensional level, were the dialectical view of technology common, we would, for instance, immediately recognise the benefit of automotive shock absorbers for roads (they reduce road wear) as well as for cars and their occupants. We would also bear in mind their potential to make us forget the roughness of surfaces… and so on!

In a world such as the Australian Aborigines inhabited before European settlement – small, tightly-knit, self-sufficient groups – techniques were 'naturally' dialectical. The groups implicitly understood the 'mechanisms' germane to their 'existence-in-tools'. The long-term viability of both the tools and the cultures that embodied them reflect the coherence between their tools and their cultural and natural environments.

Today, specialisation and the deep epistemological aIienation that characterises our culture have created techniques in which control by explicit understandings is unavoidable. I am suggesting that the development of a dialectical world-view offers opportunities to appropriate our techniques, not so much by understanding their detail but by understanding the structures of meaning that enable them.

Comprehension of form, for example, is enhanced by recognising light as a phenomenon. However, as explained above, the nature of our metaphor is a partial constituent of the form it illuminates. Touching or tasting the same 'objective' form facilitates a different formative experience. Thus a technique or artefact will embody current perceptions of the 'nature' on either side of a mediation process and in turn will form them. Recognising this enables the rise of technique which, rather than demeaning or contracting our humanity, extends it.

Heidegger speaks of breakdown as a source of insight into the means we use (1977). Breakdown is any condition in which we stumble and are forced by circumstance to generate an experience. For it to be useful in appropriating technique, we must have developing language structures (theory) coherent with, or capable of, accepting it. To assist in creating such appropriate theory we could do worse than follow the example set by our medical schools in establishing departments of Social and Preventive Medicine (see 'EcoLiteracy' in this chapter). Inherent in the studies conducted by such departments is the notion that a profession might attempt to pass responsibility for its area of 'epistemological hegemony' back to its public. Thereby the profession departs from an interpretation of responsibility as accountability in which it determines what is to be counted, and moves to grapple with what Jonas has called *The Imperative of Responsibility* (1984).

Breakdown then, is a non-trivial source of insight that takes many forms. Ironically much or most technical robustness must actually be credited to what are nominally criminal activities ('hacking').

In common with environmental science, teachers in departments of Social and Preventive Medicine are turning to dialectical or systemic means to clarify the 'realities' that concern them. Exposing the systems of knowing that are the womb of our designs and that enable those designs to be operationalised in practice is the path to closing the present hiatus between us and nature while preserving in a careful way those techniques coherent with us as nature. Recognising the existence of a virtual infinitude of parallel (same order of abstraction) and embedded (higher/ or lower orders of abstraction) systems for organising our perceptions is a liberating first step in coping with complexity and in innovating in a careful, minimally intrusive way.

In conclusion two brief personal experiences are offered as examples of the liberation implied.

*Self as whirlpool*. See 'Dissolving the Stranglehold of the Fix' in this chapter for a discussion of the application of this metaphor to real and personal situations.

*The edge of madness.* Most of us will have had the experience of approaching a plastic plant to test it for 'naturalness', and if the imitation is good we will have felt frustrated with our inability to discern the difference between 'plastic' and 'life'. This is another example of the rich experience inherent in breakdown. I believe that the source of frustration, the 'edge of madness', does not lie in our feelings of not being sensitive enough but rather in:

1. the possibility of being deceived and more profoundly,
2. the possibility that we might not be able to tell what is natural and what is not. In other words, that we just might not be capable of telling whether we – as the flower, part of our greater self – are natural. ■

# *From being precious to precious being*

Adapted from 'Being Precious to Precious Being', published in Findlay, M., 1995, *Cappuccino Papers No.1, Imagine the Future* (Australian Conservation Foundation), pp. 61-65; reprinted in CSIRO *Sustainability Network Update* No.32E, October 2003.

Recently Volvo presented its 'Environmental Concept Car' (VECC to Melburnians. It is a four-seater family-sized vehicle that uses a gas turbine spinning at speeds close to 100,000 revs per minute to generate electricity, which drives electric motors connected to the front wheels and charges a bank of batteries, which are used when 'zero emission' motoring is required. It does indeed produce few toxic emissions from the five or so litres of diesel it uses per 100 kilometres. For all its technical wizardry, however, the new machine still weighs one and a half tons.

In the 1960s I used to drive a car that Citroen has now been building for sixty years. The four-seater Deux Chevaux had an engine that developed about one tenth the power of today's averaged family car. It weighed about half as much as the VECC, could maintain 100 km/h (without a head wind) and consumed just four litres of petrol per 100 kilometres! The fact that it has survived for all those years is testament to its popularity, and to its safety.

This car was banned in Sweden because there was nowhere substantial to attach seat belts. Perhaps the authorities were also conditioned by Volvo/Saab interpretations of safety. The Swiss, on the other hand, graced the car with a comprehensive insurance category all of its own – cheaper than any other car. One reason was that the car was cheap to repair, but more importantly it just was not involved in many accidents. *Inside such a vehicle one's vulnerability is palpable, and this induces careful driving.* Swedish armoured cars and four-wheel-drive wagons, by contrast, induce a sense of invulnerability that leads to the infamous driving behaviour we associate with them.

Meanwhile, in Wintersville, Ohio, Bulldog Security has designed a talking car alarm. It can be set to scream 'Please help me!' at jet-engine volume – 127 decibels. The body language of the expensive car normally yells 'Desire but don't touch'. Once it is touched, however, the illusion shatters, and the car screams for help.

In the age of the mobile phone we are assailed by ads exhorting to buy one to ensure the security of our daughters and (in much smaller ads) our mothers.

At another level, we have the phenomenon of specialised insurance 'products', targeted at particular groups of people. Such specialisation gradually undermines

the essence of insurance. Low-premium health insurance for fit youth, for example, removes them from the general pool of insurees, in turn necessitating an increase in the premiums paid by those who are not fit and youthful.

Then there is the food 'waste' grinder that disposes of valuable food scraps, called 'putrescibles' directly into the kitchen sink. And, while we're on the subject of waste, consider why you would not pick up the rubbish in a railway carriage, even though it offends you… or what you think of NSW ex-Premier Fahey, who was stuck by a syringe while participating (without gloves) in Clean Up Australia Day 1995.

Finally, consider Australia's anti-cancer directions: slip-slop-slap and the other more explicit material exhorting us to quit smoking, trim our diets and check ourselves regularly for symptoms. *No campaign recognises that most cancers are lifestyle-induced, nor that these ways of living give others cancer.*

While these examples can all be seen as new versions of the hunt for material security, they also reflect a particular version of what is important to us, what is precious. They say something about how we see ourselves, and about how we have become precious.

In one form or another, all these stories are concerned with security. Being precious, as I am using the term here, involves developing and maintaining special conditions that set one apart. There are two parts to this exercise. First, there is the creation of the desired personal access to known rescuers in the case of the mobile phone. The other is the creation and maintenance of a social environment that condones these isolated, personalised services.

In the first three stories, people are materially protected from harm or loss through access to various devices. Specialised insurances appeal to groups whose 'special needs' are now recognised – at the expense of the amorphous mass. The cases of the food waste grinder and responsibility for rubbish in public places raise still further interpretations of preciousness. Ads for one brand of kitchen sink grinder remind us that removing food waste from the rubbish stream keeps potentially recyclable bottles and cans 'clean'. So we do ourselves – and apparently the environment – 'a favour' by separating ourselves from our wastes. Waste on trains revolts us, but we do nothing about it because we are not our brothers' keepers (and don't want to get ourselves dirty in the process). Finally, the cancer ads are seen to have succeeded when we recognise that we personally are threatened and remove ourselves from its agents.

The culture we live in rests on a general way of looking at the world that may be characterised as social Darwinist. 'Dog-eat-dog' competition is thought to 'bring out the best in us'. *There is little understanding that virtually all human and natural interactions are based on a co-operation so all-enveloping that* it *cannot be mapped*. Even in a football match, the fun derived from competition is actually the tip of the tip of a huge iceberg of co-operative interactions. Most of these physical and

intellectual co-ordinations between us, let alone between us and nature, are quite invisible.

In a social environment like this, when we seek to maintain the integrity of people and things close to us, we build on what we know we can control ourselves. When we are constrained to rely for our sustenance on an economy that formally distrusts its players, it is not surprising that people resort to preciousness as a means of maintaining their integrity.

I do not imagine, incidentally, that many people will aspire to the idea of living with nothing a thief could sell. Even less likely are we to aspire to a community in which we all alter our aspirations to allow for an even distribution of wealth, for this would mean a dramatic reduction in material throughput, not to mention in its primary driver (aspirations for goods and services). We simply cannot yet imagine a way of organising ourselves that would provide the same level of stimulation, challenge and satisfaction as our present society does, without the special privileging or preciousness.

These concerns are real enough. Even if we would like such a society, we are all aware that getting there implies profound changes. The hopeless air that seemed to pervade the March 1995 Copenhagen poverty conference is typical of our despair. We must find new sources of wealth, ways of decoupling employment from sustenance and even social status, new definitions of personal integrity, ways of enabling people to move from one social situation to another without being demeaned, and so on. Yet, while these issues are daunting, we can begin by preparing the ground.

*What we are looking for is empowerment of a particularly deep kind: the enablement of being – or, even better, of becoming. For we humans are nothing if not human becomings, always in the process of change.*

Being precious is a necessary consequence of seeing ourselves as separate from nature and requiring protection from it. If we do not subscribe to separation from nature, even the things we have grown most frightened of, death and suffering, no longer carry such fearful implications.

It is a long road to such understandings, and a road that carries with it the profound skepticism of conventional society. *Nevertheless the contradictions in present society necessitate that those of us already blessed with the wherewithal to question should continue to do so.*

## *Transition or letting go – a personal story*

The first decade of my working life ended with the sack. Over the previous twenty years I had built up a stamp collection which grew to have an appreciable monetary value. To me, however, it was a thing of beauty; besides, I thought that, if I ever had kids, I would like to give it to them and share their interest in it. Suddenly I was unemployed, and did not have the resources to insure and maintain the collection.

Though I did not need the money it was worth, I sold it, and as I watched it being auctioned away I gradually became aware of the evaporation of an attachment and of a bind. Some time later it occurred to me that I could have simply stopped maintaining it and discontinued the insurance. I would then have had that thing of beauty to enjoy and perhaps resume collecting later. But at the time its material value shone too brightly.

Later still I discovered that my children weren't interested in stamps and wouldn't have appreciated the collection if I had given it to them. This is eminently reasonable, for part of the value of any collection lies in the collecting.

Not long after my attachment to that stamp collection vanished, so did the attachments to the remaining clutter I called mine. The savings from not having to insure this clutter would now enable me to easily replace the lot if necessary. One important bunch of possessions, however, was still precious to me: my books. They had become the bane of my life, for when I lent them to students they often failed to return, and I did not like following them up.

I realised that the literature I was buying to support my teaching was tax deductible, which in turn meant that the public owned about a third of each book and journal. So okay, my books were being loaned, but what about the journals? After eight attempts, I found a remarkable feminist philanthropic trust, the Lance Reichstein Foundation, which provided the assistance to establish the Periodicals Access Network Directory, a directory of academics and non-government organisations, not connected to the main library networks, who are willing to make their (unusual) journal holdings available to the public. With this went the last vestiges of concern for my wall decorations. Now, I am angry with those who don't return 'my' stuff, but only because it can't be loaned again.

## *Transition or letting go – a social story*

My own transition was related to involvement in the being of others. Society's transition is similar, if much more complex. I shall illustrate by contrasting two community organisations: Neighbourhood Watch and the Safety House scheme.

In Neighbourhood Watch, neighbours observe street behaviours that may threaten others' property, and their observations are linked with police surveillance and protection. The scheme shores up a neighbourhood's defences against those who might threaten its values.

The Safety House scheme involves people opening their homes to people, especially children, in need. Anyone who feels threatened can simply dash into a house marked by a small yellow triangle, and there find succour.

Neighbourhood Watch cannot recognise that the values it is built to defend actually create the threat in the first place. A thief may have precisely the same values as the threatened community, but be unable to satisfy those values without

using criminal means. In this way, the thief is an indicator that all is not well with our combinations of values and means to satisfy them. The Safety House scheme, on the other hand, does not judge the need of those seeking its benefits. It accepts the failings of society, and generously shares the security its homemakers offer.

## *Transition or letting go – getting there*

In common with many naïve greenies, I did not want to bring children into the world: 'with a future like that, who'd want to?' Fortunately my partner had other views, and so, at quite a late age to still be naïve – well after the stamp collection episode – the first of our two sons was born. One of the two little people who had chosen to come and stay had arrived, or so it seemed to me. The idea that these two little people were 'mine', by law and by custom, has always troubled me. Equally, I objected to the idea that my partner and I were responsible for them. I loved them; I didn't need to be responsible for them.

This is by way of introducing two friends who had far more insight than I. They understood what living with children meant, but could not 'have their own' and did not want to use the Monash IVF programme. What they did instead reflected a profound understanding of where children fit in society.

Aldous Huxley's last book, *Island,* was a Utopia – a very different story to that in *Brave New World*, the dystopia that made him famous. It was based in part on his experience of the place children had in Melanesian societies, where children simply belong to the community as a whole. This means that all are responsible for them – or, more accurately, the community shares its love with or for all its children.

Such an anarchistic arrangement, where responsibility/love is an environ-ment rather than a directed commodity, is hard to imagine in the vast conurbations in which most people live today. Nevertheless, such care is possible even in our large communities, and there are many organisations in our own society that are based on the same concepts. Aside from all the major religions and their action organisations, there are secular organisations, such as the Safety Houses and, in my friends' case, Share Care. Share Care facilitates continuity of care for children whose parents have difficulty in caring for them on a continuous basis.

And then of course there are the kindnesses that are occasionally reported in the press as if they were unusual, but which actually occur very frequently, if usually in a very mundane sense. People stop and assist when they perceive that another is in trouble; they give money quite readily, and there are many similar examples of such generalised or socialised generosity.

Finally, let us return to the seven examples I began with and see what lessons we can draw from them.

The first three cases are cases of my property and myself as property. *Can we use these concerns to generate conditions of material and personal security?*

In order to transform the preciousness associated with the car ('jump in and go, preciously, any time') we must attempt to understand the social constructs underlying it. Currently we need to own things in order to have them at our disposal. But there are other ways to achieve the same immediacy of transport; for instance, by communally owning vehicles. (See 'The Myth of the Efficient Car' in Chapter 4: Transport, for a detailed deconstruction of car ownership.) We would then treat our cars with care but not with preciousness. They would not be nearly as easy to steal, because we would all 'own' them and more importantly we would understand that we owned them.

In relation to mobile phones, consider how a public transport levy instead of tickets would affect personal security. (This proposal is outlined in 'Tax, Not Tickets' in Chapter 4: Transport.) The levy would increase life around stations as well as on the vehicles themselves. Such changes imply caring security, as opposed to precious security, and the new form actually encourages us to generate it.

With regard to the specialised insurances mentioned above, how might we transform insurance into a social process in which the 'shareholders' regain the involvement that the old 'friendly societies' offered their members? How can we retain the specialised product, but also involve the insurees in producing the security they seek?

Currently a bland system allocates risk via actuarial charts. Without any major threat to the societies, it is quite conceivable that insurees could be involved in reduction of their risks. The insurance societies could empower insurees by providing education and other assistance. The premiums and actuarial charts would then be based on indications of participation in risk reduction rather than on the current impersonal and disconnected criteria. Needless to say there would have to be an insuree-based committee to oversee just how criteria were formulated and participation in risk reduction assessed.

To reconnect people with their waste, we can:

- Retain the word compostibles instead of putrescibles for food waste.
- Restructure household rates to recognise households that minimise their wastes.
- Make the installation of food-waste grinders subject to a licence, as they put an added load on the sewerage system.

On waste in trains, my own unit at Monash University (originally the Centre for Innovation in Waste Management, then the Centre for Environmental Management and now, Monash Sustainability Enterprise) received a grant in 1995 to pilot a scheme to do exactly what we are talking about here. The general direction was to provide structures that encourage travellers to own their behaviours. For example, we suggested that the Met only permit the sale of foodstuffs on its premises (e.g. via vending machines) where the containers are recyclable and carry a deposit refundable

at selected stations. (While successful in the short term, this pilot was not continued because the Met did not have the structures in place to keep it going.)

Finally, the anti-cancer campaign. *Self-interest is the best of all motivators;* the challenge is defining it. Most people are capable of responsible behaviour given half a chance. The 'half a chance' involves work, of course. The cancer hospitals and the Anti-Cancer Council could adopt a deeper definition of public education. This could involve people in a variety of ways, not least through small 'focus groups' that developed their understanding of the context of their actions and lifestyle, for instance that their lifestyles can cause cancers in others as well as in themselves. We attempt to do this with our new students in the Graduate School of Environmental Science every year. It involves urging people to observe their everyday realities – *washing clothes, getting to work, making beds, even watching neighbourhoods* – in new contexts.

The search for social responsibility is here, and it isn't precious. ■

# *Safetynet*

Adapted from 'Safetynet: Community, Technology and Safety in Everyday Life', published in *Arena Magazine,* vol. 26, Dec-Jan. 1996/7, pp. 47-49.

In Australia, concern for the safety of our teenage daughters and mothers sells mobile phones. In connection with Australia's daughters it goes like this:

'Her friends think she's spoilt.

For $10 a month, her parents know she's safer with Telstra MobileNet.'

The concern for mothers' safety appeared two days before Mothers' Day, though that concern warranted only a quarter-page advertisement.

Advertising such as this manipulates fears and therefore demeans the real concerns we have for each other. It corrupts one of the most powerful and human of all our values: care. Moreover, it is so easily and frequently done in the pursuit of other, limited and usually mercenary ends.

Playing so fast and loose with these deep subtleties of our social nature is unfortunately such a common phenomenon that most of us don't notice it, or when we do, we simply ignore it.

In not taking action on these subtle issues we risk the subversion of what makes us human. Being able to respond to them gives us a critical edge when it comes to avoiding overt manipulation, and much more importantly, it enables us to participate in determining what we value about ourselves and what it is about ourselves that we wish to develop. Medical technology carries a certain urgency with it because it is a matter of life and death and because it is isolable to a small, high-profile group of doctors. Common technologies such as mobile phones, however, are not immediately matters of life and death, only of status and envy and there is little to prompt us to think about how they influence us.

Joseph Weizenbaum's *Computer Power and Human Reason* (1976) is still among the most cogent works ever written to expose the social consequences of the computer, and along with its many successors, has been largely ignored. The same can be said about the way we use the car and the books that draw attention to it. The spectacular book *Autogeddon* by Heathcote Williams (1991) is hardly a best seller.

Does this mean that we are permanently locked into the trappings of everyday life? Must we accept a society that does not encourage us to step back from its trappings even when the consequences are as grave as those associated with the car used for urban commuting? And if not, what might be the characteristics of an

appropriate technology, one that at least a large minority of the population can be responsible for?

The putative safety in the apparent capacity to phone from wherever we are is based on an illusion. The security of a teenage daughter or a mother with a mobile phone in a threatening sea of less fortunate people without such phones, ignores a number of subtle problems: first, in a world in which all have mobile phones the safety-edge vanishes. Indeed, secondly, belief in security provided by devices lands us in a spiral of ever more subtle devices. These are inevitably consumer products which will benefit Telstra and industry in general. Third, they suppress our capacity to recognise that security cannot actually be bought through the agency of a material product and, therefore, cannot be provided by Telstra's telecommunications mechanisms where the society in which the mechanisms are created and defined is doing the menacing.

I hasten to add, I am not saying that bought mechanisms cannot ever be part of a secure world, for, to the extent that this article is part of the process of liberating us from our fears, someone does have to purchase *Arena Magazine* (this article's first publisher) in order to read it and in that sense we are still very much in the domain of industrial economy. And yes, people can rely just as much on a 'formula' in an article as they rely on a mobile phone.

Consistent with the idea that we socially create our fears, I am interested in intellectual models or insights that will enable us to deal with our fears ourselves rather than unwittingly externalising them to machines and thereby allowing ourselves to become more vulnerable. Where we are not able to do this and seek safety through machines only, a mechanical innovation becomes a step in a never-ending spiral of insecurity that literally capitalises upon the failure to address social dysfunction, the real social basis of our fears.

## *Technology as liberating?*

First, let us look at the process by which personal freedoms are subverted when machines are introduced without the critical involvement of their users. The process of exclusion and the consequent vulnerability generated is exemplified by a mundane example, familiar to everyone: the advent of automatic transmission in automobiles. My analysis should not, incidentally, be taken as an attack on automatic transmission, only on the way it has been introduced and used.

Automatic transmission in automobiles is sold as a liberating innovation. The act of changing gear is subsumed into the mechanism of the car; as sold, we no longer have to 'worry' about it. However, where it is introduced to society across the board it becomes precisely the reverse: crippling. Manual transmission permits almost all of us to learn eventually to change gear automatically. In other words, with time and experience, we gain automatic transmission but in this case it occurs

inside us. Mechanising the process removes this liberating potential altogether and transfers the automation to the car as a whole or, more accurately, retains it with the design engineers back in Detroit.

There are also consequences at an environmental level. Resource use increases, and pollution is exacerbated because automated transmission requires materials and energy to make, drive and maintain, and all for essentially the most marginal gain in physical convenience.

Were this new level of automation introduced in a climate of social understanding of its consequences, it would be restricted to drivers disabled in one way or another and they would use the information with understanding of its consequences. Under such circumstances the price may well be higher as a result of lower production runs, but it could be subsidised by the goodwill generated by making (and marketing) it for just this purpose, or, of course, by higher prices elsewhere. Such mechanisms are common. Spare parts prices probably provide a subsidy to new vehicles, and the price of a daily paper is low because of advertising revenues – few would afford one otherwise.

Such observations are not cynical, but are simply observations about how prices are socially constructed, and about economics which is quintessentially a social science.

Secondly, let us look at the spiral or treadmill created by substituting a device for what is essentially a personal accommodation or a way of being. A simple and accessible example of this is provided by the recent work at both Melbourne and Monash Universities showing that we are 'safer' in road smashes if we are in heavier cars. Heavy vehicles shield us better and absorb more shock, which, as any engineer knows, is associated more with speed than with weight. Such arguments are unassailable in the limited contexts in which they are put. However, we do not actually live in sum-limited contexts.

To the extent that we accept limited arguments like this, they obscure wider contexts of transport safety, such as the environmental consequences of heavy cars and more directly, the social factors that mould behaviours, and road behaviour in particular.

For instance, in society as it is currently constituted, advice like this leads to a technical spiral, an 'armouring race' in which the one with the heaviest car wins. In relation to driving behaviour, if we know – especially in the sense of feeling it – that we are in a vulnerable or flimsy vehicle, we drive more carefully.

Working with such social dimensions of safety, instead of with the technical dimensions of safety only, could benefit all road users and involve, rather than exclude, drivers from the production of their own safety.

To emphasise how critical such involvement of the user is, recent studies have demonstrated a connection between the introduction of compulsory seat belt use

and a rise in pedestrian accidents. The connection appears to be that seat belts enhance motorists' feelings of invulnerability and they drive accordingly. Compare also the stories that abound about the inconsiderate driving behaviour of owners of that ultra-'safe' Swedish car, the Volvo.

## *Safety as sales-ploy*

To return now to the mobile phone, the analysis to date implies that one might question the capacity of our children to use the mobile phone under conditions of stress, especially once its touted virtues are widely known by those likely to do the endangering. In the main at present we develop our feelings of security through immediate, personally oriented and usually mechanical devices which inhibit the growth of long-term, psycho-socially based security. The most insidious implications of the mobile phone as protector, however, are that we actually lose involvement in the social fabric that would produce conditions of deep safety. In the same way that automatic transmission locates the technical and political basis of gear changes to Detroit, the Telstra path to safety relocates safety to itself, to the mobile phones and their infrastructure.

Safety as I understand it is something that we make together in society. Individualised mechanical safety (armouring) on the other hand, necessarily arises at the cost of others; it is safety from 'them'. In a context of socially derived safety, the safety of our children (as distinct from my child) arises from trust, and trust in turn arises from understanding; especially the deep understanding synonymous with being able to take responsibility for yourself in contexts provided mainly by others. Creating the kind of understanding I have attempted to illustrate, in a climate where many of us have the dollars to buy individualised safety but not the energy and time to generate socialised safety, may well be initially exhausting. It requires a capacity to look for the social bases of vulnerability, and that those who are looking be able and willing to act on what they find. ■

chapter two

# ENVIRONMENTAL SCIENCE

The first article in this chapter, 'The Fourth E: Educating for Energy, Environment and Economics', considers energy, economics and even environment as social constructs. The article goes on to outline a possible structure for an education within a discipline that recognises the context of that discipline. This structure is, in other words, a guide to education with responsibility. Note that the article is explicitly self-reflexive, and that this enhances the reader's understanding of how reality is constructed.

The second article, 'Insights from a Tweny Year Experiment', describes in detail how the educative approach presented in the first article was applied in the programmes of the Graduate School of Environmental Science at Monash University.

# *The Fourth E: educating for energy, environment and economics*

Adapted from 'The Fourth E: Educating for Energy, Environment and Economics' published in *Multi-Disciplinary Engineering Transactions, Australia*, vol. GE20, 1996, pp.19-29.

## *Background*

From the perspective of this paper education is concerned with the transfer and enhancement of a capacity to initiate responsible action. Environment is the context that enables us to be. It very much includes society: the relationships people generate between themselves. Energy and economics are social constructs that help us make sense of the phenomena we have learned to observe in nature and those we are able to create ourselves, such as our social and physical artefacts (e.g. laws and power stations respectively). Finally, the responsibility I am talking about here is a very different beast to that normally understood by the term and so it will be discussed immediately, in the next section.

The order in which the topic will unfold begins with the notion of social construction; some definitions and illustrations and how it applies to science specifically. I will then show how recognising social constructions, and using them, enables a more comprehensive level of responsibility. Having exposed these mechanisms, and how the new comprehensive responsibility arises, we then have the tools to see how the concepts of energy, economics and even environment are constructed. From that point, the 'fourth e' of education can be examined and a particular construction of it for use in the domain of professional education will be proposed.

## *Social construction*

*'Energy a social construct? Economics I can cope with, but energy… give us a break!?'*

Well 'dear reader', please 'hang in here' for, by the time this paper is finished I hope to have shown that indeed, energy *is* a social construct and more, that recognising it as such enables us to use it much more responsibly than is currently the case and more responsibly than is currently *expected* of us.

In order to read words, not to mention to make sense of them, we have had to go through a profound and lengthy social process in which our native capacities

for thinking are stretched and at the same time conditioned. We are given litterally uncountable numbers of formalisms (rules) with which to play and are, at the same time, 'filled up' with bits of data that the rules enable us to make sense of (cf. Rafoth and Rubin 1988; Lakhoff and Johnson 1980; Turbayne 1971 and Wilden 1980 and 1987). One of these (rules) enables us to see that in the last sentence there is a spelling error – literally! The error will have irritated some of us and this is because a rule that helps make sense of something (here: spelling) has been broken and an ambiguity has been thrown into the pot of ideas I'm cooking up. The error adds to the difficulty we have in making sense of the ideas and also acts as a distraction, breaking the flow of the development of the ideas. That's why we seek to avoid spelling mistakes. Further, the rules we are given are themselves subject to more generalised rules and these govern the underlying rules. The more abstract or generalised rules are called *metarules* (rules about rules), and in the example I have been using here one set of metarules is called grammar.

At the more generalised levels these rules are not usually learned explicitly, they are simply assumed in the processes of living. Indeed, they may never have been expressed explicitly and so are just taken for granted and tacitly understood. Often they are not recognised at all. An example of a learned set of rules is the one mentioned above: standard spelling. In order not to introduce ambiguities or side messages that detract from, or distract the reader from, the primary message, they must not be contravened. A simple example of a taken-for-granted set is that one already mentioned, grammar. It is taught, but most of us baulk at learning it – at least in our mother tongue. When learning a new language we usually find it more efficient to recognise grammar! Another example is the rules by which spelling is imposed on language. This is also an example of a set of metarules (rule of rules). In English most of us are well aware of these metarules because they are so damned idiosyncratic ('i before e except after c' – and other exceptions!); in German, on the other hand, they are very regular and so tend not to be so high profile.

A more complex example pertinent to this paper is that all notions, including energy, are socially constructed. This one however, will have to wait till later to be resolved.

Specifically, if l had used, uncritically, the spell checker on the machine on which I wrote this paper, certain 'mistakes' would have crept into it which would either (incorrectly) draw attention to my American background or (correctly) to my uncritical use of a piece of American software. Both assumptions represent socially constructed judgments. Either way they recognise that a type of social conditioning has seeped through into the text. That the main message is also a complex artefact of social conditioning is not so obvious and it is that which I need to explain before proceeding to how we might more generally encourage responsibility taking for energy, environment and economics. To demonstrate the existence of social structure closer to home consider how a house is 'brought forth' or 'realised'.

The wooden frame of a brick veneer house gives it its primary form and a good part of its support too. Behind the frame, some of us (engineers) will recognise a plan on paper. We will also recognise that the plan embodies a raft of rules about building and building materials. Some of these rules will have a mathematical or other precisely formalised base while others will be empirical and based on direct experiences, 'rules of thumb' say. Not immediately so obvious are the rules about drawing which enable the plan's users to quickly and unerringly 'read' its directions. There will also be the hidden details the drafting sorority (should I have said fraternity?) need to know in order to bring the plan to its users in the most 'user-friendly' and unambiguous form. In addition to the plan, the finished house depends on other equally substantial socially derived constructions, such as financing, industrial or labour relations, occupational health and safety, materials' standards and all the mundane organisational techniques of getting materials, permits, labour, rubbish removal and even client advice to the building site on time and, again, all in a builder-friendly form.

It's easy to forget just how profound these constructs are. However, it is only necessary to consider the remarkable generalising structures that have been developed in society to enable us to, say, purchase materials before we have earned the money to pay for them, insure what we personally do not have the immediate resources to replace (this is the socialisation of risk!) – not to mention enabling access to a generalised means of payment that allows me to write this paper which will – ultimately – pay for my pie for lunch, without bartering. Imagine trying to sell this paper to a milkbar owner.

And then there are all the other mundane social constructions that we take for granted: driving on the left, accepting equal opportunities for women and not yet for the disabled, knowing that a microwave oven will not (?) poison our food for us, having a particular seating order around the table at both Panmunjom (in the Korean DMZ) and around the dinner table at home, using certain types of language (micro-dialects) with loved ones, knowing that 'you old bastard' can be an expression of friendship (within the Australian 'family' at least) and finally, accepting a particular knowledge set that tells us all these things. Other knowledge sets enable us to extend our understandings – within reason – and naturally, what I present here will, I hope, be within the bounds of the reasonable for my readers.

That science must also be a social construction is perhaps a notion that will take some of us beyond what is normally considered reasonable. If we are to proceed, however, we will have to reach a common understanding about this.

First, let's be very clear about one thing. Saying that energy, or elephants for that matter, are social constructs, is not saying that something like energy or elephants do not exist! What it says is simply, but importantly, that in order to distinguish energy and elephants from the rest of reality, certain intellec-tual – and therefore

social – constructs must be in place. Asserting then, that science is a (series of) social construct(s) forces us to look very closely at just what it means to say that anything is a social construct. Clarifying this point, therefore, is particularly worthwhile.

In the next sections we will be dealing with the social constructions of the three 'e's, two of which are thought to derive from science (you can decide which two!). Here, therefore, I will only make a few further, general comments.

In making their way down the fabulous track of intellectualisation, people render the world they (re)cognise coherent with the intellectual structures they already have. Even babies seek to make sense of, or fit, the world accessible to their senses into the intellectual structures they have. Initially they do it with their more tactile senses and instincts. Later, once operating in the domain of sight and language, and rapidly gaining further intellectual constructs which in turn have to mesh with the earlier ones, they are able to make another kind of sense of a world based on intellectual hypotheses (cf. for example, Piaget 1959, and more recently Melkman 1988). It is useful to note that intellectual constructs can appear at various levels of generalisation. Maturing means that some will be superseded while others are discarded altogether (cf. phlogiston, in early thermodynamics) but, in order to do the superseding and discarding other structures must, at least temporarily, be conserved. Demolishing too many at once results in pathology.

The opportunity to theorise prior to acting on the world is a powerful capacity. It allows us to be efficient in terms of energy and time, and increases the generality of our skills. The opportunity to theorise about our theories, to choose for example, which one we will use, makes us still more powerful. Science involves both of these capacities, the second being the one that provides the methods and methodologies of science, including the one that requires that we test our hypotheses empirically, i.e. by experiment.

Empirical testing involves designing test procedures that enable us to pour in data which the procedures process in a rigidly controlled way to produce outputs that again can be observed in similarly unambiguous ways. Put another way, the procedure and the observations will both be based on prior procedures and observational techniques that have been thoroughly tested and not found wanting. Once, however, an anomaly in either is perceived, by bringing to the procedure or to the observations a new perspective, methodological questions must be asked and eventually a way will be found to 'improve' the test design or to re-assess the nature of the data being used. All of these processes are socially derived and their uses and consequences are now the subject of a considerable literature (see for example Hanson 1993; Nelkin and Tancredi 1989 and Pinch 1993).

In the first place, the way we 'see' is provided by the constructs we have gained to enable us to make sense of the sensory-motor transmissions from our eyes, ears, fingers etc. To take a complex example, to 'see' the presence (and strength) of

what we call magnetic fields, we have devised a meter that reads gauss. We cannot consciously sense magnetic fields directly, in the same way as we cannot know time or mitochondria (components of cells that energise metabolism) or even space. Each is realised or given meaning by the constructs our hypotheses create. All are useful provided they are devised in such a way that they link seamlessly with our prior constructs.

Second, the constructs we have assimilated to 'see' with are socially provided. We gain them from our parents, school and society at large through books, the media, social pressure ('political correctness'!?), friends and so on. In addition to gaining constructs from surrounding social agencies, the constructs are themselves generated socially. While individuals create the details, institutions test them and most importantly, lend them legitimacy. This goes for the institutions themselves – they are set in concrete and mortar by other institutions (see, for example Douglas 1990).

Most, indeed the vast majority, of these constructs will be identical from person to person and indeed even from society to society. If it were not so, one couldn't make translations nor even communicate with our mothers. Of course we can do both, even though the obvious difficulties with the former highlight that despite the almost overwhelming similarities in the constructs we carry within us, there are indeed differences in interpretations between us. While it is difference that enables us to notice in the first place, it is, sadly, often where our perceptions end (cf. for example, 'ethnic cleansing').

Third, the language we use to describe anything, including science, is itself culturally based and therefore influences the way we appreciate things. For instance, we privilege the sense of sight in our discussions about intellectualisation, e.g. to see = to understand. It is only recently that we have come to say, 'I hear you' which has the somewhat precious meaning of 'I hear your intention' rather than your rational meaning. The straightforward clarity of cognition and of seeing give them this metaphoric equivalence and privilege. Another example is the use of the expression, 'to make sense' of something. We do not make sense of something via our senses but via our intellects. And yet, it makes sense to use the expression because making sense of something is similar to the experience of feeling it 'objectively' through our senses! As we've seen, this is barmy because the senses only make sense provided we have intellectualisations on call to turn them into meaning! (Some references on all this are: Clark 1988; Watzlawick 1984; Davison 1993 and Lefebvre 1991.)

All this notwithstanding, once one is initiated into the rigour of science, it is a language that, nominally at least, cultures and their individual languages cannot bias. Science and its languages, such as mathematics are now genuinely international and the vast numbers of international scientific journals bear witness to this.[1] Of course what science one pursues and when and how one pursues it are

all culturally influenced. In some cultures cancer researchers will not be allowed to use animals, in others, cancer research will not be pursued at all, other priorities will be more important. It is also well recognised that women in any culture will pursue science with different priorities and even with different methods than men. While representatives of virtually every culture today practise science, it cannot be denied that the basic presumptions underlying it are white, Eurocentric (or more accurately Semitic!) and male, even 'patriarchal'.

None of what I have said is intended to undermine the achievements of this most rigorous of knowledge structures. Indeed, perhaps its very coherence and power rest in the long intellectual hegemony these dominant groups have enjoyed.

Other groups coming from backgrounds in the humanities have made it their business to question the validity of the scientific baby as well as its contextual bathwater. While the questioning may well be healthy, conclusions – facilitated of course, by hi-tech wordprocessors and e-mail – suggesting that we drop the whole project are not shared by this author (see, for example, Gross and Levitt 1994, and the local review by Sandall 1995). Rather, this paper is based on the idea that understanding science as a social construct enables us to care for it and thereby to strengthen it (for general references see, for example, Mulkay 1979, and Barnes and Edge 1982).

For all its robustness then, the whole wonderful edifice constituted by science is based on choices of fundamental constructs which will, occasionally, have to be revised. To the extent that we can do this and at the same time recognise that *we are doing it,* we *are* responsible.

## *The social construction of energy, environment and economics*

We will now apply this notion of social construction to the three 'e's, beginning with the more obviously socially constructed one, economics, and ending with the more difficult one, environment.

## *Economics*

The social construction of economics is probably obvious to everyone except certain economists intent on scoring points. In this brief exercise we will look at one economic construct, money, a primary vehicle of economics.

Economics is about formalising utilitarian and symbolic transactions between people; it is also about the creation and distribution of the means to do things with wealth. Money enables the 'scientisation' of these things. With money we have a means to quantify, compare, store and control wealth. Canberra sociologist Eva Etzioni-Halevy has examined the relations between politicians and scientists and between politicians and economists (Etzioni-Halevy, 1985). The parallels are revealing.

Once the abstraction represented by number appeared, it would not have been a long step to represent number in some relatively permanent way and impute that symbolic representation to things in place of some value or other that the things represented for us. Despite the warnings of Moses (or God) that we ought (must not 'make unto ourselves graven images') that's precisely what we proceeded to do, however, with the saving grace that the majority of us remained well aware that coins were but graven and therefore not worth hoarding… except for their extrinsic value as things of beauty or novelty in their own right (this is art or 'numismatics'!). The business of hoarding, incidentally, turns out to be a most interesting notion which we'll come back to later. So, quite early on we developed this signifier of value, and the mechanism to determine particular values, the market, already existed, informally at least. Markets appear wherever two or more people meet and commence exchanges of any sort. Where I work, the stuff of exchanges are ideas and meta-ideas, such as the validity of ideas and the mechanisms by which validity is determined. While this is no longer unusual the processes of quantifying intellectual property are still being sorted out. Nevertheless, today all can be quantified in dollar terms and ('enterprise') bargained about.

Money, therefore, is the expression of the value we put on tradeable goods and services and once in existence it renders other things tradeable too. That is, once we recognise that things are in principle monetisable, we look around for ways of monetising things which hitherto were not monetised, intellectual property, for instance. The increasing body of literature growing under the title 'environmental economics' is, in part, the realisation of this – see, for example, the list of titles emanating from the (British) New Economics Foundation (1987).

Despite the current popularity of economic rationalism there are serious misgivings about the push to monetise among various sectors. However, on the face of it there can be little wrong with it – provided we recognise that money is only a symbol for a type of valuation and neither the total nor the only value the thing may have, nor even a demeanment of that thing's seamless fit into the wider web of existence. This demeanment refers to the seduction inherent in another capacity that enabled, and therefore preceded, quantification: the excision of part of our universe for isolated study. The trouble was that we became fascinated by the isolated discoveries and forgot to put them back! The generalising power that quantification gave to our means of production is therefore seductive in precisely the same way that words and language distract us from other human expressions that language does not convey easily: cf. here the work of Oliver Sacks' on Sign, the language of the deaf (1989). The deaf – who of course still use language – struggle under the generally unrecognised bias exercised by those of us who expect to *hear* rather than to read most of our linguistic exchanges.

The seduction provided by quantification and its subset, monetisation, lie in the capacity money gives us to transfer value precisely, to store it and therefore to

control it – along with all the liberating ramifications that go with them. Examples of these ramifications are the capacity money gives us to:

- insure certain values;
- distribute resources not currently being used by their 'owners', so as to provide loans say, that
- enable the growth of further wealth, such as the new infrastructure: from roads through educational services to public toilets;
- monitor economies with a certain precision which in turn is the stuff of,
- control.

All of these qualities carry with them profound social consequences. For instance, the capacity to exchange and store money enables the huge diversity of employment opportunities we have today; it also enables the relative independence of our children who carry with them pocket money and various other secure tools, such as transport concession tickets, ambulance membership numbers and telephone cards, all of which pay for various services and thereby provide real aspects of social security.

It hardly needs saying that monetisation has its complications. Since the very essence of money is the socialisation of value, it is very difficult to oversee, let alone control. It's a bit like the internet, with a 'life of its own'. To the extent that we are not able to involve ourselves in its control, new specialisms paid for by money involve the control of money itself; potentially lucrative and therefore obviously in need of some publicly monitorable control. Governments and inter-governmental organisations provide most of this function and this in turn ensures both the power of government and its growth – even where production itself is being privatised.

Aside from these huge issues which so much govern our lives, there are endless subtleties, such as the consequences of storage of money. In 1981 anthropologist Thomas Crump asserted that,

> *[t]he function of the store of wealth represents the future potential of money for making payments. … [It]… is, above all, … a subtle device for linking the present to the future (Keynes [reference given])… [a payee] is under no immediate pressure to make a further payment… [s/he] may hold [the] power to do so in reserve…* (1981).

What strikes me as fascinating here is the implications for this power to manipulate the wealth of juxtaposing the universality of information technology with the universality of money. The move to a cashless society, where transfers of money occur electronically, completes the inability of individuals to extract their money from circulation. Storage of money in a bank long ago started this process in earnest. In the cashless economy, however, all monies will become more or less public and untagged.

The invention of a quantifiable symbolic representation of value has affected humanity so profoundly that it is no longer possible to separate where money is the

construct generating changes, or where it is institutions based on money that are instigating it. Suffice to say that while they have numerous physical manifestations, all are defined socially.

Therefore, while it is difficult to know where to begin, or end for that matter, it is not difficult to accept that economic constructs are socially contrived. Among engineers in particular, to suggest that energy is also socially constructed is quite another story.

## *Energy*

At one level, the hectares of newsprint devoted to the pros and cons of electricity industry privatisation demonstrate that energy use is closely tied to economics and therefore at that level will certainly be subject to society's expectations. A quite delightful paper entitled 'Energy and Equity. 'Magic, Science and Religion' Revisited' was presented as a keynote paper to the Brisbane ANZAAS Congress in 1981 by Californian anthropologist Laura Nader (Ralph's sister) (1981). She states that,

> *[t]he present energy directions have been the product of a small group of experts, chiefly scientists from Western countries who have provided the main source of legitimacy of the energy business for deciding energy paths. We need to understand something about the social organisation and the culture of energy experts, in relation to democratic control* (p.28).

In this sense at least, the opening up of the electricity industry – just as the universities were opened to deeper government control by Dawkins in the 1980s – is not in itself such a bad thing. These matters, however, deal with the business of energy manipulation, not with energy itself.

The precise formal colonisation of energy by Western culture is a quite recent phenomenon, the only more recent domain of intellectual groundwork being that of information. To enter the realm of science, energy had to be defined in terms of formalisms already accepted by science. The definition of the joule as, *the work done when a force capable of giving a mass of one kilogram an acceleration of one metre per second squared acts through one metre,* does just that. We now have a handle on work in terms of the long established (standardised and universalised) dimensions of space, mass and time – each one of which has been, in its turn, laboriously constructed from intellectualisations supported by the way our senses apprehend the world.

Without going into the historic detail associated with the rise of space, mass and time as we now know them, it is not difficult to get a feel for the constructed nature of any one of these by trying to define them in a graspable way. In relation to time, there is an oft-voiced quote that goes something like: *I know what time is until you ask me to define it precisely.* Its definition dependence is illustrated by Harris in the preface to his book on *The Reality of Time* thus:

> *…[t]he central metaphysical questions about time, which seem at first sight so easy to answer (Just what is the passing moment? How do we identify the present? What constitutes the passage of time?), remain enigmatical… they are rooted in the nature of our experience… which, it goes without saying is socially constructed* (1988).

And, as Davison has pointed out in the book mentioned above, about how Australians learned to tell the time, there are many tools to do this with (1993). In common with money, once chronometers were recognised and accepted, it is they that constituted our definitions of time. They enable us to 'tell' the time. These time pieces notwithstanding, consider how you would prove, for instance, that a second measured by our most 'accurate' clock today has the same duration as a second measured last year, not to mention five billion years ago when the earth is said to have been formed?

Similarly with mass and space, each one is based in some fundamental experiences which we have striven to isolate and standardise. For all the efforts of twentieth century physics the views of these fundamental concepts held by most of us, even by students of the disciplines themselves, are still very much pre-twentieth century (see, for example, Fensham, Gunstone and White 1988).

With such considerations behind us it is not difficult to move back to the domain of day-to-day interpretations of energy use and demand, in which the social derivations are much more obvious. For instance, Illich (1974) and others have shown that the average speed of a car, when one factors in all the time spent tending to it and earning the money to pay for it, is considerably less than that of a bicycle. Equally, if the energy costs of all this infrastructure are factored in along with the energy costs of transporting the car itself and its fuel, the efficiency with which we move our selves (bodies) in driver-only cars is less than 1 per cent! (See 'The Myth of the Efficient Car' in Chapter 4: Transport, for a deconstruction of the speed and efficiency of a car.) Likewise, the energetics of nuclear power, given the enormous energy requirement of its construction, demolition, fuel, waste treatment and storage makes so little sense (Lovins and Price 1975) that its provision only becomes understandable in terms of an economy attempting to base itself on electricity at the expense of other forms of energy. (In general on energy in this context see, 'Liberating Energy' in Chapter 3: Energy.)

## *Environment*

Finally environment, and why it is more 'difficult' in this context than either economics or energy. The answer to this question provides a convenient way to introduce constructions behind our understandings of environment. With economics and energy it is by now, I hope, clear that we are dealing with constructs created by people to facilitate and explain our interactions with each other and the world. With

environment, the fallacy or difficulty lies in seeing it as if it were nature, separated from ourselves (cf. Livingston 1981). In other words we seem to be dealing with the thing that quintessentially, is not constructed. At one level, this must indeed be so: environment is the context within which we are, or more accurately perhaps, within which we are continuously becoming. In other words, it is the context from which we abstract energy and at least the 'factors of production' if not the manipulative contexts of economies.

The problem with this is that while most of us would not argue with such a statement, it is not much help, for nature cannot present itself to us as itself. It can only present itself to us through the physiological and intellectual frameworks that literally constitute our realities for us. And, as we have seen, the physiological or sensory perceptions themselves have to be translated or transformed before we can cogitate upon them. Moreover, these processes are themselves conditioned by both the physiological 'nature' of the senses and the intellectual forms available to our mental processes and their interfaces with our sensory-motor domains. So, the constructs available to us will be those through which we deal with our natural environment in just the same way as we deal with our artefactual environment.

An excellent local example of the influence of these constructs may be found in any Australian art gallery. Among the realists (as different to abstractivists), early nineteenth century paintings represent Australian nature quite differently to the way contemporary realists see it. Agricultural practices over these years of white settlement also reflect very different 'views' of the Australian environment.

It should be said in passing that there are various traditions which aspire to 'see' the world more directly. At one level there are the great transcendental or spiritual traditions which aspire to transcend cognitive thought altogether (cf. Wilber 1983) but at a more prosaic level there are the philosophers who strive to climb out of our cultural contrivances and experience nature more directly. Among them are a group of Europeans called 'phenomenologists' (e.g. Husserl, Heidegger and Merleau-Ponty) and certain American environmental thinkers who strive to do much the same today under various guises (e.g. Van Matre's 'acclimatisation', 1983 and Stone's 'earth ethics', 1974 and 1988).

To conclude this section I will work through a couple of primary intellectual constructs which are thought to characterise our view of nature:

1. Nature as separate from humans/ourselves (cf. the work of Paul Shepard, 1982 or our own Paul Collins ex-radio station ABC-RN, 1995).
2. Nature as a resource with privileged availability to humans.

The first is fundamental to the Western way of seeing the world. Were we not able to separate ourselves intellectually from nature, or even from each other, we could not (as outlined above) have science. Science depends on being able to separate the world from the observer. It does not, however, require this as a

permanent condition; indeed, one can characterise the *environmental problem* as permanently extending the intellectual separation of self and perceived world to *reality*. The extent to which we see ourselves acting *on* the world rather than *in* it, or especially *as* it, is the extent to which we arrogate to ourselves a supposed capacity to take or leave it. That is, when we've extracted our needs from it we can turn around and leave it.

Today the care for the earth that Western industrialised nations have managed to develop stems only from the rights to that earth which these peoples believe to have established for themselves. BHP Billiton, for instance, is restricted from exploiting Ok Tedi for minerals to the detriment of the surrounding ecosystems only because local Papua New Guineans can legitimately (in a court) be shown to derive their livelihood from those ecosystems as they stood prior to the mining. Such rights are established through political history to the extent that other international agreements give them legitimacy. The establishment of intrinsic rights of local peoples have only now begun to be established (cf. 'Mabo' in Australia) while the notion of animal rights (Singer 1975) not to mention the rights of trees (Stone 1974) are still only the subject of indulgent smiles.

The Ok Tedi example illustrates care derived from the acceptance of 'earth as resource' in its most blatant form. Agriculture, however, as practised virtually anywhere today can similarly be seen as little more than 'soil mining' and, to extend the metaphor, the economic infrastructures we take for granted do not yet encourage us to see economic any other way. The earth, capital, labour and the expertise that adds value to it, are all simply 'factors of production', more or less scarce, more or less tradeable etc.

Were we, on the other hand, to think of the world as an extension of *ourselves* – much as we see our children (or our mothers) – we may still use the present economic metaphors, but only as shorthand. We would know that they were not *reality,* only useful organising principles which required the utmost care in applying. Current expressions, such as 'economic rationality' or 'economic realism' would be understood as useful intellectual constructs to be applied in practice with care and consultation along with strenuous attempts to make their applications reversible.

What we have been seeking here is an understanding that goes further than simply recognising the 'complexity and interconnectedness of nature'. It is an understanding that internalises into our actions that we, the understanders, *are* nature and that the apparent independence we have from nature is an artefact or function or the intellectual constructs we use to make nature intelligible. Many of us, then, believe that we are seamlessly embedded in nature and that, while the understandings we are developing are powerful and worthy of both respect and defence, they are partial and therefore must be used with circumspection.

## *Education for a sensitively engineered environment*

What can educators do with all this to facilitate the generalised responsibility taking it implies; how can we build it into our educational structures?

All Australian medical faculties now have departments with names like Social and Preventive Medicine (see 'EcoLiteracy' in Chapter 1: Response Ability). The name suggests training to recognise the social context of disease and how to work within that context to prevent disease. There is, however, another, unusual and self-critical interpretation and it is recognition of the social consequences of medical intervention itself. The work here involves seeking definitions of adequacy in medical process and then assessment of the process from within the definitions to prevent harm (cf. the admonition: 'at least do no harm') and cost to the community paying for the processes. In other words these departments are asking about the circumstances under which medical intervention occurs and whether intervening itself is appropriate.

In a more ambitious way Melbourne's RMIT University has its 'Context Curriculum'. This programme, undertaken throughout all graduate disciplines, involves students in choosing from a large range of discrete studies offering a range of contextual insights.

For all the noble aims, however, no institution has yet bitten the bullet of:

- prescribing generalising *core* studies along the lines suggested here, nor,
- finding a way to make the new generalising ideas stick so that graduates will use them in their daily life and work.

My experience with both Social and Preventive Medicine at Monash University and Context Curriculum at RMIT University indicate that they are at best an interesting interlude which may later give pause for thought, but at worst are a prescribed evil actively undermined by staff as well as students. University staff are 'protected' from dealing with the political contexts of their work by academic freedom which is interpreted as encouraging the 'disinterested pursuit of truth' according to individual academics' interpretations (conditioned only by teaching contracts and research funding opportunities). These difficulties notwithstanding, there are subdisciplines in all major disciplines that are using the approaches illustrated in this paper – however, only in their 'own areas of expertise'. In medicine, business and social work for instance, there are various 'holistic' or systemic approaches. The theory and practice involved in these innovations is not extended to the domain where the discipline overlaps with the wider schemes of human activity. For example,

- A Feldenkrais (systemic body-awareness) therapist will not recognise, much less apply, the techniques upon which her therapy is based to her own life or to the life of her client in general.
- While my older son and I cycled from an inner-city suburb to the city to visit an academic speech therapist to deal with his perpetually hoarse voice, we were

unable to talk to each other for traffic noise. In sheer frustration I asked her what work she did to silence city noise. Of course she didn't do any, but worse, she could not see the connection to my son's hoarse voice let alone to her work.

- I suggested to the Royal Melbourne Hospital that it encourage its staff to be responsible for the health of patients when the staff were outside the hospital as well as inside. I was implying that staff might use public transport and bicycles to commute to work; i.e. that the staff wear their health-dispensing white coats outside the hospital as well as inside. Needless to say there was no reply. (See Chapter 5: Chronic Illness, for further discussion of out-patient care.)

The intellectual tools to enable the activities I am proposing are not yet in place – it is our task to erect them.

In precisely the same way the early environmental science degrees (all postgraduate) were just a range of disciplines aimed at complementing the disciplinary insights graduates brought with them. Instigators simply hoped that each graduate would integrate the diversity of insights and thereby make more sensitive choices. This did happen but the environment steadily deteriorated. By the 1980s it was understood by many environmental educators that:

- There was a consistent pattern in all environmental degradation not directly connected to the diagnostic techniques used to establish the degradation; something general was going on behind and perhaps common to all environmental deterioration.
- There were such things as epistemological constructs behind all learnings.
- In order to do something general about environmental deterioration these constructs and the institutions built on them would have to change.
- These matters, while quite political, are no more political than current developments proceeding under the status quo. That is, the approach described here is already present in human social organisation and to bring it out is a matter of re-emphasis and, later, of consistently slow and sensitive social structural change.

At one level this last point means finding ways to make energy conservation techniques just as much a paying proposition as the sale of energy, cf. the acceptance of machine and infrastructure maintenance by so-called developed economies. At another, more profound level, it means finding means to shift the definition of growth to non-material 'things' and seeing that eventually the reification ('thingification') of our world can be transcended. This must be a gradual process whereby the organisation of wealth by means of identification and creation of material needs and the manipulation of their scarcity shifts to the development of the immaterial self, so-called 'personal growth', in a society that encourages this type of growth as an essential part of the maintenance of its own stability.

Environmental Science at Monash University has spent fifteen years (as at 1996; nearly a quarter of a century as at 2005) working to sort out how these ideas might

be introduced to students (see 'Insights from a Twenty Year Experiment' in this chapter). It involves developing a working understanding of the issues developed above then practising them in a variety of real circumstances, including those of a consultant-type research project performed for a community organisation.

In the case of any other professional degrees, such as 'energy' (engineering) and 'economics', some of the detailed technical studies would be replaced by contextual studies. In addition to the grounds for the substitution made in this paper, the substitution can be justified by recognising that an understanding of context facilitates an understanding of detail. This may be compared with the liberation inherent in being able to derive a mathematical expression as against memorising it and its contexts of application.

All of us will have had the experience of teachings that stuck when we learned them and despite developing a certain facility we simply did not feel comfortable with them until, years later, when various contexts had been attained, the detail learned all those years ago suddenly fell into place (the'ahah!' experience). For me two engineering examples of this were entropy and $j(\sqrt{-1})$ as used in electrical engineering - my first discipline. I made my peace with both of them about ten years ago – twenty years after first being confronted with them! More complex examples have been the place of disease, Crohn's Disease for me, and death in life. All of these have long since ceased to be 'problems' for me through the understandings I now have about the nature of cognition itself (cf. 'Technology and the Loss of Self' in Chapter 1: Response Ability).

I am suggesting here that through development of the understandings we now have about understanding itself, especially when taught through the discipline we are concerned with, the discipline itself:

- makes much more sense;
- is much more amenable to being taken responsibility for, i.e. being cared for, sold to others etc.; and therefore,
- will fit into the wider contexts of the human project, and life in general, more smoothly; i.e. with fewer attendant dislocations.

Were we to understand the politics of economic ideas, as outlined above and in Etzioni-Halevy (1985) and Crump (1981), we would have a very different approach to the use and elaboration of economic models. Equally, had Engineering Maths IV been taught within a context of the history, philosophy and sociology of mathematics, many of the fundamental concepts that blocked the likes of me (despite fifteen years of prior mathematics education), would have been quite straightforward and not at all paradoxical (see, for example, Davis and Hersh 1986). Indeed, in regard to paradoxes, there are no absolutes, only apparent ones which depend for their existence upon the constructs we have available to us as we look at them.

The (apparent) paradox: *If you see the Buddha in the street, kill him!*, arises from the 'incorrect' idea that the Buddha is an entity – 'which' can be seen.

Studies such as these would proceed throughout the entire degree and, in being programme specific, i.e. tied into the technical and practical studies of the degree, will become considerations when research itself is done in the later years of candidature. Through these means it will be expected that students become aware of the politics of their science and its profession, and secondly of the 'grass roots' politics of construction proposals that arise from their research (whether bridges, integrated circuits or economic models). With such repeated immersion in the 'realities' of innovation, proposals will be practical in the widest possible sense. A household refrigeration task, for instance, will legitimately include an investigation of the socio-economic contexts that require refrigeration and these will be explicitly examined prior to and then alongside any technical proposals that are made. This, incidentally, was my (invited) contribution to the final day of presentations at the completion of the nationwide Green Fridge Quest, which otherwise dealt only with technical proposals – albeit imaginative ones ('Crossing the Frozen Wastes of Refrigeration' in Chapter 3: Energy).

At the end of the day, however, we cannot expect students to be sensitive to all ramifications of their proposals because, as we will recall from what has gone before, this is intrinsically impossible. The ramifications are (task) definition dependent. Nevertheless, they will be sensitive to the possibility that ramifications will exist and that they themselves, through their own priorities and ways of knowing, are choosing and constructing them and more, that they will therefore need to consult and listen widely. For the first time, however, they will have the intellectual tools to do (or at least to commission) both the consultation *and* the listening.

In parallel with the aspirations of such an innovation is the involvement of staff – its absence has hitherto blighted context initiatives in all professional programmes. Therefore, long before it was introduced to students, staff would have to be involved and their critiques built in – a quite straightforward matter, entirely synchronous with the intentions and structure of the programme itself. Likewise, the course would also be presented with existing critiques built in, and while critique of these, in turn, may be too much to include, the need and possibility of critique will not just be allowed for, but it will be inevitable, for it is the nature of the approach!

We are aspiring, therefore, to do with the professions what Standards Australia strives to do when it sets up a committee to create and monitor a standard. It searches for all those sectors of the public who will be affected by a proposed standard and tries to stimulate public involvement in its choices. Currently the professions believe in peer assessment, which at best generates discussion about what a peer is but tends toward closure of critique and the separation of people into antagonistic provider (the peers) and client groupings. An example, again from medicine, of what I'm working for here was the brave 1980s innovation called the District Health Councils (in Victoria) which sought to involve a wide public in the review of medical service

provision. It undertook to educate its members in a self-referential manner: sensitive to the notion that someone had to choose where to start (what education to actually provide) as well as how to alter this, once participants gained the capacity to criticise.

Education of this kind involves the learner critically in the process of creating the learning environment. In turn, we will have generated confidence in public involvement, scrutiny of professional work and the end of the loneliness of the long-distance whistleblower.

With education such as this we may at last attain engineering school aims such as,

> … *to make the world a more progressive place ...with the highest regard for environment* (James Cook University) and,
>
> … *quality education for men and women who aspire to being tomorrow's leaders… properly prepared to meet the challenges ahead…* (Adelaide University) (The Australian, 2 Sept. 1995, p. 46).

Indeed, we may attain the ultimate criterion of facilitating leadership in *others*.

Pie in the sky? Along with other universities and in the face of 'academic freedom', Monash University's Environmental Advisory Committee has a (as yet unrealised) brief to establish 'environmental literacy' as part of all teaching programmes. Compare this with the Talloires Declaration, 'University Presidents for a Sustainable Future' (Tufts University 1990) which committed a variety of universities to do just that. The declaration sets out a wide range of socio-environmenal actions but gives no indication of what mechanism it will use to bring these about.

This paper has attempted to illustrate such a mechanism and to show that it would be neither subversive nor seditious, for it is both a deep form of civil defence and for that matter a deep form of academic freedom. ■

Endnotes

1 Consider how arithmetic could differ in different cultures. While radices may differ (cf. the imperial and metric systems) number itself and the way numbers are manipulated will not, by virtue of the system inherent in the definition of number itself. Indeed, the possibility of different radices is also precisely a function of these same definitions!

# *Insights from a twenty year experiment*

Adapted from 'Environmental Responsibility through Social Construct Analysis. Insights from a Twenty Year Experiment', published in *Australian Journal of Environmental Education,* vol.17, 2001, pp.105-109.

Maurice Strong's UN environment conference Stockholm, 1972, provided international legitimacy for environmental concerns. From that springboard a number of Australian universities established the nation's first environmental studies' programmes: all Masters degrees. Ten years later Monash University made its programme's first and only substantial transformation, a formal obligatory ('core') introduction to transdisciplinary thinking.

In 1979, seven years after its commencement, an Ad Hoc Committee to Review the Master of Environmental Science Programme at Monash University proposed to

*… integrate the diversity of subjects that comprise the core…*;

and to minimise the

*… dangers of superficiality… and narrow specialisation…*

No further guidance was given as to what this meant nor how it was to be done. Nevertheless, from this seed began the intellectual transformation of the programme. No additional funding was provided. The project was simply supported by the goodwill of staff from various faculties.

The transformation was expected to generate a reflexive context or complement to the current dualistic or *silo-based* approach to making sense of reality. It was reasoned that such a comprehensive intellectual basis would provide in turn for metaresponsible action. This meant action that would be *optimally* circumspect. Optimal to the extent that the consequences of circumspection would themselves be recognised and would not disempower the possibility of action (see, for example, the previous article, 'The Fourth E: Educating for Energy, Environment and Economics').

In the understanding that intellectual frameworks underpin our *environ-mental problematique* (as termed by The Club of Rome) the course set out to:

a) provide a compact analysis of the intellectual frameworks behind Western thinking and especially of science, and then
b) introduce the notion and everyday practice of social construction with special emphasis on General System Theory (type 2, see, for example, Rittel 1982).

In addition to the new capacity to make a wider sense of the world, the effort was intended to assist graduate students to make a more comprehensive sense of the diverse disciplinary insights they were to acquire in their parallel (and prior!) disciplinary studies, and to pull them together in a way otherwise inaccessible to them. We were developing a 'new sense' for them which required, among other things, that they recognised how they were part of the new sense they were acquiring or, more precisely, how they were *making* it!

The proponents of the new direction were two unusual Monash academics, a geographer/anthropologist, Professor Bill Clarke and the radical economist Frank Little. In the first agonised years of the course, these two provided the substantive core of a course that generated as much confusion as insight. Inevitably a few students did make sense of the material the four of us were grappling to render coherent, and they proposed numerous improvements. The fourth staff member was a mechanical engineer, Bruce Kuhnell, involved in machine condition monitoring with a parallel interest in world systems modelling of the kind made famous by the Club of Rome (Meadows *et al* 1972).

By far the most important improvement came with the arrival of radical physicist, philosopher and green political activist Alan Roberts. For this the course owed a debt to one of its early students, another radical Monash physicist and *green* political activist, Don Hutton. Roberts was probably the only staff member in the university at the time with a major published work in the area, viz. *The Self-Managing Environment* (1979). His strong grasp of the area, along with a coherent, worldly and yet charismatic teaching style quickly transformed the two-part course into something most students could at least cope with and, at times, even enjoy. By the end of the 1980s Roberts retired and the course went onto a three-part core status with one lecturer throughout.

To the proponents of the new course, two notions were primary. First, in order to 'see' a discipline, a measure or a problem, we had to find a way to stand outside them. To do this we had to find structures that would enable us to take that step outside; to make sense of 'outside' or to create *context* for the discipline, measure or problem. Secondly, we had to find a coherent body of knowledge to legitimate us taking our steps outside. Part of that latter task involved realising that there was a constituency in the community for teaching context – or *meta*studies – which hitherto had been largely unrecognised and so was, in principle, unteachable! We were, in other words, moving into the unoccupied domains of the pedagogy of such things as, parenthood and democratic practice; things just assumed rather than formally taught. We were doing what Melbourne's RMIT University set out to do with its brave and much more ambitious, but ill-starred, Context Curriculum, introduced into all that university's undergraduate curricula. Although it comprised a broad range of context subjects, no core subject taught the 'context of context'.

Thus, no attempt was ever made to make sense of the multitude of multidisciplinary studies offered to students. It simply required students, and staff, to accept them and at best, to criticise their contents. In part this is why many staff passively and even actively, undermined the programme. They did not have the means to make sense of it in their own professional contexts.

Our erstwhile intellectual antecedents lay in philosophy, anthropology, linguistics, political science etc. and the professions that actively practised aspects of these insights, such as education and the likes of social work, psychotherapies and the twentieth century metadomains of marketing, public relations and management.

In the early years appropriate literature was hard to find. While history, philosophy and sociology of science was amassing a good literature, much of it was inaccessible to the Monash students; it was too advanced. It was also not general enough, nor practical enough. Similarly, the General Systems literature was, in the main, too theoretical and not dedicated to people who would be struggling in *the real world* to make that world more sustainable. We had to satisfy ourselves with a grab-bag of literature from various disciplines. From biology there was Conrad Waddington (1977) and James Greer Miller (1978), from anthropology Gregory Bateson (1973 and 1979) and from philosophy the likes of the great Alfred North Whitehead (1985, original: 1926) and C.S. Lewis (1999, original: 1944). For the student with time and persistence, these works offered a lot but they were heavy going. By the late 1980s this situation had begun to improve and by the end of the course in 2004 or 2005 there was a range of accessible and appropriate texts. The prescribed texts for Part 1 are listed in the adjacent box.

Environmental science as con-strued here then, required students to accept that:

1. humans work inside social constructs;
2. the social constructs we work inside can be known; and
3. we can act within and with our formative social constructs to transform the expectations we bring to our interactions with the natural world.

***Prescribed texts for 'Systems' Part 1 (STP1)***

ON SYSTEMS AND SOCIAL CONSTRUCTION:

To the late 1980s: Open Systems Group, 1981, *Systems Behaviour;*

To the late 1990s: Maturana & Varel 1987, *The Tree of Knowledge: The Biological Roots of Human Understanding.*

From 1998: Capra 1997, *The Web of Life: A New Synthesis of Mind and Matter.*

ON SCIENCE:

Collins and Pinch 1998, *The Golem: What You Should Know about Science.*

ALSO:

Senge 1992, *The Fifth Discipline.*

Searle 1999, *Mind, Language and Society. Doing Philosophy in the Real World.*

Levins and Lewontin 1985, *The Dialectical Biologist.*

Moreover, we can turn around and be critically aware that the constructs we have used are themselves constructed and fraught with the limitations of interpretation. In other words that:

> *responsible action of the kind we are aspiring to here involves being responsible for the way we are responsible.*

The intellectual exercise associated with points 1 and 2 were well within the capacity of graduate students. However, point 3 was much more difficult. Without explicit experience in applying the ideas, students reached their research project in their second year of their course and had few intellectual resources remaining to apply the ideas to critical selection and assessment of research method, let alone to wider assessments of the social constructions associated with their research projects. In other words, by the time they arrived at their research projects they had forgotten the generalised implications of their early training in social construct analysis and did not apply it.

Research projects in the Masters programme were commissioned by organisations outside the university and all were interdisciplinary team (three to five students) based. The coursework Masters involved work submitted in consultant-type team reports – no formal theses. The research Masters submitted both the consultant-type reports and research 'folios' submitted by each individual student. The research folios were the equivalent of minor theses.

*Prescribed texts for 'Systems' Part 3 (STP3)*

PART 1: REVISITING SYSTEMS OR SOCIAL CONSTRUCTION:

Thompson, Warburton, and Hatley 1986, *Uncertainty on a Himalayan Scale*.

This work is a comprehensive reflection upon the extensive analyses of a typical, if large and complex or 'wicked' environmental issue.

PART 2: TRANSCENDENCE:

Wilber 2000, *A Theory of Everything: An integral vision for business, politics, science and spirituality*.

OR BOOKS SUCH AS:

Macy 1991, *Mutual Causality in Buddhism and General Systems Theory: The Dharma of Natural Systems*.

For the first decade there were only two parts to the core Systems Thinking and Practice programme. These were the introductory, theoretical part and its reprise in the team research project which ran as a part-time component throughout the Masters degrees (it became known as STP3). Therefore, as much practical experience as possible was built into Part 1.

Practice began by requiring students to select and report on one of a range of simple but confronting practical exercises, such as commuting for a week without a car, not bathing for a week, picking up rubbish in a public place etc. While the early assessment tasks were theoretical the latter and larger

tasks required students to assess social constructs underpinning a range of mundane issues, including university assessment itself and professional accreditation.

The reprise in the research project (Part 3) involved revisiting the ideas in Part 1 by requiring students to build into their research reports an analysis of social constructions associated with some aspect of their research project. The sections devoted to elaboration of social constructs were chosen to suit the needs of the organisations which sponsored the research projects. In one case this involved analysis of research method while in another it may involve a systems/social construct analysis of a particular component of the study of direct relevance to the client. It concluded with a brief study of the place of personal and social transcendence or spirituality in the search for sustainability. This last section, and with it the degree as a whole, concluded with a low-key seminar in which students elaborated their own *search for meaning* in the wider contexts of the inadequacies of current social constructs to sustainability (in connection with *adequacy*, see, for example, Schumacher, 1976).

***Prescribed texts for 'Systems' Part 2 (STP2)***

Labonte 1997, *Power, Participation and Partnerships for Health Promotion*.

McKenzie-Mohr. D. & Smith, W. 1999, *Fostering Sustainable Behavior: An Introduction to Community-based Social Marketing*.

Finally, to overcome the problem of lacking practice, Systems 2 was introduced. It was a semester long social-change task. Two conven-tional seminars presented aspects of marketing and communications relevant to micro-social change. Otherwise the formal sessions were small seminars in which students pooled their resources along with the experience of the lecturer to facilitate each student's progress. The projects varied in scope and involved small numbers of each student's co-workers or co-householders. In perhaps half the class the projects initiated action that persisted well beyond the life of the class and in many cases indefinitely. Most tasks were 'environmental' in the most direct sense, transforming the way groups of people interacted with their biophysical environments viz. recycling, energy and water conservation in homes and workplaces, street- and community-scape changes, school and business behaviours and initiatives.

Where students were keen to extend the work commenced in this subject, an open opportunity existed in a subject called the Environmental Internship. It enabled pursuit of an initiative in the public domain under supervision of a member of the Graduate School's staff.

Part 2 became the most exciting and rewarding part of the three part series for both students and the lecturer. It offered students a real opportunity to 'change the world' and in doing so resulted in numerous small but exciting innovations. In 2001

one of these was the transformation of the way McDonald's Australia handles its waste. This initiative commenced in a suburban Melbourne franchise as the initiative of a young middle-manager undertaking STP 2.

Each year students were offered an extensive list of public affairs current to the time of writing. They chose from a list that included guided topics of their own choice and they were asked to tease out systems/social constructs they saw associated with their chosen topic.

Typical examples taken from the 2001 list of final essay topics were:

***Re: Science and measurement***

Assume that you are a scientist involved in communicating your science in such a way that your audience will gain a critical understanding of it, critical understanding meaning an awareness to its social (inter- and trans-disciplinary) determinants as well as its disciplinary determinants.

Then:

a) either generally or by using a discipline familiar to you, describe what science and a 'critical understanding' of it means to you, and
b) suggest, via this understanding, how you would work to allay the fears of fellow scientists (generally or in your chosen field) that such critical science might undermine the basis of their work and of their science.

**N.B.**

i. You cannot gain more than a Distinction if you do not attempt b)!
ii. The 'science wars' debate – relevant to this issue and kicked along by the (in)famous physicist Alan Sokal in the mid-1990s – has occupied hectares of print, some of which is available from Frank Fisher.

***Re: General (current affairs) topics***

On the following pages are a number of newsaper articles/ads reflecting current issues and the debates they are generating. Take one or other of these issues and discuss:

- social constructions that enable these issues to arise as issues in the public domain;
- social constructions that you believe are of concern, along with;
- social constructions that give rise to (your) concern in this context; and
- propose ways to dissolve the constructions of concern and/or the feelings of concern themselves. Note the difference between these two and how the 'feelings of concern' are 'used' to manipulate us.

Some interesting references on 'spin doctoring':

- Ewen 1996, *PR!*;
- Stauber and Rampton 2001, *Trust Us We're Experts*;
- Klein 2000, *No Logo*;
- Beder 1997, *Global Spin,*

- Jane Cadzow's, 'The hidden persuaders' in THE AGE's *Good Weekend*, May 26 2001; and
- in general, the Canadian periodical *Adbusters*.

**N.B.**

You are not being asked for an exhaustive list of constructions, just a development of your selections along with some justification of them. Brief guiding notes are provided with each topic.

A couple of the general topics were contemporary parliamentary inquiries. Students wrote and submitted their views to, for example, the Senate inquiry into Australia's Urban Water Management.

It should be noted that both systems and social constructivist ideas have been subjected to extensive criticism and reinterpretation. Moreover, the very popularity of social construction in *postmodern* circles has produced a backlash which risks cutting our noses off to spite our faces. Nevertheless, the criticisms are worth reading precisely because *constructs of any kind are constructed* and particular interpretations do become uncritically accepted vogues. Therefore, all the critical assistance we are able to hear before acting on a given interpretation enhances the flexibility with which we make our new constructions and therefore enhances the ways we construct our world. ■

chapter three

# ENERGY

The first paper in this chapter, 'Liberating Energy', follows on from the introduction to the subject in the last chapter, unpicking energy as an historical concept and offering social rather than technical ways to reduce energy use.

The second article, 'Conservation and Renewable Energy' strongly argues for energy conservation ahead of renewables. When published in 2004, it prompted a response from Dr Mark Diesendorf, a leading advocate for and expert on renewable energy in Australia. His response together with Frank Fisher's reply are also included. Note the small way in which Mark Diesendorf misquotes, no doubt accidentally, Frank Fisher's name, a common mistake which might lead to the impression that this is an academic debate rather than an argument of general concern. Note also how titles, education and experience all confer legitimacy. (Hint: Associate Professor Frank Fisher has never attempted to obtain a PhD.)

The last three articles explore some practical examples and their social as well as technical consequences. 'Grid-locked?' considers a specific energy structure (the potential of a global electricity network). 'Can Solar Energy Limit Environmental Impact?' and 'Crossing the Frozen Wastes of Refrigeration' tackle specific energy technologies – solar heating and refrigeration.

# *Liberating energy*

Adapted from 'Liberating Energy: On the Social Construction of Energy', a paper presented to the Students Science and Sustainability Conference, University of Melbourne, July 1993, and published in *Energy News Journal* (Australian Institute of Energy), vol. 12, no 5-6, pp.10-14.

## *Introduction*

Some years ago a teacher of maths teachers showed me a series of books he and his colleagues had put together. The books were about the 'fundamental dimensions' of length, mass, time, etc. They were written for secondary school teachers. I asked my friend whether he had considered discussing what these concepts meant, where the idea of these dimensions had come from… how, in two words, they were *socially constructed*.

As you can imagine, my friend didn't know what I was talking about. Everyone knows what length, mass and time are and how could one think that society had a role in constructing these fundamental dimensions? Weren't they after all, fundamental?!

In this paper I shall attempt to provide some insight into how energy is socially constructed and also explain why one might bother doing this. But first, a brief conventional overview of what energy means and why knowing what it means matters.

## *Energy conventionally defined*

Energy is a measure of work done. To give a foretaste of what is to come later: it is a measure of work done where *we define* what work is and *how it is measured*. For example, it is what must be expended to lift a 5 kg axe two metres, run a mile in four minutes, heat or cool a 200 $m^3$ room by 10°C, pump 100 L of water up ten M, word process this essay in ten hours on an old '286' laptop, brake a one tonne car from 60 to 50 km/h, microwave a 250 ml cup of coffee from 10 to 80°C and… allow a 60 kg woman to sleep (minimal metabolism) eight hours.

The universal scientific term used to express effort is the *joule*. The usual definition of the joule is the work done when a force that gives a mass of one kilogram an acceleration of one metre per second sqared acts through one metre. A related equivalence is the work required to heat about a quarter of a gram of water 1°centigrade or to power a ten watt compact fluorescent light for one tenth of a

second! So, it is not much energy. And by the way, power, often confused with energy, is reserved for the time rate at which something can do work. The unit for it is the watt. A machine having a power of one watt *generates* a watt second of energy per second and this is a joule. Similarly, a load on a power or, more properly, an energy system, of one watt draws a joule of energy from it in each second. While these units may seem small, the following paragraphs will show that the effort they represent *expressed in human terms* is not at all negligible!

So, a human may be thought to have a limited capacity to do work at the rate of 350 watt (equivalent to half a *horsepower* in the 'old' Imperial system) and if s/he works steadily for one hour, the energy expended is 60 x 60 (seconds) x 350 = 1,260,000 watt second or joule. More compactly we might say 1260 kilowatt second (kWs) or kilojoule (kJ) or, dividing by 60 x 60 (seconds in one hour), 0.35 kWh. This is enough to drive a single-bar radiator for only twenty minutes! Which point of course, gives us the beginnings of why energy matters: industrial society uses an awful lot and its consequences are equally awesome.

Another thing we need to know is that the energy we use takes energy to produce and transport to the place we want to use it. For instance, petrol has to be mined, refined and transported to the service station where we buy it, and all the infrastructure required to do this takes energy to build, install, run and maintain. As we shall see, even providing morning tea for the service station attendants takes quite a lot of energy. So before we poke those 50 L of petrol into our car we've had to use perhaps 10 L to get the fifty to us. Where electricity is derived from coal the ratio is far worse; for each joule of electricity we use in the city more than two have to be used at the power station and, on top of that, the device we drive with electricity does not convert all of the electrical energy to whatever we want it to do (cook, heat, light, drive a motor, TV set, etc.). And so we can talk about 'primary' and 'secondary' energies, for example, we need three joule of primary energy from coal to produce a single joule of the secondary electricity we draw from the power point.

To put this into an everyday perspective I shall give the primary and secondary energetics of some of our routines in Mega (millions of) joule… very roughly, of course.

| Task: This morning, I: | Secondary Energy MJ | Primary Energy MJ |
|---|---|---|
| • toasted two slices of bread | 0.15 | 0.75 |
| • made two cups of tea | 0.3 | 1.5 |
| • boiled one egg | 0.3 | 1.5 |
| I use a bicycle for transport but other people will have | | |
| • driven a 100 kW (130 hp) car for half an hour. | 2.0 | 20.0 |

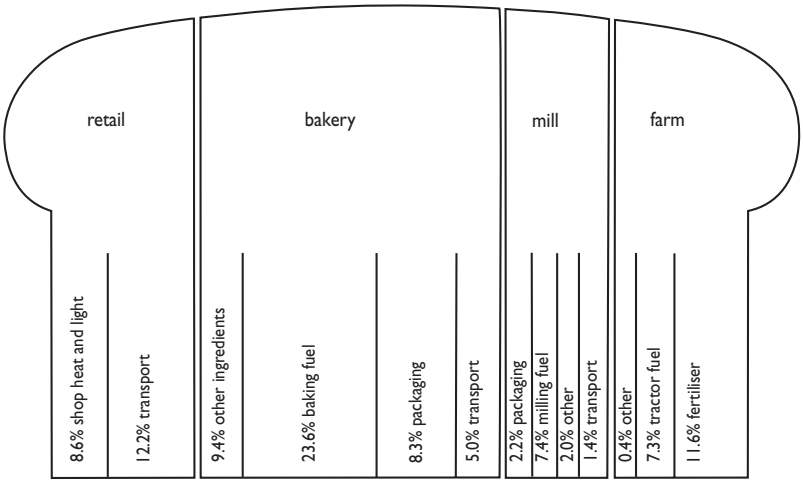
In general then, our uses of energy at home are: transport, water and space heating, cooking, washing, driving various motorised devices (vacuum cleaner, extractor fan etc.), lighting, communications and entertainment. Then there are the huge energy imports hidden in all the products we bring home, such as in bread (see Figure 1 below) and less obviously, in clothing and fruit. Consider the energy a cotton or apple farmer puts into their products, such as the energy content of pesticides and their application to the crops, let alone the energy in the more obvious tasks, such as cultivation and transport.

Beyond these uses are those that support all the industrial and social infrastructures we take for granted, from ambulances and dentists' autoclaves (sterilisers) through pie warmers in the school canteen to loud speakers for the band, air conditioners for the patrons, and refrigerators for the beer at the pub next door.

All in all, the average adult Victorian's energy demand comes to some 10 MWh/year (and our power demand is roughly 2 kW/person), a nice round figure to bear in the back of our minds (see Figure 2).

So far the energies we have been talking about have been almost exclusively fossil fuels: coal for electricity and oil for transport fuel. All of these are legacies. We might say, therefore, that we are living like a retired species, off the savings of the past. By comparison let's look at what nature gives us continuously and renewably and then look at what we are capable of from our own metabolism – which, in principle at least, can live happily from the solar energy bound into plants and animals.

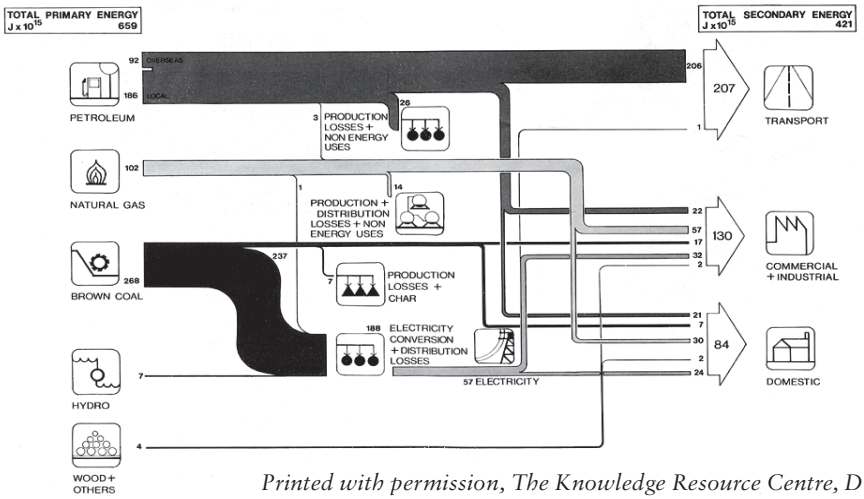
*Figure. 1: The detailed breakdown of the fuel cost of a standard white loaf of bread*




*The total fuel cost is 20 MJ/loaf, equivalent to the heat value of a kilogram of black coal or half a litre kerosene.*

*[Source: Seeds for Change, D. White et al., 1978, p. 124 ]*

*Figure 2: Victorian Energy Market, June 1991 (projected) (in Petajoule: $10^{15}$ Joule)*




*Printed with permission, The Knowledge Resource Centre, D P I*

*Note: These estimates relate to the low forecast presented in Part 1. The estimates must be regarded as approximate and for broad purposes of illustration only.*
*Based approximately on present known reserves.*
*Commencement of installation of capacity possible at this time although contribution to supplies is likely to be negligible.*

*Source: Ministry of Fuel and Power, Victoria, 1977, Figure 6.*

The solar energy that falls on a square metre of Melbourne on an average day is 15 MJ. So the average suburban block, 1000 $m^2$, receives 15,000 MJ per day.

Now, ignoring the energy *cost* of solar cells, their transport and installation, if we were to roof all this area with solar cells we might generate, at best, some 1,500 MJ of (photo-)electric energy per day (i.e. 10% of what falls on the cells). If two adults and two children lived on the block, their electrical energy demands may just be met. However, their total daily (non-metabolic or non-food) energy demands, at 2 x 1,000 MJ + 2 x 500 MJ (for the kids) = 3,000 MJ, would be double what nature gives them locally (so to speak). They would also live in darkness and need space for a lot of batteries to store the energy for rainy days and for night use!

Earlier, I suggested that we could work at the rate of 350 W or half a horsepower. It is actually unlikely that most of us could keep this up for a ten hour day; 100 W is more likely and even that, I am told, is good going. This is what it takes to power a strong incandescent light and is considerably less than it takes to run a TV set. You can get a feel for the effort involved by noticing the extra effort it takes to push your

bicycle's dynamo into supplying just five or so watt of electricity for the head and tail lights.

So, doing similar simple calculations to those above, if the family works a ten hour day generating electricity, it might manage 20 MJ. This is enough to bake one single commercial loaf of bread (see Figure 1) and is one one hundred and fiftieth of their current overall needs.

This brief and very approximate overview gives us some local perspectives on the consequences of our current way of life. The environmental consequences of these demands are enormously varied and most of us know something about them from the newspapers. However, it hardly needs saying that what the papers decide to give us (not to mention what the journalists *understand to investigate*) understates the gravity as well as the extent of the consequences. There is no room in this paper to deal with these conventional environmental issues. However, to impress on readers just how comprehensive the issues are, I leave you with two unusual perspectives and one usual one.

1. In connection with our current motoring habits and to give those more concerned about the resources used in plastic packaging a comparative perspective: a plastic, supermarket carry bag is equivalent in energy terms to driving the average Australian car some *30 m (i.e. down the drive!)*. This calculation compares only the energy equivalent of the oil used in the bag with the fuel used to propel the car – no infrastructure (to construct, transport, etc.) is included in either case.
2. If we were to take mechanical actions to completely inhibit the current environmental degradation associated with our energy demands, let alone to make good the damage done in the past, that would use a very appreciable proportion (if not all) of all the energy we generate for ourselves. Try to imagine what it would take to extract the excess carbon dioxide from the atmosphere or even, as has been proposed, to reinject ozone into the ozone layer!?
3. And nuclear power? Twenty years ago Lovins and Price (1975) pointed out that it would take a large nuclear grid with many power stations running for many years to produce nett energy; i.e. over and above what it took to build and run all those power stations and their fuel processing plants. Had they had today's understanding they probably could have shown that if we include safe decommissioning of these plants as well, a nuclear programme may never produce any nett energy at all.

But, as we shall see, this is not the whole story – for perhaps it doesn't matter that our energy generation system doesn't generate any nett energy for there may be other priorities behind building generating capacity than straightforward provision of energy.

## *Social construction and why bother with it?*

Searching for the social construction of anything puts us in touch with its intellectual and institutional (legal and regulatory, political and bureaucratic) frameworks which once established to our satisfaction, enable us to change them instead of being constrained to fiddling with their superficial manifestations (i.e. with technical fixes). So how do we look behind energy?

We shall briefly examine two dimensions of the social constructions of energy; the fundamental and, more importantly from the point of view of this paper, the practical, everyday bases of the energies we believe we need.

If we take one of the newest concepts humans are presently coming to grips with, information, it is easy to see that what anyone of us interprets as information depends on the criteria that person brings to the assessment. For instance, the clever line: 'time flies like an arrow but fruit flies like bananas' can mean many things to different readers, ranging from a sequential set of letters one can digitise and transmit over wires to the utterance of a smart alec. So, the information inherent in a communication depends on the reader as well as the sender and, most importantly, on the social contexts both take for granted.

At the other end of the scale of fundamental concepts, the social constructions of the ancient dimensions, length, mass and time, are more difficult to find. The Newtonian distinction between mass and weight (relative mass, i.e. as affected by local gravity) only occurred a few hundred years ago, recently enough to give us a feeling for the slow progression in clarification of these terms. Similarly, we in Australia have access to Aboriginal interpretations of time, say, which are very different to our European concept of it (see Davison, 1993 – a great little book incidentally).

Likewise, energy means different things to different people. To physicists and engineers it has a rigorous meaning and that meaning is applied narrowly or *normatively*. That is, these people base their understandings of these concepts on a substantial accretion of definition and proof-based on established and accepted – but unproveable – axioms. Most importantly they base their understandings on established relationships between consistently observed phenomena and the rigorous application of these relationships to new phenomena and to subsets of the relationships themselves. That is, there is a hierarchy of applicability of relationships in any discipline that allows us to develop new methods consistent with all that has gone before… with the exception of the most general insights in the discipline! To understand and change these most general insights we must step outside the discipline.

So, the definitions of energy used by these physical scientists depend on seeing the world in certain ways that for a few centuries in the late second millenium seemed clear cut but which now have had to be revised. Today, at the beginning of the third

millenium, physicists have different frameworks for the interpretation of energy depending on the scale of observation and on how matter presents itself. Thus, for example, energy and matter are two facets of the same perception of the world; gravity is no longer a simple property of matter but is a property of (the 'curvature' of) space-time which itself is interpreted through certain mathematical coherences; that is, through a similar set of mathematical *formalisms* that have accreted over the past three millenia in tandem with the physical formalisms, each set of formalisms providing the power and legitimacy of the other. Physics 'makes mathematics worthwhile' and mathematics gives physics its precision or 'sharp end'.

At a more practical level, what is important is not so much the energy associated with actions but the reasons behind our demands for energy.

One of the great insights, known for centuries and formalised in the nineteenth century was that energy is 'neither created nor destroyed', it just changes to less accessible or useful forms as it is used. Nineteenth century 'thermodynamicists' managed to give this process (entropic degradation) mathematical precision. We now 'know' that electricity is a highly accessible, valuable, organised or low entropy energy form which, if derived from even more accessible forms such as falling water (called 'potential' and 'kinetic' energy), takes very little energy to derive, i.e. there is an almost one to one correspondence between the accessibility of the energy in the falling water and the accessibility of that in the electricity. If, on the other hand, electricity is derived from low value energy forms such as coal (chemical energy), it takes a huge amount of these energies to generate. This is partly a function of the water in brown coal but mainly one of the crudity of current technology. At present it requires a three step conversion: chemical energy in coal to heat to motion to electricity. This may eventually be improved upon by both improving the existing process or by using other processes that enable us to cut out one or more of the steps between the chemical energy in the coal and electricity.

Thus, we really pay for the 'luxury' of such a flexible energy form; one that can be used for all purposes. Picking energy forms whose organisation is appropriate to the use we have for them takes more intellectual and political organisation but does not land us in inefficient transformations. In addition then, to seeking ways of using less energy, i.e. straight conservation, there is the interesting matter of choosing the appropriate energy source for the task at hand, i.e. picking the energy form whose use will itself use least energy. Electricity, for instance, even from coal, is the only (let alone the 'best') energy form for communications and lighting. Direct solar energy is the best form for water and space heating while gas cooking is more efficient than electric cooking, even microwave cooking runs from coal-based electricity. Tasmanians on the other hand, using mainly falling water (hydro)-based electricity, would be unwise to use gas in place of the highly *efficient* microwave cooker which gets most cooking power from its joule of electricity of all cookers.

Knowing all this about energy, along with something of the social construction of the *demand* for energy, can give us great flexibility in choosing a low or 'soft energy path', to use the name of one of the most famous books on these issues (Lovins 1977). In this paper there is no space to elaborate on how one might train oneself to make analyses of issues for their social constructions, so I shall simply conclude with a few examples of such analyses applied to energy-related issues.

## *The social construction of energy demand*

If one were asked to improve the efficiency of the car and one had an engineering background one might start by suggesting various engine and car-body modifications. One might suggest fuel and engine changes such as distillate and diesel engines or fuel cells and electric motors; one might also provide more refined streamlining. All of these are interesting but involve massive industrial changes which given *the financial, educational, political and psychological investments involved in the existing techniques*, let alone those required to bring about the new techniques, will be very slow to realise.

Turning to the demand for cars, it is worth recognising immediately that the interpretation of our transport demands comes, in part, from the existence of the car itself. While people have always moved about for obvious reasons, the particular demand we have today grew *with* the existence of the car! Recognising that this is a characteristic of the demand for all technologies gives us a certain edge of insight in beginning our search for new ways of dealing with technologies. Transport then, and in particular transport via cars, influences everything we do. (See Chapter 4: Transport, for articles dealing specifically with social suggestions for the demand for cars.)

However, while social suggestions for improving efficiency – car-pooling, using public transport and so on – are eminently viable in principle, they all involve us in altering ways of understanding and these have been in the main formed with the car very much in *mind*. Therefore, we who propose these ideas must seek to understand this, i.e. must be *mindful* of it before we can hope that others will consider minding our proposals. We must *mind* (care for) them because they *are* other people and people build their understandings of themselves around the car.

Equally, solar hot water is much more efficient than coal-based electric hot water. The extra construction energy for solar water heaters is offset by lower electricity generation equipment demands. However, to change to this form of heater requires us to understand that people already have other forms of heater in reality (in their houses) *and in their heads, i.e. in their expectations.* Moreover:

- The cost of these, while cheaper in the long run are more expensive 'up front' (for householders only!) and so we must find financing mechanisms that spread the cost over many years. Some of the savings from power stations not needed could be used for this.

- To use solar hot water, especially without boosters, requires us to alter our patterns of hot water use. We have actually developed quite the opposite patterns to those that suit solar hot water: highest use in winter and daily, highest use before the sun is 'up', i.e. in the early mornings (showers!).

You can see the contradictions here and how much work lies in front of the members of SEICA, the Sustainable Energy Industry Council of Australia (now the Australian Business Council for Sustainable Energy), before appreciable swings in the patterns of our energy demands are made. However, it is *social* and *economic* work that is needed, not technical.

To illustrate how diverse the ramifications of what we do are, I shall relate a recent case from Melbourne. Some ten years ago Victoria's electricity authority proposed building a powerful, overhead transmission line to complete its grid around the city – for reasons of *security* of electricity supply to the Central Business District. Many people opposed the line on the grounds of aesthetics and the fear of cancer induced by exposure to electromagnetic radiation. On behalf of the largest community health centre in the vicinity of the proposed line, I suggested that for security reasons they ought NOT build it at all. My grounds were that *not* building the line would give us the opportunity of having to live with blackouts which would in turn force us to establish *social mechanisms* to recognise our dependence on the grid and its very real potential for breakdown no matter how powerful the lines we build (see 'Comment on a Transmission Line Proposal', in Chapter 7: Taking Action).

The argument here is the same as that used to maintain both our fire brigades and our ambulance services. Were there fires only every other decade, we certainly wouldn't be as prepared for them as we are now and it would be difficult for those who understood the danger to convince politicians of the need for preparedness. What we have done here is to recognise a need for *civil defence*, a capacity to know what to do *as a public* in difficult situations, rather than leaving it to the 'appropriate authority' with all the possibilities of malfunction and impersonal care that that means. In contrast to the Northern Europeans, Australians are barely aware of civil defence. (The idea of civil defence is elaborated in 'Not Forgetting the Gas' in Chapter 7: Taking Action.)

To put these examples in a particularly harsh light, it is worth bearing in mind that they do not imply the winding down of our economic well-being, e.g. 'back to the stone age'. They imply a different sort of economy with different definitions of wealth and different forms of growth. Sweden, for instance, accepted public demands for renewable energy and induced its own industries to begin the search for viable replacements of its hydro and nuclear power bases. One consequence of their success was that they now have a renewable energy industry that can sell to the rest of the world as the rest wakes up to the same demand. And it's not the first

time they have done this; in the 1960s the same public demand for pollution control equipment induced other Swedish industries to develop equipment that could be found nowhere else, and Swedes benefitted as the rest of the world came to their doors to buy the new equipment.

The same could be done with services and conservation techniques for these are also tradeable commodities. While we currently allow and even encourage the development of destructive industries, such as nuclear power and high energy agriculture, both of which have the potential to actually produce products embodying *less* energy than was used to make them, surely we can entertain the possibility of producing things that generate tradeable services (=goods!), employment and personal and national integrity *without* the detour through resource use and environmental degradation?

While I believe we can do this, and the Victorian Transport Accident Commission's road fatality ads are examples of this (they have gained international acclaim and are sold overseas), we might also recognise that, like the TAC, we too will have to recognise what it takes to bring the public to the point where it is capable of accepting social resolutions to its problems rather than simply fixing the existing technical resolutions. Our metaphors must reach the public and also must present attractive alternatives. The first is relatively easy, the second is more difficult but also much more exciting. ■

# *Conservation and renewable energy*

Adapted from 'Conservation, Renewable Energy and the Ecology of Energy Transformations', published in DISSENT, no.14, Autumn/Winter 2004, pp.49-51. An earlier version appeared in ENERGY NEWS, Sept. 2002, pp.303-304. It was reprinted in: *CSIRO Sustainability Network Update*, no.30E, pp.14-19; *Nature and Society*, Aug./Sept., 2003, pp.9-10; *Ethical Investor,* vol.27, p.34; *Engineering World,* vol.13, no.6, pp.10-11; *STEP Matters*, vol. 122, pp.3-4; and *Chain Reaction*, vol. 91 (Winter, 2004), pp.31-32. Mark Diesendorf's letter in response and Frank Fisher's reply to him were published in *Dissent*, no.15, Spring 2004.

At the rate industrialised peoples have grown accustomed to using energy, no energy form can be used, and no energy transformation to electricity can occur, without environmental problems. On the whole all societies are profoundly ignorant of energy as engineers understand it and even less aware of energy as ecologists understand it. Hence the impetus behind this article.

I should say at the outset that as the instigator of what is currently Australia's largest wind farm (52.5 MW),[1] I can hardly be said to be opposed to the use of renewable energies. Nevertheless, I am seriously concerned with the cavalier approach to renewable energies apparent in even our most responsible media.

The very idea of renewables fosters the illusion that our present ignorant ways with energy can continue. The more viable renewables become and the more they are able to compete with fossil fuels – *most of whose costs are simply ignored* – the more they act to suppress energy conservation.

Energy conservation is our cheapest and most socially and environmentally benign energy *source*.

Conservation can be *mined* just like coal!

If we could see this, it could become exciting as an opportunity for venture capitalists and be reflected in our economic and regulatory structures.

Renewables, not conservation, are sold as a panacea. Renewables are marketed on the basis that they will permit us to continue to live in the ways we have grown accustomed to but with 'zero emissions'. This is a mischievous and dangerous illusion.

Large scale renewable systems involve mining sunshine via plants or via the heat and movement the sun gives to the atmosphere and the oceans, i.e. hydro, wind and the various (potential) marine powers. Attempting to fill the current demand with renewables

creates a raft of environmental, social and even moral concerns. Take, for example, 'energy cropping' for electricity and automotive fuels. Energy cropping means 'growing fuels' and burning them directly to generate electricity, distilling alcohol from sugar cane or squeezing oils from other plant materials and then burning these liquids in internal combustion engines to drive vehicles or, again, in boilers to generate electricity. In the case of electricity it means wasting 60 per cent to 80 per cent of the crop because burning it to generate electricity is at best only 40 per cent efficient. As auto fuel however, it means *wasting 99 per cent plus because most of it goes to drive the auto-system* and not the motorist. Only 20 per cent is turned into motion by the car's engine, then 90 per cent plus of that is used to push the car which is at least ten times heavier than its driver-passenger. Beside all the environmental damage implied here, there is a real case to ask whether it is *moral* to use potential food-bearing cropland that wastefully. This article, however, will be restricted to questions of energy efficiency rather than the design of urban lifestyles.

For all their relative benignity, solar energies mined through hydroelectric plants (solar energy lifts the water), wind generators and natural draft towers such as the 1 km high towers proposed by EnviroMission for Mildura, generate a broad range of ecological implications. Consider, for example, the implications of the Snowy Mountains hydroelectric installations for the Snowy River and for the social and ecological systems that lived along it and in it. If *all* humans were to demand the same 2 kW from the wind, say, as we in Australia currently expect from fossil fuels (coal, oil and gas), the energetics of the atmosphere will change as surely as through burning fossil fuels. Further, if we intend to use renewables to power the extraction of hydrogen from biomass or water to drive our future fleets of fuel cell powered cars and commercial vehicles, the implications for atmospheric disturbance are truly catastrophic.

For the record, it needs to be said that electricity from solar or photovoltaic cells is not an answer to the kind of bulk electricity demands we have today. Even here in Australia that is the case because the quantities available per square metre per day are small, especially after deducting the energy costs of making and installing them (see 'Liberating Energy').

In addition to ecological effects, all energy infrastructure costs energy to create, transport, install, maintain, dismantle when its life is done, and to defend[2]. If more kilowatt hours of energy are used to set up, maintain, dismantle and repair damages associated with an energy form than it actually delivers, one can be excused for asking questions about it. That is almost certainly the case with nuclear power and therefore the sanity of its use has to be questioned even before we concern ourselves with issues of radiation and the potential of nuclear terrorism. The reason that this general view is not taken is that,

- virtually no-one has it to see with;

- we have not yet created the necessarily *international* structures that would enable us to act upon it if we did have it, and;
- the profound vested interests society has in its existing energy sources militates against even putting questions that imply the annihilation of all that physical, social and personal (e.g. training) capital. Consider replacing the world's primary, fossil fuel-based energy infrastructures (a real immediate possibility with the advent of the hydrogen or fuel-cell-based economy). These are increasingly damaging earth processes in ways that are probably irreversible no matter how much energy we were to use, but we are politically committed to them.

Wind generators and natural draft towers may well deliver more electricity than their energy costs. However, they are patently *not zero emission* generators. Even in service, they suck energy from meteorological and ecological processes with various, as yet largely unknown, effects. In construction, monitoring, maintaining and dismantling them, they have the usual multifarious energy and ecological implications.

There simply are no such things as energy and environment cost-free energy forms. Even conservation requires its techniques to be set in place, monitored, maintained and ultimately, dismantled.

To return for a moment to driver-only automotive (urban) commuting, it is a category of energy use so wasteful yet so much embedded in our ways of understanding ourselves that it deserves special mention. I have already shown that it is in a class of inefficiency all its own: the transport energy system pays a 10,000 per cent plus premium for moving each of us. Issues such as these, however, simply do not figure on the public's radar because there are no publicly recognised energy indicators, let alone efficiency indicators, that include the issues raised here, which is not to say that there are no indicators at all nor that we could not build complex integrated indicators. However, the task of bringing them to public recognition is major. Few people actually read their electricity bills, let alone graph the efficiency of their cars. Most would not know where to start. Perhaps an energy efficiency meter could be given prominence as a new dashboard indicator in cars!? The problem would be working out with manufacturers what to include in the calculation and establishing a good reason for their support of the initiative. (See Chapter 4: Transport for a thorough examination of the energy implications of cars.)

Indirect means of measuring such priorities come from other directions such as triple bottom line accounting and screening practices that allow investors to make informed judgements about the environmental and social practices that underpin the activity in which they are considering investing. The task of aggregating such complex phenomena into an indicator that still permits access to details is gaining increasing attention.[3]

The price of energy is too low, joules and kWh are still too obscure as measures, and most of the really large scale pollutants associated with energy transformations

such as water, carbon dioxide and heat are all invisible and, in any case, seem not even to be pollutants. The ecological costs, such as the irretrievable destruction of habitats and species' extinctions are, if it's conceivable, even less visible.

It is theoretically possible to calculate the energies that would have to be found to make good some of this damage, e.g. to suck the excess carbon dioxide out of the atmosphere and sequester it safely. Deep geological sequestration has recently (July 2002) been proposed by the Victorian Government. If we were to add these energy-for-ecological-repair costs to the other energy costs of our renewables, let alone of our fossil fuels, few of our current energy sources would make much sense, i.e. few would qualify as sources!

With all this in mind, our richest energy lode is unequivocally conservation techniques. Therefore, change that favours the political economy and fun associated with conservation and with reuse/recycling generally can be combined with the advent of economic and other incentives that favour low energy productions and pursuits, such as in health, sport, communication, the arts, the knowledge industries and so on.

A conservation focus means that while definitely the way to go for new electricity generation, renewables should not be permitted to eclipse conservation. Many of these activities can be pursued by individuals with no help from government. Indeed, where individuals do pursue them, they add to the political constituency that government needs for it to concern itself with facilitating them! In the interim government does have two important roles. The first is to find, publicise and reverse the many perverse incentives[4] that continue to make nonsense of so many energy conserving activities. The second is to educate the whole community about energy matters, not just enhanced greenhouse effects. The effects could be transformative socially as well as ecologically. ■

Electricity in industrial society's diets is the equivalent of meat or milk in the individual's diet. Meat and milk are valuable nutrients that can provide humans' entire dietary needs,

but

in the majority of biosystems, meat and milk as human staples come at great ecosystemic cost.

Therefore,

unless we are Canadian Inuit or other desert dwellers whohave no alternative, the majority of our nutrition can be provided by thermodynamically lower quality foodstuffs to the benefit of environment and even to the benefit of our own metabolisms.

Similarly,

most current bulk electricity uses can be replaced by direct, thermodynamically lower quality energy forms such as solar energies and… conservation!

ELECTRICITY TREATED WITH
THE RESPECT IT DESERVES

# *Renewable energy misconceptions*

Letter to the Editors of *Dissent* by Mark Diesendorf in response to Frank Fisher's article. Dr Mark Diesendorf is the Director of the Sustainability Centre Pty. Ltd., PO Box 521, Epping, Sydney NSW, 1710, Adjunct Professor in Environmental Studies, School of Geosciences, University of Sydney, and Adjunct Professor of Sustainability Policy, Murdoch University.

Yet another article, disseminating fundamental misconceptions about renewable energy, demands a reply. Frank Fisher (*Dissent*, 14: 49-51) has exaggerated the disadvantages of renewable energy and inadvertently left the reader with the false impression that all energy sources are equally bad. Once again it must be emphasised that coal is by far the most harmful energy source in terms of its environmental and health impacts, as discussed in *Dissent*, 13: 47.

I agree with Dr Fisher that efficient energy use is 'the cheapest and most socially and environmentally benign energy source'. But it is only an 'energy source' up to a point. A society cannot function on energy efficiency alone. Genuine clean energy sources are needed as well and are needed now.

With a growing population and per capita economic activity, it is very difficult to stop the growth in Australia's energy demand, even with a substantial implementation of efficient energy use. We tried hard to do this in our Clean Energy Future for Australia scenarios, downloadable from www.wwf.org.au.

Dr Fisher's sweeping statements about energy conversion efficiencies and energy inputs to energy generation require some qualification. For instance:

- The claim that wind turbines 'are patently not zero emission generators' is misleading in a quantitative sense. A modern wind turbine generates the energy required to manufacture and install itself in 3-6 months of operation. Its lifetime is at least twenty years, so the energy output is at least forty to eighty times the energy input. Therefore, the carbon dioxide emissions produced in manufacturing the wind turbine are negligible compared with those it saves in a lifetime of operation. Furthermore, as energy supply becomes 'greener', more and more of the energy inputs to renewable energy (and energy efficiency) technologies will become renewable and hence emission-free.
- The claim that wind power is 'changing the energetics of the atmosphere' is also quantitatively misleading. Rough calculations by Gustavson in 1979 suggest that, if 10 per cent of the world's electricity were to be generated from wind power,

wind power would account for only about 1 per cent of energy dissipation in the bottom kilometre of the Earth's boundary layer, a tiny perturbation.

- The principal scenario in our Clean Energy Futures study generates 28 per cent of its electricity and a significant amount of its process heat from biomass, and almost all this biomass comes from the residues of existing crops, not new dedicated biomass crops. Therefore there is negligible additional land use. Of course, if we attempted to fuel all Australian motor vehicles as well from biomass, there would be a large land take from energy crops and possibly some conflict with food production.
- Using biomass residues (e.g. from the cane sugar, wheat and plantation forestry industries) to cogenerate electricity and process heat has thermal efficiency of over 80 per cent. Furthermore, it does not 'waste 60 per cent to 80 per cent of the crop', because currently most of the crop residues are either burnt off or left on the ground.
- It does not help the anti-nuclear case to use demonstrably incorrect arguments. Energy outputs from a nuclear power station over its lifetime are roughly 5-6 times energy inputs.
- The claim that the widespread use of hydrogen as a fuel for motor vehicles would have 'truly catastrophic' impacts on the atmosphere, is not necessarily true. It all depends on how the hydrogen is produced and converted into useful energy. With sensible choices (wind and solar sources, and condensation of the water vapour produced), the impact could be essentially zero.

The Clean Energy Future scenarios demonstrate the need to implement energy efficiency substantially while rapidly developing renewable energy and also using natural gas as a transitional fuel. All three 'energy sources' are needed to obtain a 50 per cent reduction in carbon dioxide emissions from stationary energy based on small improvements to existing technologies. The Business Council for Sustainable Energy (www.bcse.org.au) is actively promoting all three.

There seems to be little basis for Dr Fisher's notion that there must be a trade-off between efficient energy use and renewable energy. The two go together like love and caring. To make a large percentage contribution to energy supply, renewable energy needs a strong implementation of efficient energy use. And to make a large percentage contribution to reducing energy demand, efficient energy use needs a thriving renewable energy industry. While coal continues to dominate electricity generation, the coal industry and its supporters in government will continue to oppose substantial implementation of efficient energy use, which reduces the coal industry's market. Therefore, the supporters of sustainable energy must struggle on two fronts, renewable energy and efficient energy use.

# In response

Mark and I come from science/technology. For my part, ten years selling electrical generators and transmission equipment in ways that I grew to understand would compromise personal and social freedoms every bit as much as they would empower them. (See 'Technology and the Loss of Self' in Chapter 1: Response Ability.) For over twenty-six years I've taught graduate environmental science students to recognise social context through essentially two messages: life is always more complex than it appears and appearances depend on the way we conceive of the world.[5] What we *see* sits in multi-dimensional political and ecological contexts only visible to the willing and trained eye.

My aim is encapsulated in a line I use at student orientations: 'to preserve wilderness by enhancing the wildness staring at me across the lecture room'. If students leave the room 'wilder' or *less predictable* to me than when they came in, the wilderness in south-west Tasmania (say) will be in good hands (see Maslow 1966).

I'm sure Mark would agree that *the energy problem* is not supply, there's plenty around to exploit; doing the exploiting sustainably is *the problem*. My concern is to understand and act on the politics that give us the expectations that generate energy demand. First that means recognising the environmental and health costs of large scale energy transformations. Sure, the litany of dislocations caused by fossil fuel use is unsurpassed and much is invisible to the public ('the devil you know'?). But nuclear fuels also generate invisible and irreversible environmental and health burdens. In addition they engender unique social burdens such as inequitable development and monitoring and security demands that will last tens of thousands of years. The energy cost of repairing ecological, health and social dislocation has not been calculated because no one even dreams of doing it. However, it will inevitably be a good proportion of the total electricity generated. We might justify this – along with parallel devastations caused by the agricultural revolutions – by saying that it is the unavoidable cost of human advancement. Perhaps, but at least let's be aware of these costs and not hide them; which brings me to wind energy.

While very much less onerous per Megawatt installed than either coal or nuclear power, my partner and I have been witness to multi-dimensioned damage caused by erection of a wind farm. Ironically the damage includes tourists visiting the site, fuelled by private cars so excessively powerful that just ten could replace each wind turbine if coupled to a generator instead of a set of wheels! In regard to taking energy from the atmosphere to drive a world-wide wind based (renewable) hydrogen economy at the levels Australians expect, we would be appropriating something like 1 per cent of the solar energy that drives the earth's hydrological cycles (see Elliott

2003). In the *chaotic* world of *butterfly effects*, 1 per cent, concentrated in certain places, would have serious and unpredictable effects.

Second, my work tries to expose social consequences of energy use, such as the 'obscenity' in cropping wilderness or arable land for biofuels to:

- power *driver-only* private urban transport where only 1 per cent of the energy is actually used to move the driver (see 'The Myth of the Efficient Car' in Chapter 4: Transport);
- pollute in a very broad range of ways: beyond Greenhouse there are numerous toxic gases, microparticles and *heat*; and to
- rigidify socio-economic structures through massive capital and social infrastructure demands that militate to shore-up existing procedures.

The effect, common to the advent of all large scale renewables, is to take the heat off *reducing* energy use by appearing to justify the rightness of life-as-we-know-it. Victoria's Bracks government recently invested close to half a billion dollars in support of nineteenth century car-engine technology because it feels locked into doing so by half a century's worth of financial and social investments and the public expectations that have grown from them. To climb out of these binds, more of us have to recognise them, criticise them and learn to live beyond them, thereby providing governments with the tools for transition to a post-heat economy.

So, my article was not about energy but the consequences of understanding it in the way we do. I regret giving an impression of knocking renewables. It was not my intention. My intention was to knock the idea of replacing current energy conversion practices with a culture of renewables rather than of conservation. So, yes I'll stick to 'replace with conservation' even though Mark is technically correct: conservation is not joules just as savings are not recognised as earnings. However, if we understand the value of joules foregone (conservation), we will develop a significant consulting industry based on virtual joules. And, to use Mark's nice 'love and caring' metaphor, if we learn to 'love the world as ourselves'[6] we will revert to metabolic energies to drive urban transport and home heating instead of the fossil energies that fire the current world-wide diabetes (type II) epidemic. Comfort and ease as presently understood would be recognised as uncomfortable and 'diseasogenic' (cf. 'obesogenic') and the journey to work would be transformed from a journey to fatness to a journey to fitness and… fun[7]. ■

Endnotes

1 0.1% of Australia's installed electricity generating capacity: 35x1.5 MW turbines strung out along a range of hills in Western Victoria. Initially projected to be twice as large, local grid capacity was unable to cope.

2 Cf. the military excursions required to defend oil supplies or guard radioactive waste handling processes.

3 See journals such as the Australian *Ethical Investor*.
4 Built into the system in more ignorant days when environment didn't exist and embodied energies went unrecognised.
5 Cf. for example 'tell it as it is and it is as you've told it'.
6 Apologies Jesus …
7 I have done it for thirty-five years and look forward to it every day!

# *Grid-locked?*

Adapted from 'Grid-Locked? Why Not to Invest in a Global Electricity Network', published in *Community Quarterly*, no.44/45, Sept/Dec. 1997, pp.61-66.

The idea of a world-spanning electricity grid is appealing for two reasons, one techno-economic, the other social. First, once in place such an omnipresent grid would allow us to trade electricity around the world so that areas in surplus filled areas in deficit enabling generating systems to operate optimally.

The science is simply,

- the notion that electricity moves virtually instantaneously (at the speed of light) and at any time only part of the world is pulling peak load (we use more electricity during the day than at night), so if the world were interconnected the aggregate of the world's generators could be much more uniformly loaded;
- big generators function most efficiently (deliver most electricity for the dollar or for the tonne of fuel: coal/oil/uranium/falling water and so on) when they are able to run steadily twenty-four hours per day between services.

So, a much more even load could be placed on generators and indeed one might distribute the load to the most efficient generators, thereby reducing waste and the pollution generated per joule of electricity produced. Today, in a world at best only regionally connected, an interesting spin-off associated with the push to keep generators running at their most efficient setting, is that we seek to fill the overnight troughs by selling night rate power at bargain prices to encourage demand and fill the troughs: While each kilowatt hour from a given machine costs the same in resources terms whenever it is generated, there are appreciable savings in not having to stop and start generators (during which time the machines are not connected to the grid) and in associated staff reductions.

Second, socially, if we are all connected to the same grid upon which we depend and into which we have invested so much capital, there is an incentive to behave, i.e., if you own a share in something you'll behave so as not to threaten your own investment.

There are unfortunately, a raft of problems with this idea and clarifying them *is* worth the exercise, if for no other reason than that it demonstrates the problem societies (the world over!) have in making decisions about the scientific dimensions of technologies, let alone their politics. Increasingly today ideas such as this one

are foist onto an unsuspecting society gulled into accepting some putative benefit without recognising its deep implications.

The motivation for this response is to enhance our capacity to understand the scientific and political contexts of innovation before committing massive public resources and infrastructure to them. The underlying argument for such an effort is that most of us are keen to maintain democratic control of our lives-in-environment and, to the extent that that environment is to remain supportive of the degrees of freedom we have come to expect, we must strive to enhance our responsibility for our actions-in-environment.

This brings us to the most vital but publicly opaque aspect about electricity: the efficiency with which we obtain it.

The point is that electricity is an inefficient energy form for most applications. Indeed it is so much less efficient than other energy forms of heating, cooling, cooking and many lighting and motor requirements that its use in these applications is a type of vandalism supported, of course, by short-term political economies but on the other hand legitimated by the long-term real energy and financial costs of innovation.

Electricity, however, has no peer in communications, data processing and a raft of special low energy uses, such as medical diagnostic and treatment processes. Its convenience and cleanliness at point of use, also mean that many industrial and fine motor applications are ideally provided by electrical means. Put together, all these are relatively small users of electricity and while the diversity of such applications is expanding, each one is increasingly being done more efficiently (often dramatically so in the case of computers) and, therefore, it is entirely conceivable that they may be run by non-reticulated renewable electric energy sources, such as photovoltaic panels. This is especially the case with household uses.

## *Politics*

While the dependency upon a grid that connects us all is appealing, this kind of dependency is not involving or creative, i.e. it does not prompt us to think about the consequences of being locked onto the grid let alone to build from our grid-locked condition. Investment in an all-connecting electricity grid therefore commits us to a series of behaviours that are more damaging ecologically than they need to be. We will now look at some of the social constructions associated with being electrically grid-locked.

## *The gridlock of investment*

The primary problem with vast investment of any kind is that it enforces adherence to the investment and the priorities embodied in it. Living lightly on the earth

means being flexible in means so that we can change when we find that a particular direction is no longer where we want to be going. One of the great good fortunes of our current economic structures is the discount rate: the economic fact that the monetary value of things depreciates. This means that even if we do put a lot of effort into things, with time that value will depreciate and we will be free to step outside our investment straightjacket. While this is so in principle, life is not, of course, that simple. Invest in a City Link type freeway (as in Melbourne) and one expects it to pay for itself by being driven on, not planted to vegetables. More, investment means commitment of the investors' integrity, of their selves. Over the lifetime of a large investment, many people will have committed themselves to education to build and support it, they will have committed their reputations to it and even the lives of their families to it, i.e. they will have committed their interest to it (in both senses!). The bigger the investment, the greater the commitment and the more we will try to deter the ravages of liberating depreciation or entropy.

Applying this to our electricity grid, we have a profound commitment to public and private infrastructure. A recent example illustrates this. In the run up to the sell-off of Victoria's electricity industry the Kennett government sought strenuously to boost Victorians' commitment to electricity, thereby making a more attractive package for electricity system buyers. One way was to advertise electricity as the cheapest way to heat water. To the extent that this succeeded it led people to install electric water heaters, thereby committing to electricity one of the most important energy sinks in every household. As I explained, where applications can be switched to off-peak times, special rates can be offered, e.g. night rates. This was indeed such an application, it suited system efficiency as well as commercial efficiency. It was not, however, environmentally efficient: night rate power still generates almost as much waste, greenhouse gases, etc., as day rate power from the same machines and, of course, compared to gas-heated water, let alone solar-heated water, the procedure was crassly irresponsible. It did not lock us into shifting daytime uses to night-time use thereby enhancing overall efficiency but, rather, it locked us into new uses to fill the demand troughs, which then committed us to massively inefficient environmental behaviours (heating water with electricity) for the sake of enhancing the local efficiency of use of generation companies' resources.

## *Conclusion*

What does it profit a wo/man, to gain the world but lose her/his soul (nature)?

While electricity has indeed been a magical force in the development of humanity, its history is following much the same development as that spelled out in the children's book, *The Magician Who Lost His Powers*. In this story the kindly magician does everything he is asked to do by a society aware that with his help they can avoid the chores that seemed to clog their lives. Suddenly, the magician loses his powers and

his society can no longer find expertise to sustain itself. The magician's generosity has effectively disempowered his own community. After a long search he regains his powers and learns to use them circumspectly in a society that now understands that it must keep its hand in if it is not to lose its very humanity.

Sapience or wisdom is very much a function of decision-making from inside, from experience of living and working in the world, not of observing and assessing from a distance. However, experience alone is not enough, there must be intellectual structures available to enable us to make sense of our experiences. Common sense is currently not adequate to the kind of circumspection that would require consideration of the issues raised here before the damage they can do make their consideration compulsory.

Note how different this is to human systems which presume that we can make profits, i.e. gain more from our processes than we put in! The secret here is the cost to the environment is unaccounted and makes up the difference. Were this difference derived from renewables, such as sunshine or sustainably produced plants, this would in principle, be okay. However, this is rarely the case yet, although eventually it will have to be.

It should be noted that, in our free market system, technological development is not stimulated by waiting for developments to occur. One may simply have to stomach one's frustration watching the development of essentially misguided options, which will come and go, serving the purpose of preparing the ground for the next real leap. A good example of this is the repeated failure of domestic recycling which now, even with conservative governments in power, may actually be leading to the creation of market manipulation (levies, taxes etc.) favourable to recyclables and conservation – something many of us have been proposing for decades but which governments simply could not see the political viability of introducing.

This approach gives us quite a different slant on depreciation and entropy, doesn't it! In a sense they are both profoundly liberating and therefore anti-entropic! ■

# *Can solar energy limit environmental impact?*

Adapted from 'What is Environmental Improvement? Can Solar Energy Limit Environmental Impact?', a paper presented at the 'Solar 88, Australian and New Zealand Solar Energy Society Conference', 1988 and published in *Proceedings, Solar 88: Environmental Improvement Through Solar Energy*, ANZSES Conference, 17-19 Nov. 1988, University of Melbourne, pp.4.1-4.10.

Consider the housekeeper who has just come across research suggesting that surfactants (detergents) may be pathological in the amounts normally ingested from the thin films left on our crockery. Being a thoughtful person, our housekeeper (HK) decided that the time had finally come to use less detergent, hotter water and to rinse more thoroughly. Recognising that the additional heat and water this would require added to energy and water demand s/he decided to install a solar heater and a rainwater tank.

With idealism as motivation, a good fund of public knowledge and sufficient worldliness and guts to front the keepers of technical and financial knowledge, HK found the most appropriate devices on the market for the required duty and the optimum funding arrangements to minimise the drain on household finances. S/he even got involved in some lobbying activities to create new financing arrangements that would enable the first-cost ('up-front') hurdle impeding all 'enviro-technical' innovation from continually rendering it a guilt salve for the upper-middle class, resource-intensive lifestylers.

And then the equipment began to arrive. S/he knew that it was expensive and that installation wouldn't happen for a song either, but s/he hadn't expected it to be so big nor that there'd be so many changes to water piping.

It was even necessary to add an automated diverter to siphon off the first water to run off the roof when it rained. Perhaps a filter would have done but then it would have needed cleaning and not have taken out dissolved substances. We are talking, after all, of an inner-city household close to what cities are all about, close to public transport and… close to the centroid of urban pollution. Getting the tank in required a special crane and sacrificed half the back garden!

With this kind of monetary and personal investment, of course, the incentive to make the personal and social adjustments necessary to use the new equipment efficiently was there. HK hadn't anticipated all these adjustments either, but they

were fun to tussle with and s/he soon found that s/he developed a much deeper insight into local meteorology and its social implications. They kept the family occupied for some time. Nor was the transition without rancour, for teenage kids had grown used to instant, steaming hot water in limitless supply (as the ads went), not to mention the careless convenience of the dish washer. With a little ingenuity and a roster, however, dish washing became part of the family's meal time tradition of being together (… or something like that…).

Meanwhile the physical reality of all that equipment and its installation still rankled. What would be the resource implications if everyone were to install their own hot water heater and water tanks? And then, while one was at it, why not generate one's own power and deal with the family's wastes where they are produced? Ridiculous surely!? But then wasn't it crazy to be trading on the fact that the high energy use of others kept the unit cost of energy supplied to the booster on the hot water service within reasonable bounds? If everyone reduced their mains energy requirements, how would the power authority generate its capital requirements; and then how would those dependent upon the grid – by ignorance, design or poverty – for all their energy requirements cope?

It is not hard to guess that first, experiences such as these are real and that, second, much of it has been personal to the author and his friends. Australia is littered with the failures of such experiments and while this is okay in quite a deep sense (we must be prepared to experiment), the fact that the Third World is also littered with these (our) experiments is another story altogether, one which we cannot go into here but which desperately needs attention.

For all its apparent detail, this introductory story barely begins to recount the social, economic, legal and political implications of attempting to fit renewable (cyclic) innovation into a political economy designed around linear, essentially (but not necessarily!) non-renewable resources and their technologies.

Consider the following: today we are beginning to see environmental and social repair and maintenance activities growing to rival in capital expenditure and employment terms the so-called *productive* sector of the economy. This is perceived by many as incongruous and much black humour has been made about the apparent contradiction in counting these 'costs' positively into the GNP. That is, the meaning of wealth itself is in question. The basis of this paper however, rests on the premise that, on the contrary, the conventional procedure is correct. A wealthy society is one that *does*, or *is able to* include making good the damage created by its production *as part of* the value of that production. In this way environmental care becomes a cost of the same type as raw materials. To do this will require a powerful *conservative* change in current social epistemologies, the ways of knowing and of organising thinking that underlie social activity.

In a limited and unconscious way HK began to adjust to do just this. S/he found that washing dishes had consequences. What s/he didn't do was to recognise that

s/he was washing dishes in a way that was culturally determined: handed 'down' and 'across' by other HKs and further, that one can consciously manipulate these cultural traditions. Elsewhere, I have outlined some of the structural consequences of present technology and given the bare bones of the thinking underlying them. (See 'Technology and the Loss of Self' in Chapter 1: Response Ability.) Here, I suggest how we might use such new 'metascience' to generate a self-conscious solar *technique*.

## *Environmentally benign (solar) technique*

We have seen that science, as presently constituted, cannot cope with the kind of problems thrown up by human incursions in environment. Like our friend HK, who finally disconnected the solar heater when s/he discovered that its heat pump used ozone-layer depleting CFCs, we simply cannot know all the implications of our technologies. Nor do our presently available thought structures extend to recognising and acting upon the existence of context. At best we may be aware of the specialist context of our devices. An engineer will take piping, aspect and roof loading capacity into account when installing the heater; s/he will also recognise efficiency and the cleaning issues associated with solar cells. An economist will be aware of the 'first cost' hurdle and of financing structures available to overcome it. No present specialists involved in (solar) production will recognise a necessity to design for ultimate disposal for instance, although most would immediately recognize the economic disincentives in undertaking such work under present political and economic conditions. Nor would they recognise the existence of the anthropology of their devices, let alone of a priority to attempt to internalise such understanding. Ironically, such considerations are beginning to arise formally in connection with technological innovation in Third World aid projects.

To conclude, let us apply insight into the social context of our housekeeper's existence and see what this does to the technologies s/he requires.

Beginning with the dishes and why we 'need' detergent and hot water, consider what we do to necessitate washing dishes. For a start, we have certain conceptions of cleanliness based, nominally, on models of healthy procedures. We have come to understand certain micro-organismic disease processes that require all food to be removed from our utensils. A way of doing this consistent with our current social, economic and scientific understandings is detergent and hot water. This process is now embedded not only in law (building and health regulations) and in architectural process but in social tradition. Washing dishes is a recognised housekeeping function. Furthermore, eating utensils are also cultural constructs that presumably facilitate a certain social sophistication. None of these are 'God-given'; all are open to change.

Consider, further, what we want to remove, i.e. 'wash off', from our utensils. It is common experience that utensils associated with meat are more difficult to wash

(and to sterilise) than those associated with fruit and vegetables. They also need washing more urgently from a micro-organismic disease point of view. Without wishing to make a case for vegetarianism, I am simply pointing out that what and how we eat determines our cleansing duty and, again, none of these are 'God-given', they can be altered.

Recognising that there is more to health than absence of micro-organisms, i.e. that there are environmental disease 'vectors' (e.g. carcinogens) and that a healthy diet also depends on a healthy social and natural environment, we can begin to construct a radically different set of household techniques and, therefore, of household technologies.

We could, of course, move to throw-away utensils and microwave cooking but these simply compound the problems listed earlier.

Another way, consistent with the contextual awareness advocated here, would be to alter our eating habits – the food we eat and how it is processed and eaten. In addition to eating fewer animal products involving roasting, for instance, we could also find ways of eating that rationalise the use of utensils – substituting the rationality of environment for that of etiquette. We could also look to the consequences of other processes associated with eating. Household food preservation for instance. How best to use a refrigerator; how best to package and process foods for longer term storage that would not require the food to be further processed prior to eating. We might look to altering the status associated with foods: vegetable instead of meat, cold instead of hot left-overs and how to preserve them nutritionally intact.

Should these suggestions appear trivial, bear in mind that it is their very mundanity that is the point. I am trying to 'de-trivialise' what we take for granted.

And then, we could eat *together*.

Taking this last point and turning to less visible household technologies, what if water, its heating and disposal were undertaken communally? Small groups of households might get together to collect water, to heat it and even to use it (wash clothes!). Notwithstanding all the present social inhibitions to this, such as:

- the sanctity of individual home ownership and what goes on 'within the paling fence';
- the building regulations in support of this; and
- the present high rates of population (housekeeper) turnover – six years, on average, for Australian urban areas (ABS).
- I believe that it would not be beyond the wit of our law makers and local governments to facilitate such sharing of resources.

Beyond the heightened awareness to environmental interdependency that these new techniques would bring, would be the social benefits in striving to make them work and in their subsequent continued existence. Being independent of our neighbours as at present, with its implications of being dependent upon the 'grid',

a metaphor for all macro-scale services, means that our housekeeper is cut out of being responsible – having to care – for the consequences of these services. An Authority 'cares' instead.

Being interested in a responsible technique and in responsible technologies implies work to incorporate into them an active recognition of their contexts. In turn this will require a greater proportion of us to be demanding (involved) participants in our technologies.

For environmental improvement, it is essential. The way present technology is constituted, it alone cannot do it. ■

# *Crossing the frozen wastes of refrigeration*

Adapted from 'Crossing the Frozen Wastes of Refrigeration: Social Changes for Efficient Urban, Household Refrigeration', published in *Green Fridge Quest Newsletter*, no. 5, Oct. 1993.

Every Sunday I bake eight kilograms of bread; two kilograms goes into the freezer, one kilogram into the fridge; joining frozen, pre-prepared food and a fortnight's store of fruit and vegetables kept at 4°C. Besides these, are bulk margarine, cheese and other perishables, such as home-made jams and sauces, left-overs and some things we prefer cold (beer). My fridge is 80 per cent full only once a fortnight. Around mealtimes it's opened repeatedly, sucking the cold air out – while we search, decide and choose.

Such behaviour and more, come courtesy of socialised habits. While insulation and other technicalities of refrigerator design could be made 'greener', far more could be done to raise efficiency if the social expectations that define refrigerator use were modified, i.e. there's more to the human interface with refrigerators than ergonomics and style.

## *Mechanics*

Fridges could be horizontal or have flexible/multiple doors to stop cold air cascading from them. Double-glazed doors could incorporate venetian louvres permitting viewing without opening and without permanent, radiative losses. Sections could be isolated as they became empty. Such examples involve minor changes in expectations, but may mean buying imports, expense and delays. Working with social expectations, however, can reduce the need for refrigeration immediately.

## *Social expectations*

First, sharing bread-making would obviate long-term bulk storage of ingredients and finished products and I'd have fresh rather than thawed bread. Instead of pre-cooked, frozen meals, I could buy the same at the supermarket on my way home… Whoops, did I say that?? …Well, possibly at a reinstated corner shop/co-operative! Co-operatively run corner shops/cafes, perhaps affiliated with supermarkets, could enhance community as well as provide storage, Conversely, I could expect my teenage kids to have a meal ready for us… (pigs might fly?).

We could change the social dimensions of eating, concentrating on things that do not require cold to preserve; eating fresh through numerous social changes (vegetable instead of flower gardens, community gardens…); we could eat communally, sharing the storage task so that one household had a freezer, another a fridge, another bulk dry storage. More realistically, perhaps, cool rooms could be communal (as in Switzerland). Changes like these are not awkward or inconvenient as such; they seem so, because the expectations they rely on are different to those we are used to. And they will inevitably generate interesting spin-offs: cf. switching to compact fluorescents raised winter heating bills (such lights don't run hot); similarly, smaller, efficient, or shared refrigerators wouldn't heat kitchens as well… but our heating bills would then be for heating, and lighting and refrigerator running costs would then be for light and cool rather than heat! ■

chapter four

# TRANSPORT

The essence of this chapter is that the vast web of social and environmental problems associated with modern transport can, and indeed must, be resolved using simple, social means.

'The Myth of the Efficient Car' deconstructs the benefits of cars. A letter to the editor follows, written by a disgruntled motorist in response to 'The Myth of the Efficient Car'. It illustrates just how entrenched the car is as a 'need'.

'Tax, Not Tickets' outlines one important suggestion to improve public transport – a levy to replace tickets purchased for individual journeys.

'Safe Cycling' examines the bicycle as a tool so effective that it may 'become part of us.'

'Soft Cyclists in Hard Streets' acknowledges the 'impossibility' of bikes experienced by most people – environmental scientists as much as motoring enthusiasts – but asserts that we can and should take responsibility to move beyond this bias.

'A Bicycle Diary' gives a very personal account of the rewards of a bike/rail commuting path.

# *The myth of the efficient car*

Adapted from 'The Myth of the Efficient Car', published in *Engineering World* (the Institution of Engineers Australia), Feb./March 1997, pp.34-35, and reprinted in various journals subsequently.

In light of the UN *Climate Change and Human Health* report one might be forgiven for thinking that the economic rationalists governing our society would take efficiency seriously. But in the case of urban commuting quite the opposite is the case. Efficiency in any sense (time, energy or dollars) seems not to enter the minds of our transport planners, let alone the minds of individual commuters who make billions of transport decisions every day.

The flight from objective rationality in considering the efficiency of our transport arrangements in the city must constitute one of the profoundest, and best hidden contradictions of urban life today. Despite all the recent studies, impassioned letters, editorials and reportage/comment about pollution incidents, asthma, carcinogenesis etc, the Australian Bureau of Statistics has shown us (in 1997 and no better now in 2005) that the environmental situation is getting worse, not better. Melbourne for one, is joyously embarking upon a $2 billion freeway link extravaganza aimed at 'improving' motoring conditions for driver-only private cars, and there is no doubt that the democratic majority is solidly behind it.

Somehow, just somehow, we will have to satisfy our transport needs in more efficient ways and communicate them to the Russians, Chinese, Indians, South-east Asians, Latin Americans and Africans who still aspire to commute the way we presently do. If we don't succeed, the inefficiency with which ten billion humans then commute will snuff us all out in the *Autogeddon* (Heathcote Williams' 1991 book title) of Leakey and Lewin's *The Sixth Extinction* (1995).

Twenty years ago, in one of his punchy little books called *Energy and Equity* (1974), Ivan Illich pointed out that if one factors in the time spent parking, servicing, washing, and doing paperwork for our urban commuter car, its average speed over the 20,000 kilometres per year that most of them do, drops well below the average speed attained in actual driving. In addition to this, Illich pointed out that if we consider the time spent earning the money to pay for the car and its various parking, servicing and paperwork demands, the average speed declines again. If we now factor in the time taken to generate the infrastructure requirements of the car, such as road and street construction and maintenance

services, police, EPA-recognised environmental services, hospital, medical, legal, political, roadside repair, tow truck, ambulance and insurance services, almost all of which are currently debited to our social and bureaucratic resources, the average speed of the commuter car comes down to something our shoes would be ashamed of and the average commuter cyclist would have no trouble exceeding. Coupled with an extensive and fully used metrorail network, the potential average speed of bike/rail would take some beating. To underscore the point, factor in the currently unrecognised time spent on environmental, personal and social trauma, and efficiency in relation to the private car as a means of urban commutation becomes a complete *non sequitur*.

Substantial time-efficient responses to our commuting requirements need social, not technical, changes. For instance, we might dispense with privately owning cars in favour of renting appropriate vehicles when needed from a dense network of rental outlets provided by the market as demand rises. Renting could be arranged to complement public transport vouchers in salary packages instead of providing a car. This would deal with the serious problem we all have of making our owned or leased vehicles pay for their keep. Expending all that time and money on our vehicles provides a serious incentive to use them. Their ready availability, sitting right there in their own special rooms in our homes and city offices doesn't help either: nor does knowing that they function best with regular exercise. Shared ownership within a company pool, say, is another, perhaps more difficult option. Whether rented or shared, such options would break some of the knots that lock us into our current irrational economies of commuting. Make no mistake, renting has its benefits: competition-induced cost efficiencies, a range of vehicles suitable for different duties, effective and policeable maintenance and so on.

Mechanical engineers tell us that cars convert roughly 20 per cent of the energy available in petrol to motion. Cars are therefore said to be roughly 20 per cent energy efficient. In practice, however, this bald statement is criminally misleading. Other than Grand Prix drivers and car salespeople, most of us drive to move *ourselves* around and not the car or its 5O kg of fuel. The average car is roughly twenty times heavier than its driver; therefore its energy efficiency in moving one person around comes down to 1 per cent. Take into account the energy costs of producing cars and the many elements of commuting infrastructure already mentioned above, and the efficiency associated with automobility declines much further.

Just filling our cars with petrol involves energy expenditure, let alone the energy costs of servicing all their other needs. Add to these the costs of dismantling and recycling cars (and their infrastructures) when their useful lives are over, the energy costs of high speed police chases, slow speed legal procedures and even slower speed taxation infrastructures to provide refunds on the business use of our private cars, say – not to mention the herculean efforts nations make or will make, to

maintain access to oil, to make good damage caused by greenhouse-effect-based sea-level rises, cyclone and flood damage, and to overcome the inefficiencies of the psycho-social stresses all these will cause – and the efficiency of the car comes down to a few tenths of 1 per cent. For each joule taken to push us around, then, hundreds will be spent providing infrastructure support and maintenance. Other than electricity from nuclear fission, which actually produces no net energy at all (it is subsidised by fossil fuels from other peoples and the future), it is hard to imagine a more extreme case of technological overkill nor a better hidden one.

Take Melbourne's City Link project; the energy used just to construct it would drive the average car to the moon and back many times. Factor in repairing the damage its existence will cause as it extends the life of an urban transport mode so dramatically out of tune with biospheric realities, and our average car is on its way to Mars and back. Another revealing statistic: to provide all of Victoria's electricity you only need to couple some 50,000 of our overpowered cars – just 2 per cent of the state's cars – to generators. Is this really efficiency, not to mention (economic) rationality? And are the consequences of changing these behaviours really more disastrous than the consequences of sticking with them?

Technical heroics are unwarranted. Driver responsibility can trivialise engineers' heroic efforts to improve automobiles' mechanical efficiency by just a few percent. For example, simply choosing an existing small-engined car can improve the efficiency by which we move ourselves by 100 per cent, and putting a second person in that car can add an additional 100 per cent. And these improvements can be made tomorrow with no capital outlays. Nicer still, both initiatives enhance the efficiency of all the infrastructure I've mentioned.

Finally, there is the simple nineteenth century technology already in place: the bicycle combined with the train. There is a lot going for these two humble machines. Together they offer a level of physical, social and environmental joy that can only be appreciated by trying them. We must be prepared to persist for a time but the more we do, the more joyous is the experience. Would it mean losing too much face to show the Chinese, Indians and Africans that *we* want to emulate the way *they* commute now – but with 'attitude'? ■

# *No simple solutions for city transport*

This letter by Ron Hansen, MIEAust (retired) was published in *Engineering World*, April/May 1997, in response to Frank Fisher's article, 'The Myth of the Efficient Car'.

Frank Fisher ('The Myth of the Efficient Car', EW February/March) may have had his tongue in his cheek with some of his pronouncements. In floating simplistic solutions he may be creating other myths.

He overlooks the universal attraction of the motor car in every society – the freedom and independence it confers on the owner. Absolutely nothing by way of rail/tram/bus networks offers even a tiny fraction of that satisfaction, traffic jams and pollution notwithstanding.

Sure, we desperately need better public transport, with access points (rail stations, etc.) no more than a kilometre from one's place of residence. But for Sydney even that means vastly multiplied rail/tram routes, plus transverse grid-connection lines instead of the near-total radial networks at present. I imagine the greens would be just as vocal at carving such corridors through our suburbs as about new expressways. And as for a network of monorails, the mind boggles.

As for Fisher's enthusiasm for reversion to developing-world-style bicycle transport, this just might have some appeal where,

- the pedaller is young and fit;
- the distance is only five kilometres or so;
- the terrain is flat with no exhausting hills;
- there's no headwind;
- it's not raining; and
- temperature and humidity are both mild.

An impossible ask.

But for the bulk of our ageing population, getting from point to point means an independent powered capsule such as the motor car. People *want* their private vehicles, regardless of the cars' undoubted inefficiencies and clogged roads. Some genuine lateral thinking on the problem is needed.

As for ideas, let's try these for starters instead:

- Decentralise. Yes, an overworked buzzword so far, but given genuine commitment by governments by way of tax restructuring and other incentives it could certainly work far better than tinkering with the present mess. Stop further

expansion of our capitals, and boost both the population and quality of life of our regional centres.

- Why commute at all? Teleworking is already becoming an accepted alternative. A major fraction of all the work currently done in offices and bureaucracies could be readily switched to the homes of the employees, or perhaps to localised neighbourhood work centres within walking distance of the residence.
- Stop panicking about the future. Human ingenuity being what it is, a solution will be found to any problem if people are given a free hand. ■

# *Tax, not tickets*

Adapted from 'Tax, not Tickets: a Public Transport Vision',
published in *Monash News,* Oct. 2002, p.5, and
'How to Get the Public Back into the Transport System',
*THE SUNDAY AGE*, 11 Aug. 2002, p.15.

## '$1.6B BID TO WOO PASSENGERS FAILING',

*THE AGE, 2 Aug. 2002, News 2.*

An annual public transport levy instead of tickets could transform a surly culture of fare evasion into an opportunity that would make the first city to introduce it successfully, the envy of the world. Currently Melbourne's public transport is free but encumbered by a parasitic employment scheme that provides 'Metcards'. These cards purport to be public transport tickets, but they are actually 'public transport ticketing tickets'. They only pay for their own infrastructure, i.e. for ticket administration, policing of fare-payment, armouring against fare-evasion, defensive advertising and making good the public relations disaster all this constitutes.

It is no secret that a well-patronised public transport system moves people around more efficiently than a transport system based on driver-only private cars. Its potential environmental benefits are legendary; however, the 'perverse' incentives to using Melbourne's existing system are also legendary!

One of these perverse incentives is, of course, the ticketing system itself. In addition to not generating a revenue flow over and above its current costs, it does not even serve reliably to gather statistics. One could be forgiven for asking whether it was designed by the road lobby.

Ticketing encourages us to stick to our cars and therein lies another perverse incentive.

Still another disincentive is Melbourne's awkward if extensive radial or CBD-centric public transport network. Connections to most other destinations are poor. While this problem may be overcome by coupling bicycles into the existing public transport equation – that's a path beyond the imaginings of most Australians who seem to have an aversion to anything smacking of non-sporting physical exertion, let alone environmental sustainability.

So how would a public transport levy 'make Melbourne marvelous'?

First, it would provide an explicit incentive to use public transport by requiring all urban income earners to pay an annual amount in much the same way as we

currently pay for vehicle registration, Medicare, and the fixed costs of reticulated water, electricity, waste-disposal, etc. Public transport would then be free at point of access, a social revolution!

How such a levy would be struck and collected would have to be a study in its own right. At first glance, since outer suburban residents' access is poor but their use extensive in kilometre terms, it seems that a fixed levy for all people within the MET-system's catchment would be a fair and straightforward mechanism. The usual equity measures would apply.

Once the hurdle of implementation was passed, its user-friendliness would become obvious. Visitors, the young, the old and disabled people of all kinds (the sick, physically disabled, frail, non-local-language speakers, etc.) would benefit especially. Many of the current disincentives would vanish as the clear incentive to use it became apparent.

Levy payers would know they had paid and so would be encouraged to use it *and to be responsible for it*. At present the real payment is hidden; it is taken from 'consolidated revenue'. Its payment is not brought to our notice. Therefore it's easy to understand why we feel no responsibility for it. An annual public transport levy rate notice would also be an opportunity to bring news and views about the system to users, just as we do today with water rates.

Rising patronage would lead to fuller vehicles, more frequent and faster services, better connections and so on and as these improvements became apparent, patronage would increase further. We might then see a real reduction in the costs of transporting each person.

The levy would provide a real and trouble-free income beyond its establishment and annual collection costs. It would enable ticket police to become transport assistants and in the same vein would permit the *disarming* of railway stations. All travellers would be equally welcome. Stations could open their existing exclusive real estate to community and commercial interests. The many empty and vandalised (another running cost) stations could be let to 24-hour users such as the police, health centres or other community activities whose very presence would render stations safer.

These community improvements would constitute a powerful and comprehensive growth of social capital.

The eventual mass shift of commuters to a now efficient and well-patronised public transport system would offer numerous and far-reaching environmental and social benefits. Similarly it would offer comprehensive health benefits. Beyond the benefits of pollution reduction, well-patronised rapid transit stations would eventually be within walking or cycling distance of everything, thereby providing healthy exercise.

Finally, a social benefit worth mentioning in its own right would be the disappearance of the Orwellian potential to monitor our movements (cf. the

barcoded commuter passes being proposed – for motorists too!). The potential to monitor people movements is touted by some as a benefit of the new electronic billing systems and they are apparently already being introduced by urban public transport providers overseas.

In this regard public transport is different to most reticulated services, such as water and electricity. It is a form of telecommunication, not a *good* physically independent of its users. There is no pressing social need to curb communications. Indeed, the opposite is likely to be the case because being with each other voluntarily is usually a social plus, so billing systems for communication should neither be restrictive nor send restrictive messages.

While there are some environmental reasons for curbing the use of public transport and even for curbing telecommunications, they are trivial by comparison to the environmental disaster involved in persisting with commuting by driver-only car. They are also trivial compared to the democratic potential of unfettered human communications!

In terms of the power of the stranglehold of the current 'necessity' to own one's car, a public transport levy may well be seen as a perverse incentive itself. To government and the taxpayer, however, the overall cost of public transport would not change; it would only be exposed and the public benefit from these government dollars would increase. In terms of community enhancement and environment however, there would be no perversity, only benefit. ■

# *Safe cycling*

Adapted from 'Safe Cycling – Uses of Limited Vulnerability', published in *The Social Educator*, April 1991, pp.17-26.

## *Holistic education and the bicycle*

There are at least three reasons holistic educators might give serious consideration to safe cycling.

1. Their students (and perhaps they themselves) ride bicycles.
2. The bicycle is justifiably the symbol of ecologically friendly technology and is still the only means of high speed auto-mobility. *We* as holistic educators, are therefore obliged to push it, and in turn to investigate the context in which we might do so safely. The irony in the necessity of the *automobile* to move its 2,240lb of material to transport 140lb of immobile person should not escape us.
3. Cycling and its vehicle represent a relatively simple technical process. In seeking to understand how it is socially constructed we gain experience that will enable us to approach far more complex technological processes, such as genetic engineering, micro-processing and nuclear power with the beginnings of participatory insight.

Of all devices associated with holistic values and environmental concern in Western industrialised societies, the bicycle must be first. Many people concerned to practise holistic values ride bicycles in an essentially hostile environment: road traffic. Moreover, many young people ride with little insight into what safe cycling means and I would imagine that the case with adult cyclists is not much better. Present bike-safety programmes are adequate in terms of current legislation and the machine-oriented view of the world that our legislation reflects, but lack understanding of the social dimensions of the automobile/mobile-self interface.

In situations of relative balance between actors in a drama, ignorance of social dimensions on the grounds that they are the same for all actors may be reasonable. In the case that concerns us here, however, we have a situation of dramatically unequal coexistence, a condition in which one set of actors appears to be totally vulnerable in relation to the other.

The deaths and injuries among cyclists – especially of school age – are tragic and to the extent that environmentally concerned teachers advocate cycling, it is imperative that they (we!) develop and teach a robust programme of bicycle safety.

To encourage cyclists to improve the safety of their cycling environment, the discussion begins by exploring something of how tools in general can make us vulnerable and then how we might use an understanding of this vulnerability to arrive at cycling behaviour consistent with safety in motorised urban traffic. The discussion is deliberately built around the bicycle used in a restricted role as urban commuter vehicle.

## *Tools*

Tools extend what can be done and experienced. Today's tools, for example, are responsive to a very much wider band of the electromagnetic spectrum than our innate senses. In addition to heat and light, machines 'sense' a wide variety of radiation types and translate some of their invisible (extrasensory!) characteristics into forms that can be assimilated (radio transmissions to sound, for example). Similarly, other tools extend other activities and some tools enable us to perceive quite new functions that have no precedent in our old ways of seeing. For instance, we travel regularly at twenty times walking speed, fly, use artificial kidneys to prolong life and use chemicals to alter states of mind.

With all tools, however, it is rare that anyone should want to have them simply for the experience of interacting with them, rather than with what they mediate for us. Computer hackers and some motor enthusiasts are examples of people thrilled by their machines but we shall see that even here the situation is not that simple.

Beyond the money and status successful design attracts, design engineers themselves are usually interested in the understanding of nature facilitated by a design, rather than in some abstract fascination with its material realisation. Similarly, a 'trail bike' or 'dune buggy' may appear to provide 'unnatural' thrills but the thrills are not unnatural, only the means to them are. Feeling that one is in control of one's machine (as with a hacker) and perhaps of the terrain (in the case of a motor enthusiast), that we are attracting the attention of others to what we are doing, that we enjoy the physical experience and so on, are all natural experiences even if the means to gaining them are artificial. An artist portraying a machine on canvas is actually communing with herself while painting; developing her capacity to portray and to excite the imagination of others through her work. Our computer hacker is similarly involved in such genuine, ordinary, personal experience. In all these ways tools are *mediators* of nature, transducers that facilitate types of natural experience.

Natural as the experiences they facilitate may be, the interactions we are involved in with technology are increasingly ones of alienation and vulnerability. This arises as a direct consequence of the social and epistemological (ways of knowing or thinking) structures upon which our society and therefore our technologies are based. Without going into how this happens here (for this see 'Technology and the

Loss of Self' in Chapter 1: Response Ability), the basis of vulnerability stemming from, or *coherent with*, our interactions with our technologies lies in the way they define our understandings of our *selves*. While there is no way around this, i.e. any interaction with nature through technology is necessarily defined by the technology, there is no reason for not working to recognise that it happens and how. What follows is an attempt to do this for the bicycle in a context of urban motorised traffic.

## *Vulnerability*

We are vulnerable to the extent that we become non-creatively dependent upon, or feel controlled by, something (or someone) that for its part appears not to need us. This can be interpreted as not being in control of something we feel we should be able to control. It can occur when we depend upon something we do not understand or when we are in a situation where other living things need not or are not able to *care* about us. Cyclists, for example, depend upon motorists who are usually unable to conceive the cyclists' situation on the road.

In respect to technology then, understanding means that:

- either the person using it or someone whom that person trusts must know its mechanics and programming intimately;
- the person using it is capable of understanding how to use it optimally; and
- the community that developed and uses it understands its social and environmental implications sufficiently for it not to create irreparable harm to either society or environment.

Similarly, when living things care about us we are relatively safe, for the essence of caring involves identification with the cared for, which in turn is a recognition of reciprocal dependency and mutual benefit.

If a technology or artificial situation upon which we are dependent is opaque in some way, we are at risk. Thus, if a bicycle lighting system is based on imported, sealed, high technology equipment, we risk not being able to repair it. Equally, if we or our actions cannot be understood by the people with whom we are interacting, we may again be at risk. For example, motorists regularly enter traffic up 'T' intersections and strike cyclists travelling along the top of the Ts. The motorists invariably maintain that they simply did not register the cyclists because bicycles are not normally expected objects of traffic; they may be seen but are not registered, identified with or *cared for.*

## *Safety*

Tools are used safely when they become part of us. If we think of our hands as tools, we use them best when we *know* them and their potential intimately. We may choose to use them dangerously to some extent, but if they are known to us in the sense I am developing here, we will only hurt them within the bounds of

their capacity to heal themselves – as when we pick blackberries. In the same way, we can develop intimate knowledge of our tools to the extent that we become *one* with them. Once expertise like this is acquired, the tool being used slips from consciousness and appreciation of the natural thing the tool was originally employed to facilitate may occur without the tool intruding. In 'Knowing and Being' (1969), Michael Polanyi described how blind people develop a feel for their surroundings through their canes, which become extensions of their beings. Similarly Abraham Maslow (1966) describes how expert wood carvers, violinists and bakers all develop oneness with their tools. Bakers' tools, by the way, are often still their hands.

It is a commonplace that expert tradespeople (e.g. 'master' carpenters) also understand the maintenance and origins of their tools. This raises an important aspect of expertise, namely that it is not incidental that experts know their machines intimately. In fact the reverse is the case; they are expert precisely because they have intimate understanding of the tools of their trade as well as of the way they are used. They know a great deal themselves and what they do not know is the province of others whose knowledge they trust. Although more complex, precisely the same situation applies to work with people. A good social worker, barrister or manager recognises the social structures (traditions, laws, ways of thinking and so on) that give form to the lives of their clients. All social intercourse is *in-formed* ('hard-wired') by such hidden structures; they allow us to function and in a sense they are our humanity.

We become expert with tools, then, by recognising what we can of the technical structures underlying them and working assiduously with them until both the tools and the theories drop from conscious view. What remains is the new and largely inarticulable knowledge of expertise (Dreyfus and Dreyfus, 1986). In such work lies the essence of safety.

## *Bicycle commuting in a motorised environment*

There are those who argue against requiring cyclists to wear safety helmets by law, claiming that encumbrances like helmets contradict the essence of the bicycle which in many respects is indeed the 'freedom machine' (see for example, Colebatch, T. 1985, 'Spoke in the Wheel of Freedom', *THE AGE*, 8 Feb., p.13). In the sense outlined above, the bicycle is intrinsically less vulnerable than motorised means of transport. Nevertheless, the argument against legislating for helmeted cycling is simply not an appropriate response to cycling in an environment structured for and by cars. The path to safe cycling in a motorised environment begins by recognising the conflicting environment and then learning to act accordingly – *insinuating* the bicycle into it. The remainder of this article will outline how this insinuation might be pursued.

The commuting environment comprises hardware, rights-of-way and behaviour which may be described as follows:

### *Rolling stock*

The obvious difference between bike and car is the physical. First, the car is a motorised, heavy, four-wheeler, while a bike is a light, narrow, two-wheeler. While for the bike this spells great efficiency, it dictates vulnerability to sideways impact and a path (travel behaviour) that is unpredictable to people who are only used to the behaviour of cars. Cars also offer metal encapsulation, speed and acceleration. The last two are rarely of much use during commuting trips but are still justified on the basis of allowing motorists to extricate themselves from difficult traffic situations. This again reflects the common misunderstanding of what constitutes safety (of which more below). More substantial reasons for these mechanical characteristics arise, of course, out of the logic of the private car. Few of them have to do with optimal commuting under any definition of urban commuting.

### *Rights of way*

Roads used by bicycles are built for cars and trucks. They are hard and full of discontinuities, such as bumps, holes, entries and exits for cars, parked cars, lanes (to get across) and difficult turns. Roads are also polluted and noisy (try talking to a child on a rear bike seat in a busy street). Finally, roads are controlled by laws and police, both acting with the motorists' interests and motorised structures foremost.

### *Psychological and social environment*

The contrast between perceptions made 'through the windscreen' and those made 'over the handlebars' is rarely considered, despite it being a fertile area for intervention on behalf of cyclist safety in a motorised environment. This is an example of the neglected social construction mentioned at the outset. It is my experience, moreover, that understanding 'the view over the handlebars' is the most accessible and powerful means to safe cycling available to the cyclist. I shall proceed by listing various aspects of the relationship between cyclist and motorist but stress that some of the responses related may not be experienced consciously; they are my interpretations.

Behind the windscreen (i.e. in the motorist environment), cyclists may produce feelings of:

- Incongruity or 'cognitive dissonance': originating in the contrast between the power and weight motorists use to operate at speeds that ultimately are not much greater than cyclists attain.
- Vulnerability: successful use of the bicycle for urban commuting highlights the dependency of motorists upon mechanical power and technologies, neither of which originate within them. In other words, motorists use a tool whose

major characteristics are strongly divorced from our everyday understandings of ourselves; they are not even amplifications of powers or prowesses that motorists may already hold. Cars, in common with much of our technology, are in a real sense fantastic – an observation that explains something of their popularity. Therefore, the notion of *oneness* with this technology, which builds on a clear relationship between user and tool, is a difficult task. It is *not* impossible, however, as anyone who remembers Fangio or Sterling Moss and their hugely expensive technical teams will attest.

Another implication of the persistent presence of the bicycle is that it questions the validity or legitimacy of the materialism underlying an attachment to our motorised transport system. The current apparent confirmation of self that some of us derive from driving may be exposed as a sham, for there is nothing particularly heroic or self-affirming about controlling powers that do not derive from ourselves and over whose control we have such tenuous and limited hold.

These implications are the essence of vulnerability; a world view of strength dependent upon poorly understood foundations. It compares with one that derives from the *inner* strength which relies upon incorporating a deep understanding of the system of which the cyclist is a part into the cyclist's own being. In this way the bicycle subverts the legitimacy of the automobile and is therefore a threat to the system of invulnerability based on material protection. Compare the following outcomes:

- Guilt: the aware motorist is conscious of the load motorised commuting places on resources and environment and that, all this notwithstanding, s/he is still driving.
- Aggression: arises first in response to the obstruction to traffic that cyclists present but interestingly, it may also be a response to guilt triggered by the criticism cyclists represent, as outlined above. Further to these, two additional and apparently contradictory sources of motorist aggression may derive from perceptions of cyclists' own:
    - Aggression, such as when they flaunt the freedoms their bicycles offer by blatantly squeezing through columns of traffic, taking to the footpath, cycling through red lights and so on.
    - Vulnerability. Here the motorist demonstrates a perverse but well-known reaction to Gandhian non-violent procedures, i.e. to lash out in frustration against them.

To the cyclist sitting behind handlebars, the motorised environment engenders substantially different feelings. Some of these are:

- Insubstantiality, irrelevance, juvenility and impotence. In addition to overt, and quite normal, motorist behaviour that belittles the cyclist, other factors underlying the sense of the bicycle as a toy or 'at best' a sporting good are its:

- Dimensions: the big gap in static (size, weight) and dynamic (speed, power) dimensions between car and bicycle.
- Politics: bicycles do not require much from 'developed' economies and therefore will not be accorded the economic (and therefore political) respect that an economic dynamo such as the car commands. Curiously, in Australia at least, the bicycle industry itself underscores this position with its low standard of – and charges *for* –maintenance and second-hand bicycles. Fortunately (I am only half serious), this is beginning to change with the renaissance of the bicycle as a middle class recreation.
- The immaturity associated with it: cycling is associated with childhood activities and frivolity. The frivolity is underscored by the assessment that goes, 'someone who so underestimates the dangers and so willingly foregoes the time savings and the luxuries rightly accorded an adult must be lacking in adult purpose and seriousness and therefore can hardly be a responsible parent or be conscientious about getting to work'. (From an angry, anonymous parent.)

Finally there is simply the:

- Omnipresence of the automotive environment, unyielding and threatening in its hardness. Its hardware and rights-of-way are concrete in both material and metaphorical terms. Busy streets become barriers to natural communications thereby encouraging the spiral into technological bridges (phone, fax, TV, computer networking...).

- Aggression: as with motorists, the most straight-forward source of aggressive behaviour arises in response to unexpected obstructions in cyclists' paths. Other sources are reactions to the impotence outlined above, such as deliberately flaunting the freedoms mentioned to (perhaps) 'even the score'.
- Vulnerability: engendered by the impotence described above, on the one hand, and motorists' aggression on the other… that is, in addition to a persistent awareness of the inorganic hardness of the environment in which s/he cycles.
- Indignity: arises from the nakedness of one's condition as a cyclist: sweaty, flushed cheeks, rapid breathing and sheer vulnerability (cf. the feelings engendered by watching a loved friend cycle away among trucks and cars...) all rendering the cyclist undignified in the current social contexts s/he rides through.

## *Safe cycling*

In our motorised, dualistic world, safety arises by applying a policy of 'isolate and shield'. The ultimate realisation of isolation being the expressway (or *freeway* as Melbourne's optimistic road makers call them); while that of shielding is that armadillo of cars, the Volvo. The ubiquity of the car depends, moreover, upon the existence of experts, capital intensive workshops and some means of spreading

responsibility and expense for all types of malfunction. The latter (maintenance) function is met by maintenance contracts, automobile breakdown services and nationalised insurance and rehabilitation schemes, which in effect socialise access to it.

The extent of these requirements for expertise and capital are such as to require in turn, a large economy (transnational, in the case of small countries) for their continued existence. Therefore, a necessary loss of involvement of users in the transport task occurs. The anonymity and vulnerability implied by such a system are the basis of what Tibor Scitovsky has called 'The Joyless Economy' (1976).

Safe and continuous cycling on the other hand cannot – yet – be provided in this way. The very 'green' characteristics of the bicycle in industrialised societies mean that safety and maintenance can still reside in the joyful or 'vernacular' (Illich, 1981) economy as against the formal economy in which (necessarily) cars are produced. In Third World countries, incidentally, bicycles may still be relatively 'hi-tech' – it is the relative status that counts!

Cycling in this way actively involves users in the provision of their own safety and maintenance. Essentially, such safety arises through cyclists knowing or feeling when they are riding dangerously and, once in trouble, knowing that they can turn to the numerous informal systems around them for help. To put the situation in the terms used above to describe the motoring environment (shield and isolate) the cyclists' environment is one of 'know and share'.

*Knowing* refers to a well-known consequence of vulnerability: sensitivity. The immediacy of hurting oneself on a bicycle quickly trains the cyclist to remain within the realms of what s/he can deal with. There is simply no opportunity to 'accelerate out of a difficult situation'. The dimensions and consequences of dangers on a bicycle are both more obvious and more limited than those involved with motoring. Further, the accidents that inevitably accompany acquisition of knowledge about one's situation on a bike are limited in scope and rarely involve injury to second, let alone third, parties. In respect to maintenance, the realities of commuter cycling ensure that cyclists will look after their machines in conformity with their cycling situation (see next section on sharing). In the beginning the maintenance strategies learned may not be sufficient to prolong the life of a bicycle, only to keep it going. However, as the cyclist's experience grows, long-term maintenance strategies will appear.

*Sharing* refers to the opportunities cyclists have to call on their (social) environment for assistance. These are extensive and of course most rewarding to use. In the first instance cyclists have recourse to each other, the passing public, and facilities of all kinds en route are another level of assistance while motorists themselves are a benign but often hidden resource. Cyclists do not recognise them as such, much less have the wherewithal to approach them for help. Using these

'resources' often results in a sequence of pleasant consequences, which hardly need elaboration. The primary problem in using them is simply that we are not conditioned to seek assistance in this (nominally 'free') domain.

The last point is also worth dwelling upon. The car is heavy – we cannot simply lift it up and walk away with it. It is also complex and expensive, all characteristics that fit it well into present social frameworks which seek to monetise and socialise (spread around) the costs of activity. Once a device is assimilated into the system, there is no need, and no expectation, that we will draw on informal social structures to keep us going. A primary consequence of the dominance of this way of doing things is that informal systems atrophy. Their disappearance leaves us with the kind of fundamental vulnerability we see daily on our roads where stricken motorists, for some reason, cannot immediately lock into formal structures of assistance and other motorists, resentful of the blockage they cause, drive around them. In addition to this, there is the persistent fear of this happening; a fear I suspect most motorists carry with them all the time.

The approach to safe cycling advocated here is concerned to resurrect, or at least save from total subversion, a way of helping ourselves that, in the first instance, relies on *creative dependency* or responsible use of the humanity and expertise of people around us. In conclusion, I offer a few recommendations along these lines.

Our aim is to develop a feeling of trust in our machines and in the social context that supports them and through which they roll. This means recognising the learning process itself, for example, that in the beginning, a simple bike and simple route are safest. Then:

1. Get to know your bicycle and how it handles on the routes you are likely to encounter. Aim to be so much at one with its mechanics and the routes it will take that its operation becomes subconscious, allowing your full attention to focus on the traffic (cf. the way drivers internalise manual gears in a car – we change gears subconsciously after a time, leaving our attention free for other things).
2. Learn to *drive* and observe:
   - how a car moves and how it 'uses' the road; and
   - how cyclists appear through the windscreen – note your own reactions to them for they will educate your behaviour as a cyclist (in motorised traffic) more effectively than anything else.
3. Consider and act upon the psychology of motorist-cyclist relationships, e.g. be predictable to motorists by say:
   - using your awareness of the behaviour of cars on the road to help you to ride in the same way as cars move, i.e. in straight lines without weaving, and starting and stopping without wobbling.
   - recognising the impact, or lack of it, that cyclists make upon drivers and not playing with this awareness ( e.g. do not flaunt road rules).

4. Do equip yourself with safety gear, but remember that it will be useful only if it does not detract from the oneness you have established with your bike. Beware, in other words, of the subversion of safety by:
   - spurious 'safety' equipment that does not add to your safety (you must *know* your accessories too);
   - excessive safety equipment that turns cyclists into clowns, hypochon-driacs or show-offs excessively concerned with themselves and therefore into objects of derision – a state not conducive to safety; and
   - other accessories, such as 'Walkman' stereo headphones at the most extreme end of the spectrum, but also multiple gears that require persistent attention (conscious thought or effort) to change.
5. Recognise that cycling encourages contact because cyclists are not isolated from either their environment or their fellow road users, and note that excessive safety (and other) equipment can armour and therefore isolate you on a bicycle almost as effectively as the metal-glass shield of the car (see again Sennett 1974).
6. (Very much related to 5) enjoy your vulnerability – the openness and accessibility to others and to environments that it offers you. Nothing will encourage others to join you more than if you are seen to be creatively dependent and enjoying it! ■

# *Soft cyclists in hard streets*

Adapted from 'Soft Cyclists in Hard Streets: The Social Dynamics of Traffic for Safe Cycling and a Safer World', presented to 'Greenhouse '91: Changing the Climate of Opinion' Conference, Greenhouse Association of South Australia, Adelaide, 30 Aug. to 1 Sept. 1991.At the time of printing, a version has been accepted for publication in the *International Journal of Environmental Consumerism*.

Many factors drive the environmentally concerned to look wistfully at the bicycle; if only…

The nineteenth century bequeathed Australian cities radial train networks appropriate to the commuting needs of few twenty-first century residents. However, if commuters would cycle to and from railway stations, memorise train timetables and a few other infrastructural details, the old network would suddenly cover a large part of expected twenty-first century commuting needs. Modern clothing renders the bicycle appropriate even in cool and squally Melbourne; while today's light-weight, strongly-built, geared bicycles make light work of even Sydney's hills.

For all this, of my thousands of mature-aged, post-graduate environmental science students fewer than 5 per cent consistently commute by bicycle (i.e. for all the environmental goodwill in the world). Factors that motivate the 95 per cent of otherwise enlightened people to persist in driving the planet to a premature 'heat-death', not to mention driving the Australian population to obesogenesis and its many consequences are the subject of this paper.

Put like this, the question suggests social and psychological motivations rather than simple technical ones, such as 'too far to go', 'no public transport nearby' etc. To most of us these motivating factors will appear to be formal, money-related economics; legal strictures and interpretations of physiological stress, such as the apparent effort involved and the supposed comfort and safety compromised. Few would recognise private ownership (here, of our cars) as a primary social determinant of how access to cars is gained. That is, few recognise that we-as-society *choose* private ownership as an organising principle which then plays a strong role in determining the way our daily lives are *constructed*. Few recognise that definitions of comfort and convenience that compromise personal fitness are non sequiturs. Nor do we know to question the big ideas[1] that assert, on the one hand, that we individuals are independent entities in an objective world that lies

outside us simply awaiting our decisions to operate upon it and, on the other, that the objective world is ours to exploit and, more, that we are lacking (in, for example, entrepreneurial spirit) if we don't exploit 'it'.

The idea that somehow, we *construct* the way we see trees, say, and therefore *construct* the way we interact with or use trees, would be credible to few. Similarly, we do not understand our cities – with all the hardware we have constructed in them – as *visible representations of ways of thinking* that are carried around in our heads. Our expectations do not include a capacity to recognise that everything we do realises some socially constructed way of doing things borne in our heads and therefore, that much of these ways of doing things is not *human nature* as commonly thought, but rather, *social* nature – which is eminently changeable![2]

To illustrate this, let us examine a news item. In response to the 1991 Hawke (Labor) budget the Federal Opposition Leader, Conservative, Dr Hewson, was provoked into saying,

> *I am proud that I had the opportunity to work hard in this country and earn enough money to buy a Ferrari. I have no embarrassment and shame about the fact that I managed to be successful, and every other Australian would just love the same opportunity for their kid.* (*Financial Review*)

While I doubt that many of *my* readers would want such opportunities for their children, what Hewson probably could not see was that while Australians may well want the open society that enables the opportunity for their children to buy a Ferrari, it is not human nature that dictates this, but just one interpretation of the best interests of children. Hewson's limited approach is a recipe for a 'joyless economy' (as Scitovsky 1976 called it). It is filled with internal contradictions, such as the meaninglessness of aspiring to a Ferrari-lifestyle when everyone can have it.

The point of such a lifestyle is precisely that everyone can't have it! The impossible resource demands that such a lifestyle would present is still (fifteen years later) an issue that does not arise in public discourse, despite years of exposure in the thoughtful literature (see, for example, Hirsch 1977 and Leiss 1978, not to mention Veblen 1994, original 1899, or… Christ 0000!). It completely misses the point that such an aspiration is itself part of an elaborate construction that is our, particular, political economy. Moreover, it misses the point: if we were to recognise how we construct our political economy, the personal expectations that go with it and the responsibilities we have for their consequences, then we may well regard the behaviours of Hewson (and Hawke, Howard, Bush, Blair et al.) as those of social pariahs – people acting in grossly irresponsible ways. That they are *not* regarded in this way means either our social structures are so opaque as to block the view of the consequences of materially-excessive lifestyles, or that,we already are so aware that we tolerate such ignorant behaviour as a manifestation of the necessary slowness of social change, That is, 'to know all is to forgive all'!

Naturally, it is the opaqueness that I believe we must clarify. However, to clarify, it is more revealing to look at the problem as one of an absence of intellectual tools than of clarifying a particular opaqueness with existing tools of clarification. The reason for this is that if we are personally empowered with these tools for investigating social structure, we can clarify anywhere, any time and under any circumstances. Whereas, if we seek to clarify just one, *particular*, structure such as the legalities associated with conveyancing (selling real estate), we will be able to handle conveyancing without being able to generalise the insights we have developed to other situations.

The biophysical down-sides of current developments *and* parallel attempts to 'fix' them independently of their contexts fill a good proportion of our daily papers. Controls on development are a first step to recognising contextual limitations. These limitations can be gauged by observing the persistent:

- tightening of standards upon which developments are based;
- development of new criteria which force extensions to existing standards;
- recognition of new phenomena altogether, which force construction of totally new standards.

Who, for instance would have thought that antibiotic (over)use might pose a threat as great as the succour antibiotics first brought [3], and who in Australia knew about the ubiquitous magnetic fields that pervade electrified environments until the Australian Broadcasting Corporation's *Four Corners*' programmes brought them to public attention in the early 1980s (see, for example, 'Submission on Electro-Magnetic Radiation' in Chapter 6: A Range of Environment Issues). Such public questioning only highlights concerns, it gives no insight into underlying mechanisms nor assistance with establishing the (social) structural bases of the phenomena that have eventually pushed themselves into the public eye as 'concerns'. The persistence and acceptance of disturbing (both senses) industrial practices, such as the mining, processing and use of asbestos, despite public questioning, for virtually the whole of the twentieth century is a particularly nasty example of the impotence of whistleblowing without recognition and action on social (here political and economic) contexts.

One characterisation that provides a useful explanation in terms of isolating and defining social process is to see present approaches to environmental degradation as *displacement* activities. The majority of responses that arise from the organisations we currently entrust to deal-in-the-public-interest with dislocations (mainly governments and large corporations) are defined in terms of quantitative scientific parameters that describe the dimensions of the immediate breakdowns. With data like these in hand and no contextual insights to draw upon, such as the bases for choosing the particular data, severe rains or earthquakes are thought to be *the* cause of the property inundations and deaths that make

headlines precisely in terms of the data at hand! That data is privileged because it is data (quantitative); we are not used to social analysis as data (qualitative) and of course newspapers are loath to permit extended analyses as news!

We are not used to seeking causation in the social structures that, in our example, push people onto inundation prone lands. Indeed, the idea that we might look for causes of this kind does not arise[4]. The response within the current view is to build barriers against floods and to warn people in time to allow them to vacate 'their' land. The thought that we might alter the social structures that put people into such dangerous situations is not available to us as socially (politically) viable. We have not been educated to see social structural determinants. Our education did not include Bateson's education about education.[5] Even where such thinking is available (e.g. the policy staff of Oxfam), it is seen as threatening and difficult to use in the public domain. It is in professional use today in 'development studies' and areas such as social work. So, outside university tutorial exercises, it is not within current popular imagination to seriously countenance a situation where a government *or international NGO* might buy inundation prone land (for example, in Dhaka or Funafuti (Tuvalu)) at current (i.e. fair!) market prices, then assist its present owners/inhabitants to resettle on some equivalent non-flood prone lands and finally, prohibit resettlement on the original flood-prone areas.[6]

The level of abstraction we bring to our efforts to deal with our problems is simply too low. Mark Sagoff put it this way:

> *Americans had a rough idea of what would be necessary to beat the Russians to the moon. The costs were reasonable; the technology available; the political forces in place. When the United States declared a 'war against pollution' in the 1960s, however, no one knew exactly what would be required to win* (1988).

Using this insight then, and motivated by a desire to commute in our cities as if they, and more particularly *we*, mattered, let us see where an awareness to the social construction of *traffic* leads.

## *Getting there safely*

In 'The Myth of the Efficient Car' and 'Commuting the Car', I considered a variety of aspects of traffic illuminated by an awareness to the social structures that create them, and in 'Safe Cycling', I examined the bicycle as a tool. It is time now to investigate behaviour, and the role the bicycle plays in the title of this piece. The behaviour we observe in traffic is conditioned in part by the material determinants of traffic but also by hidden social determinants that give the material elements of traffic their structure. The ways we have learned to think about the elements of

traffic determine the behaviour we observe. Only part of these is conditioned by engineering realities. I shall illustrate this through a discussion of safety in traffic.

For my purposes let us think about safety as a condition in which we feel in control of the determinants of our activities and recognise that this includes feeling confident about knowing what the determinants are. In the case of traffic I have suggested that most of us feel that we have *no choice* in the ways in which we interpret our transport duty. The interpretation of safety is a case in point. Knowing that I ride a bicycle, my students deliver paper after paper demonstrating how, for various reasons, it is quite impractical for them to be bicycle commuters. They are all enlightened, mature-aged, Master of Environmental Science students. In addition to politico-economic structural arguments that show quite powerfully that society couldn't (wouldn't) tolerate a massive decline in private-automobile commuting, feminists argue for the 'freedoms' a car offers them to participate in a patriarchal world. Riding a bicycle would, in both cases, seem to be a case of cutting our noses off to spite our faces.

While these arguments are reasonable in the contexts they are made, I can see little alternative in the long run, to changing the contexts they are based upon and … *preparing the ground for new contexts requires some of us to do that preparation*. It is not just to provide intellectual constructs coherent with another, sustainable, way of being, but it is also to provide the bridging examples of practice that will enable us all to cross to them with confidence. Further, those of us who recognise a need to change, will have to strive to make our new constructs (ways of doing things) and the bridging activities to get to them, *attractive*. In the present case that means cycling in traffic as it is, using public transport as it is while at the same time devising new traffic variants, facilitating connections between modes and so on. Showing, in other words, that these things can be done and more, that it is fun to do them.

The case of safety in both cars and on bicycles is transformed if we shift our thinking from the 'armours race' mentality of present safety approaches – in which the 'Hummer' is today's ultimate armoured road vehicle – to the apparently perverse notion of safety inherent in vulnerability. This argument is again based on the notion that if we know our vulnerability *viscerally*, i.e. if we can feel it, we will act in a safety-enhancing way.

The case of cycling in traffic is of interest for many reasons besides challenging conventional (wealth-enhancing/life-defeating) notions of safety. Beyond the simplistic notions of threat to wealth, there are extensive economic benefits inherent in switching to the bicycle. In addition to the, as yet not well internalised, economic benefits of pollution reduction, minimisation of resource and space use, etc., there are many other economic benefits to be found at the personal as well as the national level. These will eventually replace the wealth generation

based on DODO (driver-only-driver-owned – see 'Reclaiming Urban Wealth by Disowning the DODO' in Chapter 7) automotive commuting. Beside the liberation that reduced oil imports would bring (reduced military expenditures), there are innumerable social benefits associated with the flexibility and low profile of the bicycle (it is light and can be carried with one anywhere) and with the personal connections the accessibility of the cyclist fosters. Cyclists are not boxed into an insulated capsule that must be legally parked before leaving it. At a more general level, however, there are the opportunities cycling offers for the preservation and empowerment of the softnesses that constitute our humanity in an essentially hard or machine-based society[7].

By building into itself many 'mundane' human functions much of modern technology makes it hard for individuals to *be* themselves. Aside from 'machine' models of ourselves, such as the common view of 'intelligence' we are often defined by, and seek to define ourselves, through our machines cf. the 4WD/SUV owner.[8] In addition to a failure to understand that our humanity relies on being connected with the nature that is (i.e. sustains) us, most *hi-tech* devices actively discourage our involvement. So, from the Rolls Royce that is so silent that one only hears the clock ticking, to 'user-friendly' hard *and soft*-ware, it is expected of us that we will not *want* to be involved with how our devices mediate the natural experiences they are designed to bring to us. This is a subtle and insidious form of domination or imperialism (see 'Technology and the Loss of Self' in Chapter 1: Response Ability). Its consequences are never more apparent than in the case of disaster which leaves most of the surviving public with no idea about what disaster resources their communities offer, let alone how to engage with what is left of their infrastructures to commence their reinstatement. Civil defence training is not something wealthy societies want to bother their pretty heads about.

New techniques are introduced because they are more 'efficient' in some narrow sense. Innovation does not recognise the virtue or *efficiency* in devices that build sensitively on connections to what is already there and social innovations are in the main simply not considered.[9]

Cycling does both. It builds on connections already there and, since its technology is trivial (essentially eighteenth century) the path to its use today is very much in the realm of social innovation. Its technology is totally accessible, it meshes easily with other potentially sustainable commuter modes, such as the train and enhances their usefulness and, therefore, that of the investments in infrastructure that they represent.

## *And so, to soft cyclists in hard streets*

The initial feeling of vulnerability that cycling engenders, heightens our sensitivity to environment on the one hand and to the harshness of current traffic on the

other. To change conditions on the road to favour soft vehicles, practical politics requires that we present these intentions to responsible authorities and demonstrate to them that we represent a substantial vested interest. To do this safely and attractively however, requires on the one hand that we give much greater currency to the environmental and social benefits inherent in its use. On the other that we understand the social dynamics of traffic and this means recognising that we live in a world conditioned by a view 'through the windscreen' rather than 'over the handlebars'. I will conclude by elaborating two awkward circumstances.

There are many ways to put people down. In societies where basic needs are, in the main, met, one of the most important needs is that of defending and enhancing self-respect. This is the problem of maintaining *substance*. There is an apparent annihilation of capital implied by a transformation from a car-based society to a bike-based society. As explained above, this would not happen as such; we would simply get a transfer of wealth from the motor industry and its multifarious ancillaries to other, at best non-material, goods. Nevertheless, it is very clear that at present, riding a bicycle, no matter how pretentious the bicycle and attendant 'gear', cannot do for one's presence (substance) in most social settings what a flashy car can do. Indeed most languages now have a whole set of metaphors derived from cars and their performance. Aside from this obvious but trivial assessment of 'substance', there are more important manifestations of it that arise in daily life, such as the public assessments heaped on me when:

a) thirty-five years ago, my company secretary took me aside to warn me that a young engineer in my position should not be demeaning his firm by turning up to important meetings on a bicycle; and
b) twenty-five years ago, parents at my children's primary school expressed their disapproval for carrying my kids to school on my bicycle, stating that I clearly couldn't be taking my responsibilities as a parent seriously!

Somehow, then, we need to assemble the 'critical (social) mass'[10] necessary for approval to accrue to cycling as a legitimate way of commuting and, therefore, to cyclists as legitimate beings in society.

Secondly, recognising that through the windscreen, cyclists are seen as vulnerable, enables cyclists to remove their attention from the immediate presence of the largest part of automotive traffic to that part of it which, for many reasons, is *not* 'concentrating as it looks through the windscreen'. That is, our focus as cyclists must be on shaping our behaviour in traffic to events that distract the watchfulness of drivers. These will range across:

- topographic (e.g. crests) and road engineering conditions;
- traffic generated conditions, such as density, mix of forms (cars, trucks, trams...) and crashes(!);
- traffic interface conditions, such as where other diverting things are happening,

e.g. streams of traffic merging, where people enter vehicles (and doors open!) etc.; and

- behavioural circumstances (lighting a cigarette while driving; mobile phone use while driving, arguments…).

All of these are predictable and can be sensed and allowed for… eventually subliminally. This applies even to the last category, the personal behavioural status of drivers. Up to a point we can allow for this least predictable variable by, first, having experience of how *we* behave in such circumstances behind a wheel and by riding so as to cut through the preoccupation of such drivers while not antagonising them, e.g. by catching their eye.

By actively exercising our capacities to recognise social constructions we become much more sensitive cyclists – to the point where we can sense potentially dangerous situations from individual driving behaviours.

In the case of child cyclists, I have advocated (but not yet found the money to initiate) the production of virtual reality situations which would permit them to sit behind a 'virtual wheel' ('Link' or flight-trainer like) and through the experience of driving a car while looking through the 'virtual windscreen', develop an understanding of how cyclists are seen by motorists. In doing this the software would have to simultaneously involve its users in how it was constructed so that users understood how the virtual world was constructed. That is they would be involved in recognising that there is a difference between the virtual world and their virtual interaction with it and hard reality.

In conclusion, this last sentence raises the general point I have been trying to make throughout. The responsibility engendered by the approach I am advocating implies, at all times, to oneself as a co-evolving part of the environment we're acting *in* (i.e. not *on*!). This action in the awareness that we are recreating structures that affect others and their environments will help us to act circumspectly, openly and where possible, reversibly. It enables, indeed, a new golden rule: 'Do Unto Others as *They* Would Have Done Unto *Them*' – which requires of us a capacity to recognise the contexts in which others believe they live before we act. ■

Endnotes

1 In the jargon of the 'postmodernists' this is called a *grand narrative*.

2 This is what Garrett Hardin and his reviewers in *Science* of 1968, were not able to see in his famous paper 'The Tragedy of the Commons', i.e. the tragedy was not 'human nature' as he surmised but *simply* the social forms we (still) live in. Had this been understood at the time, his paper would have been ignored.

3 A subject well known to me as a) a chronically ill person dependent upon hospitals and b) the consumer representative on the National Health and Medical Research Council's Expert Advisory Group on Antimicrobial Resistance.

4 Remarkably this is even so with environmental data-gathering exercises which, despite interventions (in the Australian context) from this author, are usually collected without exposure of their socio-political contexts cf. 'State of the Environment' reporting.

5 Or, 'learning about learning' = learning how to learn/teach oneself. See e.g. Gregory Bateson's famous 1973 work *Steps to an Ecology of Mind*, not to mention the likes of Ivan Illich's *Deschooling Society* (1971).

6 It might be noted that some NGOs with international scope are now doing such things (cf. debt-for-equity schemes) which of course are beginning to generate their own colonisation critique: cf. Bill Cooke and Uma Kothari, 2001.

7 In remembering the relativity of social contexts, note that in another social context the bicycle can be seen as 'hard'. It was a machine of war in Vietnam. Among much else, it bore soldiers and cargo along the (in)famous Ho Chi Minh Trail.

8 Rugged characters? Or perhaps more realistically, fragile egos? Years ago I devised a bumper sticker for these vehicles: 'Robust vehicle for a fragile ego?'. Never produced it because the message was negative and what's needed is rather one that enables such drivers to see themselves as rugged per se, i.e. without their vehicles.

9 For years I have attempted to put the notion of a public transport levy on the political agenda. See 'Tax Not Tickets' in this chapter.

10 Critical Mass is the name of a monthly mass meeting of cyclists that takes place in various cities around the world to demonstrate the viability of cycling.

# *A bicycle diary*

Adapted from 'Perspective: A Bicycle Diary' (In Transit #1: Stories from the Bike-Rail Front – Melbourne's Best-kept Secret), published in *Ride On* (Bicycle Victoria), Feb./Mar. 2001, p.44. The 'In Transit' series by Frank Fisher continues in CERES Newsletter.

3.30 p.m.: At Clayton Station picking up litter while waiting for a train. *Gee that's kind of you*, says a freckle-faced ten-year-old fellow traveller. Had to resist giving him a hug; clearly he was (also) an eccentric – he had his baseball cap on the right way around.

3.35 p.m.: Climbed on, tied up the bike and sat with a couple in their mid-twenties … breathing the contents of a spray can of black paint. Must have looked at them dolefully for she said, *if you've got something to say mister, say it*. So I explained that I was chronically ill, had had twenty operations in the past forty years and that there really were better ways to fill one's life than sickness. She smiled, shrugged and went back to filling her plastic bag. For my part I struggled to find a more positive response, gave up, opened the window to allow the rest of the world to enjoy the fumes and resolved to approach government to prompt paint makers to find other ways of propelling their sprays.

4.00 p.m.: Out at Richmond and cycling up Hoddle Street to Collingwood Town Hall for the City of Yarra's Disability Advisory Committee meeting. Passing hundreds of auto-commuters sniffing their own exhausts, as they sit, self-assured in the knowledge that while they may be killing the world as well as themselves, it is in the best of company and aided and abetted by governments and all the devices the growth economy so eagerly and, properly, provides for them: drive-time radio, mobile communications, hot drinks … .

6.15 p.m.: Left Collingwood, passing the same lanes of stationary cars on Hoddle Street for Richmond Station; an express train to Box Hill and a short cycle ride up Doncaster hill to Car City (Manningham) Town Hall, arriving in the meeting room at 7 p.m. for the inauguration of the Yarra River Keepers Association.

The only other way to have done all this would have been by helicopter… and imagine the parking problems!? ■

chapter five

# CHRONIC ILLNESS

The articles in this chapter are written from the point of view of someone with an invisible disability. As such, they are a vehicle for 'coming out' as disabled. This is itself an important step in the process of empowering people with disabilities to take positive control of their lives. The articles outline a variety of ways to achieve this. They also deconstruct the way disability is viewed in society, so that all of us – the disabled and able-bodied – may benefit from a new approach.

# *The hidden majority*

Adapted from 'The Hidden Majority: The Plight of the Non-Visibly Disabled', published in *New Doctor*, 1981, pp.37-40.

The non-visibly disabled are chronic disease sufferers – the silent majority of all disabled. So silent indeed that even the sensitive, visibly disabled like the writer Alan Marshall overlook them,

> *It is difficult for a normal person – a man or a woman with no visible handicap – to understand the release from servitude that a cripple experiences when given work for which he is paid* (Knight and Scott, 1980).

In this paper I shall attempt to outline the discrimination to which the non-visibly disabled are subject, the implications for the individuals concerned, give some of the reasons for the discrimination, and conclude with a case for recognition of the disabled in general.

The discriminations the non-visibly disabled suffer may conveniently be divided into two categories, overt and covert. More particularly, these may be labelled the institutional (often backed by legislation) and the social. I shall deal with the overt first and only briefly, for it is the covert which are least recognised and which, I believe, provide a key to understanding the non-economic reasons for overt or institutional blocks to those with disability.

## *Institutional discrimination*

I shall sub-divide this section into the areas of employment, the provision of personal security (insurance) and education. It is generally accepted that mankind needs some form of 'self-actualisation'. That is, the possibility to build an image of himself – to develop a structure of self-respect based on the realisation that he can, that he is able. The nature of this self-actualisation differs radically from culture to culture and even from person to person within a culture. In our culture it is very powerfully connected with employment and, furthermore, employment is almost totally synonymous with working for remuneration. The extent to which one is able to 'find oneself', then, depends on gaining work which suits us and gives us a maximum monetary reward. The quote from Marshall confirms this and, as I implied at the outset, it is by no means only the visibly handicapped who know the experience he mentions.

Employment opportunities are most conspicuously limited in government situations. Here the dreaded 'medical' is enough to discourage the disabled from applying in the first place – in order to avoid the harrowing and depressing experience in getting as far as the medical and then being, perhaps kindly, informed that one's application cannot be given further consideration. It is interesting to note that in Victoria the public service is more open to the disabled than are statutory bodies (such as the Tramways Board or the Melbourne Metropolitan Board of Works). For this we have to thank the existence of the 'overworked and underpaid' equal opportunities group who do have certain powers within the Public Service Board but not within the statutory authorities. Local governments operate much like private enterprise, usually only requiring a medical for superannuation purposes. Except where the private sector becomes very large (and approximates government bureaucracy) medicals are not sought, other factors relating to capabilities and personality are more important. Given the nakedness of private enterprise (the need to produce to survive), employers in this sector usually show a remarkable degree of tolerance to the disabilities of their employees. Part-time employment is usually exempt from the medical in all sectors, a point I shall take up later. Finally, one of the saddest ironies is the blanket exclusion of the chronically ill from the armed forces.

Now, from the point of view taken here, there are two sides to the income derived from most jobs; one is the degree of security attached to it and the other is access to superannuation. Superannuation is attractive for two reasons: it aims to provide an inflation-proof income on retirement or disablement(!), and it almost invariably constitutes an addition to salary (that is, the employer undertakes to pay part of it). Superannuation, as already intimated, is either closed to the chronically ill or at best is restricted and/or subject to a 'loading' (extra payment by the disabled person). If superannuation must be based upon competing schemes offered by private firms it is easy to understand that the firms will require some 'loading' to take on the chronically ill. However, if we view secure employment of the chronically ill as one of the many positive discriminations of an enlightened community, there are many benefits which I shall outline in the conclusion of this paper.

In regard to questions of misuse of permanency and superannuation by the disabled, I believe that this is unlikely. In the first instance, it is hard to imagine that the disabled would not themselves select away from unsuitable work or work likely to exacerbate their condition. Secondly, 'using' the condition to shirk work is the opposite of my experience, which is that the sick try to compensate for present or future incapacity by doing more and being more conscientious than the average healthy person. I shall return to this in the section on covert discrimination.

The formal provision of security comes in many forms: permanent employment,

superannuation and insurances of various kinds, entitlements to sick and long-service leave.

## Permanency

At base line, where the chronically ill person is so unwell as not to be able to work full-time, the situation is little different from that suffered by healthy part-timers. That is, no tenure, no sick leave, no superannuation, etc. Of course the healthy may take out various insurances. The present general employment situation is working to better the imbalance between the healthy part-time worker and the healthy full-timer; not so with the unhealthy.

An economy like ours relies upon tenure of employment. The way of life that has arisen around it requires purchases at a rate and magnitude quite at odds with the size of short-term earnings. Long-term loans and hire purchase agreements require continuous employment. Similarly life insurance and superannuation schemes require long-term employment to make their rewards worthwhile – that is, for those who survive to enjoy the rewards. Those individuals who do not have security of employment and who attempt to live in the style of others on the same but secure salary must do so with a certain tension. The tension does little to aid the chronic complaint, and this particular refrain arises with almost every inequity encountered by a handicapped person: the inequity creates a stress which worsens the handicap which worsens the inequity and so on.

### *Sick leave*

The chronically ill will rarely take sick leave for minor ailments, 'storing' it for a possible decline in their chronic condition but – Catch 22 – sick leave is often not cumulative past one year.

### *Life insurance*

This is at best available at a premium, for which the sick must either work harder to pay or suffer a decline in material living standard.

### *Superannuation and health insurance*

As if the life-insurance (private sector) offerings were not poor enough, much of government still assumes a quite unabashedly fascist stance in its negative discrimination against the chronically ill by excluding them from superannuation schemes and encouraging the formation of health insurance for the healthy, thereby raising premiums for the unwell.

There is a final twist to this sorry tale and it concerns the provision of what the Swiss call 'Salar-aus falls-versicherung' – a loss of salary insurance which covers the insured for the loss of earnings while incapacitated. This can mean covering the loss of employment altogether. Such insurance is vital for the self-employed. In

Australia it is available from private insurers but for the chronically ill is expensive almost beyond belief. Recently the self-employed gained a victory in that the High Court allowed them to claim the premiums as a tax deduction. This is logical in that we have a 'free enterprise' oriented government; however, the situation for salaried personnel in regard to the tax deduction is still unclear, and the matter of easing the high cost of loaded premiums for the chronically ill has not yet been touched.

### *Education*

There are two issues here: the lesser is gaining access to awards; the major one is that of assessment. Certain scholarships are tied to the outcome of a medical administered in my own case *after* the scholarship was awarded. The scholarship was rescinded pending 'consideration' of my medical history. Six months slipped by before it was finally reinstated – the personal anguish those six months cost my wife and I was little less than a major bout with my disease. The problem of assessment and chronic disease is more subtle and widespread. Supposedly there is the possibility of 'special consideration' normally reserved for the one who falls ill just prior to or during the assessment. It is quite another issue to know how to allow for a chronic disease sufferer under examination conditions. Quite aside from this question is the commonplace that few wish to pass under conditions of special consideration. The answer to this problem lies in altering the type of assessment, rather than attempting to fit person to assessment. Many would benefit from such flexibility, a major group being menstruating women.

## *Social (covert) discrimination*

### *Coping with oneself*

Ours is a *doing* society, and the stereotype of the person who does (whatever that may be) is the able. Now this in itself is not a source of discrimination but given that we all have to take on tasks for which we are not stereotypically suited (are not suit-able) there are, necessarily, going to be many ways to 'do', each way being the modification of the stereotype to the individual concerned. These modifications may be ranked for various purposes, and herein lies cause for discrimination. If we cannot produce a certain amount in a given time for a certain number of years we are diminished; if we cannot act in a certain way under certain circumstances, we are diminished. The extent to which we are diminished is culturally determined and given the inbuilt aspect of the ranking system, the incapable or dis-able will also see themselves in this light.

Seeing oneself as a lesser version of a 'normal' person provides a handicap in itself. Hence the need for a disabled version of *black is beautiful*. The point of such an exercise is that we measure capabilities relative to the person rather than the race as a whole. No one denigrates the four-minute miler because a horse can do it

under three; by the same token the coeliac is equally entitled to feel he is a person even though he cannot eat wheaten bread. However, in competition – at the firm's canteen for instance – he will not be treated as such, but rather as an irritating stickler, or one who begs special consideration. Special consideration is not a quality given much support by Australian culture… it is positive discrimination, and there are few classes of people upon whom we willingly bestow it (children who show promise in sport are such a class). There are other issues which underlie the negative response to a call like this; I shall deal with them in the final section.

## *Coping with others*

### *The work place*

For the reasons already mentioned, work place pressures are acute and ever present. The chronically ill are usually employed with the same work output expectations as the healthy, and this is usually clearly understood by both parties. Therefore, first, the disabled person expects to produce at the standard rate despite physical discomfort. This is a stressful situation with the potential of aggravating the disabling condition. Secondly, the worker is often in a situation where the exact course of his/her disease is quite unpredictable. Consequently the sufferer must attempt to allow for a period of major absence from work by earning the goodwill of his employer. This means in part, building up a strong credit balance of unused sick leave. Not easy in the situation, however, such individuals are relatively inured to minor discomfort and therefore the everyday ailments may simply be worked through. It also means being there when needed and, much as all minority groups (most famously: women!), working harder than the norm in the position. Thus, hopefully, another sort of credit is built up in the perception of the employer. Such thinking is largely based on a false premise, for unless the employer himself is disabled the extra efforts will not be credited in the way the sick person hopes. In fact the effort can be turned on its head to the extent that the sufferer is suspected of being perhaps 'workaholic' and indeed resented by co-workers for being overly conscientious.

### *The monitors of sickness – the medical profession*

Without taking on the symbolic relationship that exists between the chronically diseased and the medical profession, there are a few issues worth highlighting here. Most of us today are well aware of the situation whereby the patient 'abrogates responsibility for himself, and the medical profession arrogates it to itself'. This means that the patient falls into a subject relationship allowing no flexibility even where the patient *may* be aware that no good for himself is coming of it. In other words, despite no progress, the patient feels a need for a backstop – a basically trustworthy person/institution who will be there when all else fails. Now, if the patient, sensing the stagnation or deterioration of his condition, unilaterally

decides to take initiatives outside the existing relationship – what he is doing is either unethical or stupid. If the initiative fails and is discovered by the original 'monitor', the original relationship is at best damaged. In his own perception of the situation, the patient is in a highly vulnerable position and the means of pulling him back into line range from subtle derision to outright unwillingness to re-communicate. The potential consequences to the patient are obvious.

Another issue is the provision of *health certificates* – again, just how these are completed is seen by the patient as dependent upon the relationship with the monitor. It is here that the restriction to the conventionally accepted monitor closes, for employers will usually not accept certificates from unconventional monitors. By the same token, medical benefits and tax exemptions are usually not granted to the patient who incurs expenses on unusual treatments, much less self-directed treatments. These arguments become particularly pertinent in the light of the realities involved in predicting the course of many of today's chronic diseases. Diseases such as cancer and the auto-immune complaints are not predictable in individual cases. The best that can be done is an estimate made on the basis of probabilities derived from epidemiological studies. Epidemiological studies for almost all such diseases are notoriously inadequate for they require time, either considerable funds or voluntary manpower, and a willingness to work in an area not regarded by the profession as in the least prestigious.

Finally, while the prognosis for such diseases is unclear so too, of course, is the aetiology. Therefore patients' condition may realistically be said to lie very largely with themselves, and *the* major duty of the monitors of their disease is to encourage patients to look for their primary resource in overcoming it in themselves. Not an easy task, since doing so might first be interpreted by both monitor and patient as a sign of defeat, and second as an opening to the patient to try unusual avenues such as diet and yoga, which may be successful and hence appear to cast doubt on the conventional approach. This is not an argument for less doctoring. Much more, it is an argument for a broad-minded approach from all who deal with such patients, to encourage them to be independent and find their support where it best suits them and least damages their capacity to care for themselves.

Unknown aetiology and unknown prognosis put the sufferer, psychologically, into a very different category to that of the visibly disabled. Those who treat the non-visibly disabled could improve the quality of their work considerably by bearing this in mind.

### *Social life*

In many respects this is the most difficult area, for the ill are most vulnerable here and can least expect understanding. At the level of fleeting contact, people expect others to behave according to some basic norm and when they don't, there is a more-or-less involuntary negative reaction. The apparently normal appearance

of the non-visibly disabled is, of course, a thoroughly mixed blessing. It means that they can on the whole pass unnoticed, yet are confronted by the continuing frustration of having either to cope with the expectation of 'normalcy' where it may be difficult or even impossible, or to force recognition of difference.

At the level of long-term contact, the nature of the interaction changes. The patient expects recognition and acceptance of his condition, When it is not continually forthcoming the necessity to remind becomes a painful chore. In seeking ways around the chore, behaviour patterns arise which may well produce less favourable relations than coping with the reminding function.

## *Philosophy and conclusions*

It will no doubt have occurred to the reader that the issues begged here are the general ones of tolerance and of indeed sympathy for difference. Until quite recently the idea of a society able to tolerate even superficial differences easily was difficult to imagine. Difference carries with it various kinds of potential threat, even the threat of dependence. Today we are beginning to recognise that physical differences carry few real threats and the rise of the various black, women's, homosexual, disabled … liberation movements attests to the changing climate. An outcome of the past discrimination was the isolation of groups which could not or would not align themselves with the norm. Today this practice has merged perfectly with the needs of a society that gives primary allegiance to economic and technical expertise. Thus, economies of scale (real or perceived) and the emphasis on specialisation with its accompanying technical structures have perpetuated the means of dealing with social functions in isolation. Whether it be teaching, planning a sewage system or making ball-bearings, all are carried out by specialists as far as possible from interference by the untutored. It is not surprising then that we prefer to treat the disabled in isolation – it is more rational and they do not get in the way. It takes little imagination to understand how the disabled lose through this treatment. But how does society as a whole lose?

There are two answers to this. The first is simply that in order to recognise ability we must recognise disability. On the face of it, this is trite. However when coupled with the second answer it becomes considerably more powerful. The second answer is that in order to survive, humankind –indeed life – requires diversity and a certain level of disorder.

There are two ways of looking at this statement. From the point of view of a species or life in general, ecology has shown how diversity provides the basis for a robust life form or biosphere. Certain species are able to withstand shock by adjusting among types, or suiting particular types to particular duties. On the other hand, evolution requires a certain level of disorder to permit further – as yet unknown – 'choices' to be made.

From the point of view of human behaviour, the presence of variety and disorder permit robustness of character and again the development of new ideas, i.e. 'progress'. The process of maturing is that by which individuals expand their range of responses to reality and their ability (openness) to synthesise new ideas and skills from the disorder around them. In Western societies we gain our breadth of response through involving ourselves with life. If we create for ourselves a certain background of security we are able to confront new situations in the knowledge that provided we are sufficiently open to them they will benefit us by expanding the limits of our awareness: which means that our ability to deal with the same experience again expands, and – more importantly – so does our capacity to extrapolate from our fund of experience. That is, our predictions become more accurate.

Disability of one sort or another will always be with us and for the reasons I have already outlined, this is neither sad nor bad. Our attitudes towards it could change radically, however, in order to (a) gain from it as a society, and (b) ease the existence of the disabled. It took the 1981 award of $2.6 million to permit the view made here to reach the status of an ABC news item. Thus Debbie Skow, a Granville rail disaster victim, pointed out that the disabled usually know more about themselves and human nature in general as a result of their experiences with themselves and others. We as a society can benefit from these insights.

I believe we can derive two lessons from the preceding discussion. The first is a plea to us all, and it is simply to: *recognise the difference*. Difference is not simply a right but a necessity; life cannot exist without it, and we are richer in proportion to the difference we can assimilate into our culture. We need to understand that difference is not a threat, not even a challenge, but rather the very basis of culture, maturity and survival. In particular, those who educate need to found their approach on this insight.

Secondly, if we agree to ease the lot of the disabled we must look to:*adjust the structure* of home, work, school, etc. so that it at worst does not discriminate against the disabled. By structure I refer primarily to the institutional structures which govern all other structures. To do this most simply the experience of the disabled themselves should be used to, at best, reorganise structures to discriminate toward them.

Let me conclude with a quote from an article which appeared in *THE AGE* Melbourne:

> *… teach the three Ds…*
> *Difference is natural;*
> *Difficult is not impossible;*
> *Discrimination is necessary.*
>
> (Bartolomew, S. 1982 'Don't Tell Billy', *THE EDUCATION AGE*, 16 June p.2)

## *Postscript*

On 3 August 1981, the Federal Government notified hospitals that chronic disease sufferers will not be charged for hospital treatment (including out-patient services) incurred by their chronic condition. This is good news; however, what precisely is to constitute a chronic disease was not clearly specified.

In view of the situation outlined above, it will be very interesting to see how many of those excluded from public service jobs, superannuation, life insurance and so on, will in addition, fail to be recognised as chronically diseased for the purpose of Commonwealth medical benefits. ■

# *The social genius of the chronically ill*

Adapted from The Social Genius of the Chronically Ill or the Bicycle Route to Continence, unpublished.

Let's get one thing clear at the outset, life is its own motivation! Short of clinical depression, people want to live. In common with so many misunderstandings, the notion of 'motivating people' says more about the way we mis/understand life than about what 'drives' people. On the margins of life, opportunities are sparse, however, and this can undermine the drive of those who dwell there. The dreariness of maintaining life under conditions of chronic illness contrasts with those of maintaining 'normal' healthy lives. The usual life-maintaining activities are wrapped around by numerous supportive social forms. Meals and even bathing, are looked-forward-to activities associated with rituals that make them acceptable and enjoyable. Procedures that must be followed by the chronically ill on the other hand are either not ritualised or are the subject of negative rituals supported only by down-at-the-mouth rites, such as 'following doctor's orders'.

How then might we transform this situation? How can we, the chronically ill, take an active role in reconstituting the way we are seen and, more importantly, the way we see ourselves so that our lives become meaningful as they are - ill - yet without compromising the possibility of perhaps, one day, becoming well?

I am non-visibly disabled (see 'The Hidden Majority' in this chapter)[1], comprehensively chronically ill with Crohn's Disease and the consequences of two generations (forty years) worth of attempts to treat it. I have been kept alive by a lot of ingenuity, much of it others', some of it mine. The pills, injections, high-tech. monitoring, surgical and other procedures are those of others, the organisation is mine and so, on the face of it, is the motivation to keep on organising. As one well-intentioned specialist put it after my last major operation ten years ago,

*Frank, you're anal enough to cope, here's how …*

It took ten years and some fifty kidney stones per year but I made it, avoiding in the process some $M2 worth of TPN[2]. This saving to the Commonwealth incidentally, goes unrecognised - earnings are easily accounted for but not savings! This incidentally, is another discrimination that militates against the chronically ill looking after themselves.

For all that, in the forty years of my disease (all my adult life), I've probably ingested quarter of a million pills (mostly nutritional supplements), had thousands

of needles stuck into me, been hospitalised twenty times - half a dozen for major procedures - and had litres of pethidine poured into me. Only a wealthy industrialised state could afford that as a public service. However, only wealthy industrialised states generate the disease I have!?

The absence of a large part of itself can take an organism well beyond its natural tolerances. To some extent science and technical ingenuity can substitute, but they add to the awkwardness of managing the condition. Bringing to our condition a capacity to see and to alter the social contexts within which management happens opens many new options for us. In this article we will look at a couple of examples.

Chronic illness means spilling sticky hydrating fluid down your trousers as you juggle fifteen pills into your mouth while staving off the urge to deal with the next round of diarrhoea and keep off a gouty left foot. It means quietly checking the contraindications in the next prescription for a new treatment, against all the other medications you're currently taking while suppressing a desire to scream at your well-intentioned doctor, 'After all these years you should know (what pills I take),' and realising that this time you're going to have to go it alone, without the new drug, because the contraindications are serious and you can't come off the earlier drug. It means knowing every trick in the book to reduce waiting times and communication blocks and to rationalise the seven health-system visits this week so as not to be absent for too long from work and not to stretch the patience of medical staff, let alone threaten their integrity. By the time you've learned all these tricks, it seems, you're dead – or is there a general approach that might liberate one from learning from each experience separately?

In addition to the drain on the public purse, chronic disease is time-consuming and enforces a comprehensive self-centredness as well as a certain lack of spontaneity. None of these make us appealing. Indeed, a few days ago I found myself standing in the train opposite a very fit young man in shorts and singlet. He sat in a designated disabled seat. He had one artificial leg and one artificial hand – yes, a hook. I stood balancing my bike in the train's gangway musing on how easy it was for him to occupy that seat and - whether I would swap my ***in***visible condition for his visible one with its suite of more obvious limitations and frustrations.

Chronic disease is lonely in a special sense and while it may seem that the more responsibility one tries to take the more lonely it becomes, let me show how precisely the reverse can be true.

## *Keeping outpatient pathology outside*

Twenty years ago Outpatient Pathology (OPP) asked me to collect faeces at home. On Friday afternoon they provided large plastic bottles and told me to bring them back full on Monday. It was hot, most of the five litres per day I drink to inhibit

kidney stone formation go through and not into me so the volumes collected were large and promptly began to ferment in the heat, threatening to pop the bottles' lids. I'd had to put them in the fridge and disguise them from two inquisitive young kids. The lids were not water-tight (most people have solid faeces) so getting them back to hospital on a bicycle was … interesting. Not exactly a pleasant weekend, but it occurred to me that it would have been a lot easier if outpatient pathology staff had thought through the physical and social implications of their requirements and shared that thinking with me, the patient. So I wrote my experiences into a humorous submission and actually did get an inquiry going at the hospital. It duly foundered on the money it would require to train the pathology sisters. It also foundered because no one, including me, had done the calculations to show how much would be saved by training patients to do tests for which they would otherwise be admitted. Again there was the problem of savings not carrying the political clout of earnings - made worse in this case because of the obvious, initial expense for training pathology staff before savings on not admitting patients could have commenced.

Some years later staff at a social work department heard about the inquiry and decided to run with it as a conference seminar topic on patient empowerment.

Fifteen years later, I thought it would be interesting to use the case to illustrate patient involvement to a first year medicine class. So, on a regular visit to OPP I asked for one large collection bottle. The nurse asked why and on telling her she said,

*Wow, what a good idea, I'd like to be involved in that!*

By now I was a member of the hospital's community advisory committee and thought, 'Yes, now maybe I can make it happen!' And indeed, working from both sides of the organisation, there is 'movement at the station'.[3]

## *The bike path to managing incontinence*

I commute by bicycle and train, taking the bicycle onto the train. I have done this for thirty years. In part I do it for environmental reasons. However, as time went on I discovered that in addition to this reason, it was immeasureably the fastest way to move around the Melbourne metropolitan area (some 5000 square kilometres), the cheapest and personally the most liberating because it keeps one fit, brings one in contact with one's fellow citizens and enables rapid access to toilets. Or, at least, it used to! In recent years the costs associated with maintaining public toilets have prompted the various authorities that offer them to close all but those in the most crowded and well-staffed areas. This constitutes a profound curtailment of the freedoms of incontinent citizens of which we have some two million in Australia.

With that in mind I lobbied a small number of relatively vandal-proof versions back into being. The media assisted generously and the notoriety that came with

it, saw me do a three year stint on the Board of the Continence Foundation of Australia. Here I worked to assist incontinent people to 'come out' and in particular to get the incontinent onto bicycles. Fat chance you say? Sure. I probably didn't convince a single person to do that. But the stories I told in the process certainly did assist many people to see themselves, their conditions and the possibilities available to them in a very different light (see 'The National Public Toilet Map' in this chapter).

Being forced to live continuously beyond one's comfort zone is awkward, yes, but it is also profoundly liberating. It enables a level of awareness and of being that is otherwise difficult to attain – we do not voluntarily walk such paths. Finding them at a relatively young age enables us to make them ways of life rather than 'roads less taken'. By these paths the slide into invalidity is as far away as our imagination likes it to be (see, for example, P. Young-Eisendrath, 1977). ■

Endnotes

1 In this article chronic disease and the chronically ill refer to states of comprehensive systemic breakdown and support in which some (usually) named long-term condition causes a multiplicity of interlinked adverse conditions, many of which arise from the treatment administered.

2 TPN: Total Parenteral Nutrition: Intravenous hydration and nutrition.

3. A line from one of Australia's famous poems "The Man from Snowy River", A.B. (Banjo) Patterson, *The Bulletin*, 1890.

# *The National Public Toilet Map*

Adapted from 'National Public Toilet Map Improves Quality of Life', published in *The Australian Health Consumer,* no.1, 2002, pp.31-32.

This morning I got to work because I know how to access toilets along the way. I am incontinent[1] and interested in all incontinent people being able to move as freely as I do. The Department of Health and Aged Care's new online toilet map helps make this possible. There are two kinds of toilet available to us:

- Public toilets – open to all, thinly distributed, often disgusting (vandalism of one sort or another) and often closed (especially in the case of those offered by public transport authorities).
- Private public toilets – provided by organisations for their clients. Such organisations range across many kinds of business and all government instrumentalities and they are potentially open to all of us.

The National Public Toilet Map makes the position and user status (opening hours and access conditions) of Australia's public toilets accessible to the public (see box)[2]. For this the Department deserves our gratitude and congratulations!

People can use the public toilet map to print maps of public toilets in their selected town, suburb, park or street or along common travel routes.


*Used with permission. National Continence Management Strategy, Australian Government.*

Maps showing local area toilet locations can be accessed and printed from the Internet at: www.toiletmap.gov.au

For further information about the

- The National Public Toilet Map database, or the
- National Continence Management Strategy in general contact the Commonwealth Department of Health and Aged Care at: continence.strategy@health.gov.au

For personal assistance phone the National Continence Helpline. Staff will print and mail relevant maps and other materials. Phone 1800 33 00 66.

Beyond its obvious value for planning our movements (excuse the pun!), The National Public Toilet Map has generated substantial discussion about the

plight and extensive prevalence of incontinence. It is high time! With decreasing willingness of governments to fund public facilities and in the light of prevailing vandalism, the distribution of the network of publicly accessible toilets is unlikely to improve. The accessibility of private public toilets therefore becomes a decisive factor—indeed the only opportunity—for maintaining the freedom of movement of incontinent people.

In many respects these toilets are far superior to public toilets. They are more widely distributed, better maintained (for obvious reasons) and are often open 24 hours and 365 days. They are the toilets in organisations, such as fast food and petrol franchises, police stations, hospitals, public libraries and in country areas, shire offices and rural merchandisers, such as Elders and Wesfarmers.

The challenging issue is how to make access to the private public toilets a legitimate expectation without a user having to buy the owner's services. For needy users there are two problems. First, how to ***say*** that one is incontinent. Secondly, how to convince oneself when contemplating going out, that there will be a toilet there when one needs it. The first is a problem for 'needy users' and their supporters. Legitimating one's need beyond simply stating that one is incontinent shouldn't be necessary because few people would refuse a request prefaced like that, and no one but a genuinely incontinent person would use such an introductory line! The second problem can be overcome by public-spirited organisations.

Extending generosity to the incontinent must be in the interests of private public toilet owners. Governments and private-government organisations operating in the interests of the incontinent can provide incentives. Both can provide free advertisements for participating toilet owners in tourist and community publicity materials and both can offer well-publicised community service prizes.

For their part in this plan of 'articulating' the toilets already in existence, governments at all levels should be directed to make their own toilets available to the needy. The advent of this new service should be made known to organisations dealing with incontinent or potentially incontinent people. In an age of economic rationalism, it is surely rational to extend the use of existing government services and thereby to increase the participation in public life of a very significant minority. ■

Endnote:

1. Incontinence is a loss of control of one's bladder or bowel and affects a significant proportion of Australians at some stage during their lives. The problem is particularly prevalent amongst older men and women and can occur after childbirth and surgery. Those who live with incontinence problems can suffer significant social consequences, limiting their participation in day- to-day social or sporting activities and restricting their ability to travel.
2. As well as being a valuable tool for Australians with continence problems, The National Public Toilet Map is also providing a valuable service to families with young children and tourists.

# *Permanent versus cheap*

Adapted from 'Maintaining Independence for the Chronically Ill: Replacing Expensive Permanent Assistant with Cheap Occasional Assistance', published in *Health Issues*, vol. 46 (March 1996), pp.16-17.

## *Background*

Over thirty-five years (as at 1996) Crohn's Disease has cost me all but one metre of small intestine – and in that the disease is active again. Between November 1995 and January 1996, two large public hospitals and one small private hospital (remember Victoria's doctors' strike!?) helped remove some two dozen small and two large stones from both kidneys; the large stones required lithotripsy (ultrasound disintegration). Kidney stones are one effect of malnutrition arising from attempting to live *normally* on so little small intestine.

## *The issue*

As humanity's understanding of science and its technological applications increases, so the demands on infrastructure expand. Nowhere is this more evident than in that most immediate of all domains: medicine. The cost to long-lived, ageing, industrialised societies of the medical demands of their populations is increasingly worrying, for the very immediacy of ill health diverts funds from investments that only pay in the long-term, such as education and even politics and political infrastructures (e.g. constitutional reform).

In this brief article I put a plea for helping the chronically ill take responsibility for themselves. Specifically: to provide Pharmaceutical Benefits Scheme (PBS) support for various high-tech food supplements with the potential to keep people with various digestive failures off permanent intravenous nutrition.

There are of course, endless similar opportunities for empowerment of the chronically ill. Here, however, we begin with one of the most straight-forward: retaining our capacity to feed ourselves.

## *The problem*

In order to maintain adequate nutrition and hydration (sufficient to live on and to flush small kidney stones) it was suggested that now I would have to live on an intravenous drip. This procedure would be provided by the State, is simple enough but underlain by a couple of relatively low probability, potentially mortal, dangers

(gas embolism and infection). Fortunately, however, for both the taxpayer and for me, outspoken and concerned nutrition and dietetic personnel put a proposition for a radical and thoroughgoing change in lifestyle. It could, if rigidly adhered to, keep me going for some time (perhaps years) without intravenous feeding – even through Melbourne's hot, dry summers. The latter is particularly problematic because as an environmental scientist, my means of transport is bike/rail and physical exertion in the heat increases water throughput. These generous people used the hiatus in my treatment caused by the Victorian doctors' strike to provide extensive training and support in the new regime – well beyond the call of duty. The catch – of course – became evident when I began to provide for myself at home.

The new regime involved changes to eating and drinking: no natural fats/oils of any kind; no free sugars; minimal roughage; avoidance of a whole range of specific foods; separation of eating and drinking by at least half an hour and six small meals rather than three large ones. Aside from the appreciable psycho-social changes in pursuing a normal working/child-supporting life under this regime (consider the planning involved), I had to provide the four special dietary supplements required by myself. These are in addition to the fourteen pharmaceutical supplements provided by regular injection and oral medication, for which I pay only a small proportion of costs.

The existing supplements:

- slow the onset of the disease (immunosuppressants);
- force my remaining piece of small intestine to absorb extra mineral and vitamin supplements which it cannot extract from food alone; and
- alter the constituency of what is actually in my gut so that it does not absorb dietary oxalate (the primary direct cause of the kidney stones).

The four new items are: absorbable fats, a hydration improver and a nutritionally appropriate fluid containing oxalate-suppressing calcium. They are:

- a high-tech, very short-chain cooking oil (MCT-oil): $1/day
- a short-chain powdered fat and general nutrition supplement, Lipisorb: $5/day
- an electrolyte drink, Gastrolyte: $7/day
- a calcium enriched soy milk: $2.25/day

If you reckon you're reading the words of a cyborg (bionic person) you wouldn't be far wrong!

## *Reducing the cost*

Most of us drink something like milk every day anyway and although soy milk costs twice as much as cows' milk, it is environmentally much the preferable beverage, and therefore for both these reasons I reckon that I should foot this bill myself. Indeed, as more and more of us do so the price declines (full-fat, but not

Ca-enriched generic brands are already on sale for as little as $1.50). At least two similar types of powdered nutritional supplements are already on the PBS. Both of them are essentially baby-formula supplements.

Some time ago a group of local residents, including me, successfully fought to retain a pharmacy in the Collingwood (now North Yarra) Community Health Centre. We pay some $200 a year to use it. With its help, the remaining costs can be further reduced to approximately $9/day. Via special bulk buying and reduced packaging arrangements, which I am in the process of negotiating, this sum may be further reduced to about $8/day.

It is hard to avoid seeing the incongruity in sustaining babies while letting parents fend for themselves. Surely it would be as important to help maintain sick parents as viable, productive (taxpaying!) members of society, able to look after their children, than to sustain non-economically productive parents on drips and countenance having their children become wards of the State!? Is that reasonable from the taxpayer's point of view?

At present, therefore, I will be saddled with an annual bill of around $3,000 for successfully keeping myself off the much more expensive government-funded intravenous nutrition/hydration option. This figure does not of course include any costs of obtaining and preparing these supplements, let alone of lobbying to get them at the cheapest possible price in both dollar and environmental terms.

## *Benefits to the taxpayer*

- Avoiding the much greater expense of intravenous nutrition and care.
- Maximising the opportunity of people with severe nutritional deficits to remain independent and productive in the wider community.
- Maintaining a tax source rather than generating yet another new tax sink.

## *Proposal for catalytic occasional assistance to avoid permanent assistance*

In order to enable, and indeed to catalyse, the chronically ill to provide their own essential nutritional supplements, I propose that they be added to the National Pharmaceutical Benefits Scheme as they are identified. Medical legitimation (special prescription) will be expected before a consumer obtains such government assistance. However, the point here is that doctors and consumers should be encouraged to look for such options rather than go with guilty/obsequious cap in hand to the government to beg for them. A decision like this would remove one of the initially onerous and obvious impediments to those still able to undertake and pursue the personal changes required to maintain an independent path to their nutrition. ■

# *Casualty and the legitimacy of the chronically ill*

Adapted from 'Consumer Empowerment: The Legitimate Involvement of the Chronically Ill in their own Care', published in *Health Issues*, vol.52 (Sept. 1997), pp.12-15.

This paper offers just one example from my own experience to illustrate the literally endless opportunities to improve the involvement of the chronically ill in their own treatment and care, thereby:

- enhancing their independence and feelings of legitimacy;
- enhancing their objective conditions – to the extent that their own self-awareness improves and they can act consistently and *on the spot* to improve their own lot;
- reducing the costs of treatment; and
- improving the efficiency of the community resources used for their treatment.

For various reasons I often enter hospital via the Emergency Department. The immediate problem will be something like a stuck kidney stone which causes a lot of pain. Pain relief is in order. It is usually administered quite quickly but some of the drugs used for this have the effect of relieving other types of muscle spasm as well; such as peristalsis (an involuntary set of contractions that moves food through our gastro-intestinal tract). The result is pain relief and a second effective blockage, this time of the gastrointestinal tract, and no one but me will be aware of it. What now follows is a painful comedy of ignorance played out at the expense of the consumer and the State.

Since I have thirty five years' experience (as at 1997) with what happens if I eat or drink anything on a blocked intestine, I don't do it. I communicate my self-diagnosis to staff but the *nil orally* sign I attempt to erect over my bed remains invisible. The consumer's diagnosis is, for the time being, just that, the consumer's. Kindly staff persist in bringing me food and drink because I am registered in their records as a *kidney stone* and kidney stones can eat and drink; albeit sometimes when I've been *two kidney stones* the fluid may be problematic. Not eating or drinking when the official classification does not preclude it then casts me as a *difficult patient* as well as a *kidney stone*. I am not forced to eat or drink of course and eventually a saline drip is brought along and I'm plugged in.

The routine X-rays are conducted and, in due course, analysed by someone in Urology. At this point, with luck, the gut blockage is noticed and a call is sent out

to Gastroenterology and indeed, on the third or fourth day, a real sign goes up, *nil orally*. I am now legitimately a *gut* as well as a *kidney stone*.

The Casualty Department of the hospital has a thirty five year record of my trials and tribulations and through gritted teeth I have let Casualty know that and will usually also have presented my outpatient booklet and number. So, quite aside from having the confidence to listen to me as a *card carrying* long-term consumer, that *card* should have been the key to lock me into a data stream that would have immediately let Casualty know who and what they are dealing with. The reality is unfortunately far from this. The consumer is first a piece of scientific evidence upon which the diagnostic expertise of the Casualty Department exercises its empirical skills, long before any data management expertise is brought to bear on the case. There are two untapped potential sources here: first, that of an articulated consumer record and, second, that of an articulated consumer. The two back each other up and help to define and legitimate each other.

The articulated consumer record is not a simple thing to create. It requires all sorts of language compatibility (of those logging in the data, of those generating and accessing it from a variety of medical disciplines) and access rights issues to be accommodated. The electronics on the other hand is the easy part, if initially expensive and fraught with all the usual teething and obsolescence problems. What needs to be borne in mind is that once the initial manual translation of data into electronic form has occurred, it never needs to be translated manually again. The record has become a profoundly liquid asset.

The consumer's pain and anguish notwithstanding, the fact that the consumer may have something legitimate to say about themselves, and therefore assist in short-circuiting the empirical process, is currently given little credibility.

Once the empirical process corroborated my diagnosis, there was no recognition of the corroboration let alone an apology for the unnecessary misery. The exercise had no pedagogic consequences at all and the managerial process remained untouched. Not only was the exercise in vain, there was no one around to know that an exercise was going on.

## *Directions*

To maintain the chronically ill in productive capacities in society and reduce the community bill for supporting them by the modern health infrastructures, I offer the following suggestions:

- Chronic illness is multiply variable; there are many diseases and disease stages, different individual experiences of these and different social contexts within which to experience them.
- The social contexts profoundly determine the way diseases are experienced (even the way and extent to which pain is experienced) and treated.

- The capacity of society to recognise the unique experience of each diseased person determines the capacity of that person to optimise their conditions.

My dream for the wheelchair-bound, for instance, is not that we build expensive concrete ramps in all public places. Instead, ramps would be built in the heads of the populace so that the wheelchair-bound are always lifted over obstacles by passers-by without being asked to do so or requiring thanks and without the person in the wheelchair experiencing any feelings of debt. Thus empowerment of the chronically ill is a matter of creating social structures that recognise them and generalised structures that enable the recognising or facultative structures to reach them. It is not enough, for instance, to build 24 hour toilets, we need to advertise them as well and in such a way that makes them *attractive* to the people for whom they are intended.

*Coming out* is a special process for the disabled because, as different to the comings out of women, blacks and gays, the disabled are in a very real sense *not the full two bob*. Where Equal Opportunities fails the disabled is in that it has not begun to create the social mechanisms that will recognise the limited abilities of the disabled; indeed it has not even recognised yet that it might do so. ■

# *Depowering the health institutions*

Adapted from 'Facilitating Community Advice by Depowering the Health Institutions', published in *Health Issues*, no. 65 (Dec. 2000), p.6.

*'When people who aren't used to being heard, speak to people who aren't used to listening, things happen',* Allan Pinches, 15 September 2000.

*'Involve me and I will understand',* Anon.

To be involved in decision-making, a person must be able to recognise that they are being listened to. In the case of a patient in a hospital that means demonstrably overcoming a power gap between patient and the institution. Empowering the consumer, or giving them permission to speak is one side of the equation but 'depowering' the institution vis-à-vis the consumer is the other.

Depowerment is *not* disempowerment. No one wants disempowered institutions. Effective institutions, capable of engendering confidence in those who seek their services, are desirable. Depowerment involves reforming the ways patients encounter the staff of health care institutions so that consumers feel themselves to be respected collaborators or 'mitmenschen' (with-persons) as the Germans put it. At present this means recognising that barriers to inclusion and isolation exist. These barriers need to be replaced with open, collaborative structures and approaches where there are no barriers.

There are a number of social structures that must be dealt with when seeking collaboration with patients. For example, patients and their carers can easily feel *indebted* to staff they deal with in health care institutions. Worse, they can feel they are at their mercy. Instead of seeing themselves as partners in a process of health maintenance or cure, these feelings can lead to uncritical acquiescence to directions and/or a tendency to 'humour' staff in self-defeating ways. Such tactics derive from perceptions based on immediate staff demands and the way the demands are presented. Consumers often have minimal understanding of the wider contexts of these demands.

There exists the belief that uncalled-for patient intervention might damage or at least inhibit treatment. This belief persists in spite of it being widely known in the community, that consumer involvement *will* ultimately enhance rather than damage treatment.

Hospitals are often perceived by patients and portrayed by the media as stressful domains of medical experts, where the most useful stance on the part of the patient

is silent conformity until otherwise requested. This can lead to the perception that a patient will not be respected as a consumer and a consumer's personal knowledge has no legitimacy in a hospital setting. The domain of acute care is not expected to be open to the insight and involvement of 'ordinary people'.

Subtle discriminations between staff and patients is generated by the many behavioural and physical contexts of the institution. These include:

- dress worn by staff (not necessarily just formal uniforms, indeed uniforms need not be threatening at all);
- how physical space is organised, that is the way offices, rooms and corridors are laid out; and
- the language used by hospital staff and its silent presentation, signage.

The power structures that sustain such social structures help to distance and secure the staff and administrators or health care institutions. These structures also help to keep at a safe distance the needs, situations *and metainstitutions* within which these institutions, in turn, operate.

To begin opening up and unwinding these distancing structures, the active involvement and cooperation of the patient in the hospital corridors needs to be sought. The path to 'mutual empowerment' must come first from organisations that demonstrate a willingness to engage.

It is not enough to place consumers on powerful committees, the institutions themselves need to be 'depowered' and restructured to make them consumer and consultation friendly. ■

# *Technology assessment and the TGA*

Adapted from 'Technology and the TGA', published in *Australian Health Consumer*, no.2, 2002-2003, pp.35-37.

The Therapeutic Goods Administration Medical Devices Evaluation Committee (MDEC) was established in 2003 and examines, for TGA approval, devices destined for use in the human body. The committee is chaired (as at 2005) by Professor Paul O'Brien, gastrointestinal surgeon at Monash University. The committee is a two-tiered structure, with a core standing committee of twelve medical and bioengineering specialists and a subcommittee of some fifteen associate specialists available on call for the evaluation of devices where their specialised expertise is necessary. There is extensive opportunity for consumer participation within the MDEC and it is encouraged and facilitated by the chair and TGA representatives.

Various subcommittees within the MDEC are being formed to deal with special categories of device. They include:

- biomaterials and bioengineering;
- implantable medical device tracking; and
- medical device incident review.

## *Beyond the biophysical implications of devices*

My involvement with the Committee stems from my primary area of interest, which is in encouraging recognition that we socially construct our actions and that therefore we, as a society, are responsible for our actions and can change them. That is, our actions are always political or carried out with the tacit consent of others. Recognising it is, in principle, involving and encourages the democracy we have fought so long and hard to create. The basis of my interest is that when people recognise that their deliberate action is based on socially constructed knowledge,[1] they can act metaresponsibly – that is, be responsible for both the actions and the complex frameworks that *enable* the actions and generate their environmental and social consequences.

In the first TGA-MDEC meeting I proposed that the TGA incorporate technology assessment (TA) into its deliberations and tabled an explanatory document at the second meeting. This document did a number of things.

First, it explained the basis for technology assessment. We know that cars, for example, create sparsely settled suburbs, we know that 'magic bullets' create an approach to health, we know that packaging distances us from what it packages and tends to influence the way we see its contents (cf. 'clothes maketh the man'–

not to mention the woman!) and so on. Today's medicine is well aware of all this. From 2002, Monash University's Bachelor of Medicine/Bachelor of Surgery (MBBS), has included a first year subject called Health, Knowledge and Society which encompasses the rudiments of such reflective and indeed reflexive thinking.

Second, it sketched precedents for technology assessment. TA is well known in universities and has at times, in the last two decades, been sanctified by developed country governments in, for example, offices of technology assessment, Australia's Australian Science and Technology Council (ASTEC) and offices, or secretariats of/for future(s) studies. Notable in this latter category are the Swedish and Norwegian secretariats for futures' studies which have carried out world-first analyses of many major technologies and techniques ranging from energy conversion to care. At universities, the home for such work is primarily in the history, philosophy and sociology of science departments. However, the work is also very much alive and well in anthropology, sociology, environmental science/studies, engineering and architecture, futures' studies (at, for example, Swinburne University of Technology), context studies (RMIT University) and even special units in science faculties such as CHAST (Centre for Human Aspects of Science and Technology) at Sydney University. Among the most famous are various centres and programmes at the Massachusetts Institute of Technology (MIT) and that university's famous house journal, *Technology Review,* carries admirable social analyses of technology along with its staple science and technology reportage.

Finally, it sketched the procedure for technology assessment. TA involves seeking out and critically evaluating the social frameworks (expectations) that simultaneously allow us to develop techniques to do things and then put them into practice. Technologies are subsets of techniques, that is, we can think of them as 'congealed techniques'. An injection needle is not 'just' a device for introducing a fluid into flesh, it also carries with it a raft of 'legitimations' – it promises to do the injecting antiseptically, in correct dosage and under trained procedures (not just anyone can use one – at least not in a medically supervised environment!), it has become a symbol of various kinds, no longer all benign, and so on.

Similarly but more generally, a technique such as a standard carries a raft of social constructs with it. Standards are distillations of their community-of-origin's priorities; they relate to and set out in operational form the politically acceptable working dimensions associated with their concerns (i.e. the techniques and technologies they standardise). They bear with them authority, rigidity, precision. Most importantly, they embody the security of a capacity to be changed 'with due rigour and responsibility'. Society can, therefore, rely on them, build insurance and security systems on them – and so on…

The proposal suggested that the TGA call for a list of preferred consultants to undertake 'as required' studies of the social implications of the items that fell to it

to examine. This would have the side benefit of reinforcing and strengthening the consulting capacity in the community for such work just as the MSAC requirements for 'evidence' strengthen the community resource for evidence providers such as the Cochrane Collaboration and basic research in general.

While the initial response to the proposal has been positive, in order to embed the principles of TA formally into the Committee's deliberations, the issue will need to be raised with the TGA itself. ■

Endnotes

1 They include, of course, the decision-making and enabling structures of action – such as financing arrangements, the dollar being one of humanity's most comprehensive and therefore powerful social constructs.

# *A discriminating act*

Adapted from 'A Discriminating Act', published in *Consuming Interest*, Winter 2000, pp.24-26.

It is not widely understood that discrimination against the chronically ill is now legally sanctioned by the Federal Government's Disability Discrimination Act of 1992 (DDA):

> *Section 46 (1) This Part does not render it unlawful for a person to discriminate against another person, on the ground of the other person's disability, by refusing to offer the other person:*
> *(a) an annuity; or*
> *(b) a life insurance policy; or*
> *(c) a policy or insurance against accident or any other policy of insurance; or*
> *(d) membership of a superannuation or provident fund; or*
> *(e) membership of a superannuation or provident scheme; or*
> *(f) the discrimination:*
> *(i) is based upon actuarial or statistical data on which it is reasonable for the first-mentioned person to rely; and*
> *(ii) is reasonable having regard to the matter of the data and other relevant factors; or*
> *(g) in a case where no such actuarial or statistical data is available and cannot reasonably be obtained – the discrimination is reasonable having regard to other relevant factors.*

The immediate consequences of this nasty exception to the otherwise benign intent of the DDA are that:

1. people who live with some chronic condition and its treatment, i.e. people labeled chronically ill, are excluded from a range of actuarial-chart-based insurances such as life insurances and superannuation schemes that incorporate life insurance, travel insurance, home loan insurance and insurance that covers for loss of income;
2. people who do not have chronic diseases gain insurances such as those in 1. above, for lower premiums than were all Australians given equal opportunities to insurance. In other words fit youth, say, are subsidised by exclusion of the disabled; and
3. insurance providers gain business that may have been foregone were premiums higher.

For those of us who fall outside the insurable range the consequences are themselves disabling, i.e. restricting and demeaning. Some of these consequences will be detailed below along with the fate of various attempts made to overcome this discrimination which while now official has always existed.

## *It's a business*

Insurance is a business designed to turn a buck out of a certain level of 'private socialisation' of risk. Being private implies that business erects its own entry conditions. Until explicit national legislation requires it, the business is not obliged to adhere to United Nations' protestations of the sanctity of human rights that expect disabled people to be considered as fully human. Therefore, to the extent that 'high-risk' groups are not beneficial to the profitability of insurers, nothing other than 'good form' (doing the 'right thing') requires entry criteria to include them. To their credit, some companies do optimise the situation by creating special loadings through which the less benighted individual can gain cover by paying an additional premium. The fully benighted, however, remain outside by virtue of the inexorable logic of the actuarial chart.

Private socialisation of risk therefore simply excludes or loads high risk categories. In addition to the material restrictions this places on the really sick the wider denial involved in classifying large numbers of humans as 'high and low risk' involves accepting a particularly crude and ironic approach to each other. Many of the most memorable of humans down the ages have been today's uninsurably disabled… and yet society supported them.[1]

Aside from direct exclusion from many activities, the failure to gain 'cover' for oneself adds another burden to that already borne by the chronically ill *and all those who bother to associate themselves with them*. Aside from impaired access to services, knowing that one is essentially a ward of the State, or of others' largesse, is demeaning. The conventional response to this situation is that these people must either dramatically constrain their expectations and/or construct other means of securing what insurances would normally provide. The irony in the latter response is that if the message below actually gets out, the expectations that support the need for insurance are at risk of evaporating and with them the business itself.

The unconventional approach, which it has been my great good fortune to discover is that most things that insurances provide are chimerical and disentangling oneself from them is profoundly liberating.

There is, however, another nastier side to all this. One can transcend material demeanment personally but it is quite another thing to overcome it in the eyes of society not familiar with the criteria of personal enlightenment by which sick people may come to assess themselves. Exclusion from superannuation once meant exclusion from certain jobs altogether and, at a minimum, exclusion from employer contributions to it. This implies a triple burden: sickness, self-insurance

and restricted or reduced employment. These burdens imply an exquisite and permanent increase in stress arising as much from the recognition that one is a lesser class of being as from the obvious insecurities arising from reduced income. That itself adds to the misery of the dis-ease. By contrast, recent years have seen a dramatic improvement in recognising that *being in control of one's life* is itself a primary determinant of health![2]

The social restrictions associated with the failure to gain home loan and salary replacement insurances simply exacerbate the failure to access life insurances and super.

While failure to gain travel insurance is quintessentially a middle class concern it contains some illuminating twists. Travel has become the modern status symbol for those seeking to avoid the trappings of conspicuous consumption – with ironic consequences for the environment. For academics in a small country far from the centres of intellectual activity, however, travel is often the only way to access one's disciplinary peers. Without insurance, travel for the chronically ill is essentially impossible, particularly if one does not have private health insurance. Private health insurance will not cover pre-existing conditions for the first year of membership and there are (or were, until recently) only four countries offering reciprocal rights with Medicare: Sweden, the Netherlands, United Kingdom and New Zealand.

Some years ago when I put this situation to a highly placed officer of the Life Insurance Federation of Australia, I was told that were s/he in my situation s/he would not admit to a medical condition, i.e. s/he would perjure herself. That is not an option for me.

## *The response*

The Senate inquiry into superannuation (1992-3), faithfully registered my concerns in its final report and the parliamentary secretary to the Federal Treasurer honestly recognised the problem thus:

> *The intention of the DDA is to protect the community from unfair discrimination. The provisions of the DDA relating to life insurance and superannuation acknowledge that statistical and actuarial evidence can confirm that particular groups of people constitute a higher underwriting risk. I recognise that the chronically will fall into the 'higher risk' category and, therefore, may be unable to obtain insurance. To provide a 'safety net' for those 'higher risk' groups, the Government provides appropriate social services.* (31 March 1995, my italics.)

Honest thanks, but is that the best we can do?

Meanwhile the Human Rights and Equal Opportunities Commission responded this way:

> *… the DDA does not in fact render or recognise all discrimination in insurance as legal. Only those exclusions or distinctions based on disability (that) can be shown to be reasonable, based on actuarial evidence and/or other relevant factors, are excepted from the prohibition of discrimination by the Act. The best means to test whether a particular distinction or exclusion is reasonable, or whether it is unlawfully discriminatory, is to use the mechanism provided by the Act to make a complaint* (3 November 1999, my parentheses).

Precisely, and of course there is no need to (make a complaint), for the very existence of the actuarial chart is the problem! Nevertheless, in the same letter I was chastised by the President with:

> *… your concern regarding lack of various forms of insurance cover for people with chronic illnesses is not, in fact, 'essentially a political issue' nor nominally outside the Commission's brief …*

Curious then that the Treasurer's own office could see the problem but not HREOC, despite repeated representations, which now simply go unanswered. I have been reduced to a pest, and a sick pest at that.

At best the insurance industry is willing to create certain 'B class life' categories, insurable for higher premiums. In individual cases it might also wedge a borderline individual into an existing scheme for a loaded premium.

My only success in leveraging this entrenched situation came when, in the 1980s, my university joined the national universities' super scheme. With the assistance of the academics' union, a temporary 'window' for disabled academics on staff at the time was created and these fortunates now have full super: no loading, no demeaned category. It is not difficult to imagine how much easier it is to work under such circumstances!

## *A proposal*

Essentially the only way of overcoming the problem outlined is to delete chronic disease from the insurance actuary's armory.

Beyond that lies the much weaker option of establishing a private fund through some generalised body such as the Chronic Illness Alliance and sourced by the contributions of the chronically ill themselves and their 'healthy' families, friends and sympathisers. Assistance from the Federal Government might be expected in line with the social service savings to be made by the consequential outcome of security-in-depth: maintenance of the chronically ill in gainful employment and psycho-social independence. An existing public-spirited institution might kick it off: Bendigo Bank, are you listening??

Endnotes

1 See for example, the benign fate of the village idiot in the famous 1980s Italian film: *Tree of Wooden Clogs,* not to mention such classics as Dostoevsky's *The Idiot*.

**Note** that it is precisely the accuracy of modern diagnostic techniques and the tools of statistics that give us the relatively new capacity of 'legitimate exclusion' of whole classes of people from 'A class livelihood' and its perks.

2 See the work of Marmot and others in Dr Norman Swan's Health Reports of November 1999 – transcripts available from the ABC's website.

chapter six

# A RANGE OF ENVIRONMENT ISSUES

The first four papers in this chapter criticise current dualistic approaches to particular environment issues: food and nutrition, water, GM (genetic manipulation or genetic engineering) and electro-magnetic radiation. The fifth paper offers up computers as a general example of dualistic technology. The papers also point to appropriate social and systemic alternatives that incorporate an understanding of the *context* of these issues.

These alternatives are radical but not naïve. On the contrary, they are given with the express understanding that, while the systemic approach is not recognised by mainstream politics, it is important to keep voicing it. It is in the conversations (arguments, enquiries and opinions) about these issues that the political reality is created and transformed.

# *Food and nutrition*

Adapted from 'Towards a Food and Nutrition Policy for Australia', published in *Food Policy,* vol.11 no.4 (Nov. 1986), pp.274-278.

In response to a request from a 1983 conference on Agriculture and Human Nutrition, the Victorian State Government set up an interdepartmental committee to draw up proposals for state-level co-operation between the Departments of Agriculture and Health in developing a human food and nutrition policy. The discussion paper that arose from the Working Group represents a remarkable compromise: *Making Healthy Choices Easy Choices: Towards a Food and Nutrition Policy for Victoria* (1984). Recommended dietary changes are consistent with present nutritional insight and have not been excessively diluted by industrial and life-style interests. It bit the politically hard bullets by recommending continued reductions in fats from red meat and dairy products (representing major local primary industries), as well as the relatively soft ones, such as reducing alcohol, salt and sugar consumption and increasing whole grain cereal, fruit and vegetable consumption. Nevertheless, the document has deficiencies which might have been acceptable twenty years ago, but in 1985 are disappointing.

Notable is the silence of environmental interests, otherwise well represented by a large local bureaucracy. More generally, it is difficult to discern any analytical framework for assessing the wider implications of providing good human nutrition other than that provided by historical precedent and local political realities. Had, for instance, a systems approach been used, some consideration of the anthropology of food might have led to a more comprehensive and coherent set of recommendations. The following comment is offered in the hope that it might influence others who are attempting the eminently worthwhile task of building regional or national food policy.

The Working Group assembled to write the draft comprised three representatives from the State Department of Agriculture, three from the Health Department, two from the Department of Education and one from the Department of Social and Preventive Medicine at a local university. In addition to major behavioural recommendations, the Working Group recommended the formation of a Food and Nutrition Council with fourteen members: two each from the government departments of Health, Agriculture and Education, one from Consumer Affairs; four scientists from human nutrition, dietetics, agriculture and food technology;

two representatives from supply – a farmer and a food processing industrialist; and one from demand – a consumer representative.

The formation of various other bodies was also recommended:

- a Food and Nutrition Education Advisory Service to be established as a sub-committee of the Council and to have regional representation;
- a Primary Products Promotion Unit in the Department of Agriculture; and
- an expert committee appointed to review the potential for producing and marketing leaner meat.

The comment below draws attention to four major deficiencies:

- lack of a systems approach to food and nutrition;
- no consideration of the environmental implications of human nutrition;
- no consideration of the implications of food 'additives'; and
- no apparent use of the anthropology of food.

## *A systems view*

The discussion paper contains the following paragraph:

> *Given the extent of overweight and obesity that exists in spite of considerable individual effort to control body weight, the merits of community-wide approaches to weight control as part of a food and nutrition policy should be apparent. Such approaches need to address typical eating patterns in the community, especially those associated with excessive weight gain in infants and children* (p.12).

The control of body weight is correctly recognised as a complex phenomenon comprising physiological, psychological, social and most importantly epistemological (i.e. frameworks by which we think and know) structures. Systems and subsystems, such as languages, traditions, legal and other bureaucratic systems are interlinked, and any particular organic 'whole' one chooses to discern can be thought to act to sustain itself as a whole. This self-maintenance or homeostasis persists to the extent that both the sub- and supersystems of which it is part, survive. It is one of the most important characteristics of systems.

General System Theory, developed by von Bertalanffy (1968) and others is a set of understandings drawn from generalisations of systemic behaviour observed in nature (see also Wilden 1980). The sections that follow derive from this approach.

## *The outer environment*

Satisfaction of nutritional needs requires something from the environment, both from our outer environment (natural resources) and our inner, physio-logical and psychosocial environments (Borgstrom 1972).

The word agriculture gives a thoughtful and benign aura to the intrusive operations used to feed – in this case – four million 'affluent' Victorians. It also

incidentally, gives an impression of working with nature… Less euphemistically, 'agribusiness' may be regarded as a complex mining venture seeking soil constituents, such as water, minerals, space and structure. To operate like this, inputs of energy occasionally even larger than the nutritional energy outputs of the 'crop' (it may be beef) are required, along with an array of artificial nutrients, conditioners, hormones, drugs and so on.

A picture arises of the fields ('agri') becoming simply an extensive framework for anthropogenic inputs. In addition to losses of soil mass and structure, the disturbances inherent in many industrialised cropping procedures include the transformation of indigenous species to 'pests', massive water and soil pollution and the introduction of exotic species, some of which also become pests. Combatting (as in warfare: the ultimate technical fix) these effects in turn generates further requirements for pesticides and other hardware.

There is one mechanism that could already be used to examine these activities. To the best of my knowledge, however, environmental impact assessments (EIAs) are not required for agricultural practices anywhere in the world. Given the power of Australia's rural lobby and its (often justified) fear of city-based expertise, an attempt to apply the tools of environment assessment to farming procedures would be met with vehement opposition – despite improving local awareness to the extent of rural degradation (Bolton 1981). Rather than using such draconian measures, a more effective means of reducing the extent of damage would be to change the way we eat (i.e. demand management).

In general, and with only minor exceptions and complications, per capita nutrition provided from plant crops requires less of its environment than animal 'crops' – animals reprocess plant crops from land that could feed people directly. The point in resurrecting such well-established truths is to act as a reminder that eating habits are directly coupled to land use patterns.

Food production processes occurring on-farm are by no means the only ones with impacts on environment; off-farm processing of raw foodstuffs, transport, packaging and retailing procedures all have powerful effects. Consider, finally, two quite mundane arguments, both of which favour plant foods:

1. Greater effort is required to handle, preserve and prepare animal foodstuffs (note especially the hidden costs such as those associated with legislation and policing of standards).
2. Disposal of left-overs and cleaning after preparation of meat-based meals is more difficult and resource-intensive than for the equivalent vegetable meals (again, note the hidden costs associated with the more difficult pollutants originating from meat).

Many of these impacts are already well understood. Therefore, while complex, it would not be an impossible task to plan human nutrition to reduce

its environmental impacts considerably. For instance, encouraging nutrition from fresh, local plant sources, purchased where practicable in bulk, would be a good start.

Finally, eating has major equity implications (Moore Lappe 1982; Dumont & Cohen 1980). While by no means exclusive to the Third World, negative effects of First World diets are most blatantly obvious there. For instance, coffee is exported from land which might otherwise be used to grow foodstuffs for local consumption. Closer to home, access to foodstuffs marketed without contact with 'unnatural' chemicals (so-called 'organic' or 'biodynamic' foods) is clearly the preserve of educated middle-class consumers. Other subtle inequi-ties arise through varying capital requirements of different crops, access to techniques for market manipulation (e.g. the food futures market) and so on.

## *Additives*

The food we eat is laced with additives of human origin. In some cases it is virtually only additives, e.g. diet cordials – again the picture of nature (here: water) providing a framework for anthropogenic inputs. An overview of the sources of additives may be gleaned from the following:

- inadvertent remnants of production, processing, transport and handling (antibiotics, pesticides, fertilisers, metals, oils);
- inadvertent pollution from outside (lead, salts);
- transport, handling and retail facilitation (preservatives and other additives to alter structure, taste, smell, colour); and
- processing and cooking (similar to transport, etc plus detergents).

Supposedly these additives have known effects and appear in foodstuffs at levels which cause no harm or at least no 'statistically significant' harm. Even if this should be so and all synergistic effects of the multiplicity of chemicals ingested are known to be benign, there still remains the aesthetic or philosophical issue of freedom of access to affordable 'pure' foodstuffs.

## *Anthropology of nutrition*

The anthropology of human nutrition refers to the cultural frameworks that guide what we eat and how we eat. It concerns itself on the one hand with why we eat the particular foods we eat and, on the other, with why we eat them the way we do (Farb & Armelagos 1980). I introduce it here in the belief that understanding the cultural determinants of eating habits permits access to new degrees of freedom. Cultural determinants affect every link in the chain of foodstuffs from land to mouth. They influence detail and the overall picture and, while difficult to map in detail, a general understanding of the way they act and of their subtlety is accessible.

For instance, the issue of freedom of access to pure foodstuffs gains its definition from the way purity is perceived and the understanding and acceptance of the political economy that produces them. Further, the choice of foodstuffs and the way they are eaten are also bound by a society's mores. Compare the status (as edible) of food from vending machines with that of food from live vendors (not a straight-forward issue!). Thus, complex cultural factors provide broad determinants for the ways foods are produced, handled and marketed.

However, it is not possible to isolate culture from hardware; they are interdependent. For instance, packaging and chemical treatment of foodstuffs required by present retailing and marketing techniques alter the way foodstuffs appear and therefore, the way they are presented to us; this in turn influences the way they are bought and used. Significantly, such treatment enhances the impression that foodstuffs are artefacts, which assists a process of dissociation of foodstuffs from nature. From this split, which is characteristic of all our interactions with nature, arise numerous large-scale social and environmental vulnerabilities (Shepard 1982; Bookchin 1982).

At another level altogether, nutrition affects world view. For instance, a wheat field means a different landscape and therefore a different understanding of land to that which would be associated with dairying, let alone with hunting and gathering. In addition, bread fulfills a very different role to that taken by steak. So, while the focus of urban-industrial peoples is not on rural landscapes, this does not mean that its face does not affect us, nor that continuing to ignore it is healthy. Equally, awareness of the cultural role of foods would allow Australians to cope critically with notably successful industry campaigns to boost sales of particular foodstuffs (e.g. 'Feed the man meat') (Tuan 1974).

## *Recommended changes*

The changes recommended below are offered on the basis that improved insight will enhance the efficacy of policy, that draft policy is written to inform and to stimulate public discussion and further, naïvely perhaps, that overt political realities are only allowed to assert themselves in the final policy document.

### *One: the working group*

Three areas of interest not formally included at present should be represented:

a) environment, with emphasis on anthropological and systems expertise;
b) consumption, with emphasis on experience from the consumer viewpoint of the entire chain of supply – from farmer to kitchen equipment supplier; and
c) pharmacology of food additives.

### *Two: dietary guidelines*

These should include environmental implications of eating. In terms of the outer environment: encourage consumption of *local* foodstuffs taken from as low as

possible in the food chain, e.g. soy bean products rather than animal products and marine organisms eaten directly rather than consumed after conversion to the meat of land-based animals, such as chicken or beef. Such foodstuffs should not be promoted as substitutes but as valuable foodstuff in their own right.

For the inner environment: recommendations concerning culturally consistent ways of eating the foods from the outer environment to gain most from them. For example, guidelines on food combining, cooking, timing (including eating seasonally consistent foods) and on the psycho-physiological implications of food and eating.

### *Three: principles for governmental action in promoting dietary change*

The discussion paper requires six principles to be considered in Section 7:

*7.1 Nutrition education to employ tested methods.*
*7.2 Nutrition education to be sensitive to other influences on food selection and preparation.*
*7.3 Conflicts between agribusiness and nutrition policy to be minimised.*
*7.4 Public education about content of packaged and other foods.*
*7.5 Facilitation of production and marketing of healthy foods.*
*7.6 Communication between organisations responsible for nutrition to be enhanced.*

### *Recommendations can be added to each of these*

For principle two: awareness of the cultural determinants of diet is to be raised; i.e. foster understanding of how particular frameworks of perception influence what and how we eat.

For principle four: food labelling might follow the Swedish model for packaged foods which, in addition to naming chemical constituents, includes a guide to major nutritional components by weight. Where possible, however, packaging and additives are to be discouraged.

For principles five and six: work to strengthen controls on food advertising and display techniques to align them more closely to the Food and Nutrition Policy.

In general: work to eliminate contradictions and inconsistencies arising in the public works and internal workings of the organisations responsible for nutrition. For example, see that staff restaurants operate consistent with the policies they promote.

A seventh (new) principle could be to:

- establish criteria for environmentally sound food and nutrition;
- develop community awareness of the environmental implications of food and nutrition;
- facilitate production and marketing of environmentally sound foods;
- encourage consumption of locally grown foods which are appropriate to the

climate and soils of the region as well as to the cultures living there.

In respect of Third World equity and bearing in mind Australia's attempts to exercise controls over the use of its uranium exports, it is tempting to suggest an eighth principle along the following lines:

Seek Federal Government controls on:

- the use of primary foodstuffs for large-scale production of inefficient second and third level foods (third level = grainfed beef, eggs from fish meal, etc.);
- speculation in primary foodstuffs; and
- primary use of arable land for energy crops (e.g. sugar for alcohol-based fuels) (see 'Conservation and Renewable Energy' in Chapter 3: Energy). The political impossibility of such a suggestion makes it, at best, something of which to be aware.

### *Four: proposals for action (toward policy implementation)*

The discussion paper suggests the involvement of various State Government departments: Health; Agriculture; Youth, Sport and Recreation; Education; Consumer Affairs. To these I would add the departments concerned with conservation, environment and community welfare.

In the primary vehicle put forward to carry out most of the discussion paper's suggested actions, the Food and Nutrition Council, the following areas of expertise should be explicitly represented: environmental science (with training in General System Theory), anthropology (with emphasis on food/eating) and retailing.

The main functions of the Food and Nutrition Advisory Service,

> *… would be to draw attention to the considerable range of existing educational materials… consistent with the dietary guidelines and the use of established independent bodies such as the Australian Nutrition Foundation.*

It will also,

> *… be placed… to play… a useful role in in-service training* (p. 3).

The concerns of this paper would lead the service into accumulating data from non-traditional food and nutrition sources; e.g. it should be specifically competent to advise on: cultural determinants of nutrition; mechanisms used to market foodstuffs; and environmental and equity implications of foodstuffs.

Finally, the policy recommends encouragement of nutrition obtained from a variety of foodstuffs, in particular cereals, fruit, vegetables and the human breast. All other recommendations concern reductions. The positive message might be put to the public in terms of the value of food produced locally via minimally disruptive means, handled and marketed to maintain the integrity of the original food value and further, to encourage consumers to adjust their lives to maximise their own access to that original food value. ■

# *Water wars*

Adapted from 'The Coming Water Wars', published in *Consuming Interest*, Spring 2001, pp.16-17.

To the extent that Victorians want to restore the Snowy, let alone the Murray and other lesser water courses, such as the Latrobe, they face a fantastic opportunity to become home to world's best practice water management! The fresh water crisis in Australia, subject of extensive recent news and opinion pieces in our daily papers, effectively challenges our major urban communities with an opportunity to show that they can conserve water and, more, that they can profit from the exercise.

The great majority of Victorians are Melburnians. Were they able to transform their water use patterns they might then be justified in expecting their thirsty neighbours to take the hint and do likewise – thereby allowing the Snowy to have its head. Indeed, Melburnians would then be in a position to assist their neighbours! If however, *urban* Victorians – sitting on all their advantages of industry, community and education – can't curb their disposable water uses they can hardly expect Murray valley irrigators and downstream urban South Australians to curb theirs.

Currently Melburnians siphon a fair proportion of Gippsland's water into themselves; quietly killing off the Gippsland lakes and numerous less obvious eco- and agricultural systems. Such behaviour has enough irreversible social and environmental consequences to fill a library with PhDs.

These consequences arise from intellectual and institutional habits grounded in understandings that are, from twenty-first century perspectives, narrowly focused and profoundly ignorant. Once embedded in capital and personal (e.g. training and status) investments, understandings are hard to change. Their persistence is a function of the requirement that investments pay for themselves. This legacy of intellectual and institutional habits has generated numerous 'perverse incentives', sending mixed messages many of which point in quite the wrong direction: toward profligate use of water.[1]

The vaunted potential of twenty-first century technologies, such as computer controlled drip irrigation and low-flow shower heads, cannot give us sustainable water use if introduced to a market governed by nineteenth century priorities and the institutions based on them. They will only be implemented if people are *empowered* to use them by changed institutional priorities that engender circumspect use. Ancient intellectual, institutional and capital infrastructures make hypocrites of us when we demand conservation from our neighbours.

## Old habits

Modern environmental science offers more rigorous understandings from which to build institutions consistent with what modern science is telling us about environment. In relation to water consider the following:[2]

- Mundane activities, such as *water-flushing toilets* based on successful nineteenth century sanitation techniques; the *weekend car-hosing ritual* and a wide range of *moist-climate urban activities,* such as gardening with exotics are all supported by:
  - relatively low and undiscriminating water prices;
  - outdated health regulations;
  - nineteenth century cleaning techniques with twentieth century expectations of cleanliness and parallel needs to demonstrate that we're meeting these (over-the-top) expectations;
  - the way our payments for water use are effectively hidden, e.g. when paid for by others, at work say, or by us, but as part of a bill paid infrequently and often automatically or, worse, as part of a wider bill whose components are not itemised to show us where water is used. Customs like these conspire to help us forget that we are actually paying, or worse, they shield us from ever knowing our water costs.
- Agricultural planting of almost whatever we like when we like, e.g. moist climate species in an often unremittingly arid or at least 'capricious' environment. This is a function of the legal freedom to 'do what we like on our own land'; to participate in the market as economics, the law and entrepreneurial skills determine and to do so with whatever technologies our participations uncover, such as flood irrigation. It is also a function of the *lack* of market value for many ecological realities; their measures and weightings are yet to be popularised [popularised, i.e. to gain market or dollar currency!]
- Tardiness:
  - in maintaining water systems, e.g., leaky tap washers; and
  - in installing smart water monitoring systems, such as rain sensitive municipal sprinkler systems.

Both are habits supported by cheap water and the time and perceived awkwardness involved in maintenance and replacement works. Time may be easy to cost but awkwardness is more difficult because maintenance does not yet have the same *social cachet* as innovation. Indeed it may never have it and so must be consciously supported by social systems. At present its support is much better than in Third World countries but could be much better.

- Water-intensive production techniques, again encouraged by low water prices and the failure to mention or itemise water use in a contents list or in the documentation for products that use water in their manufacture. Water has so

many uses – solvent and cleaner, coolant, transport vehicle etc. – it's easy to overlook and forget them.

- A view of water conservation as *restrictive*, i.e. as inhibiting spontaneity and so of being precious or even draconian, rather than as a matter of mature and thoughtful management.

## *Fresh opportunities*

Most Australians know that water *is* precious and that there are ecological and even geomorphological consequences in taking water from one area to give to another. Most of us would also *like* to behave as if we knew that but not when so many of our social systems are stacked against us doing so. Advertising campaigns, such as 'Don't be a Wally with Water' that seek to encourage water conservation in a social environment oblivious to its value or in which its value is hidden, are a bit like tossing a callow youth into a casino with an unlimited personal credit card and expecting him to spend with the insight of a professor of statistics. A comprehensive approach that exposes how our social structures make us 'wallies with water' is what is needed.

There are plenty of opportunities for State and municipal governments to reconstitute the way urban Australians use and understand water. Certainly, we are playing with complex capital and personal investments here, but our bureaucratic skills should not be inadequate to changing them, especially if bipartisan support can be found.

A public inquiry into the opportunities for transforming urban water use with a view to it becoming a model for twenty-first century water use might be a start. Out of that might come things like a 'water rating' for goods and services which lists how much water it takes to manufacture our newspaper say, and how much water it takes to deliver it!? Difficult perhaps, but not more difficult than the 'life cycle assessments' we already do to determine the energy 'embodied' in goods and services.

Downstream water users might then be a lot more sympathetic to the aspirations of the likes of Victorian Independent MP Craig Ingram for his Snowy River; and our cities could then *sell a raft of new expertises*. There can hardly fail to be strong demands for that raft in the years ahead as increasing numbers with increasingly diverse water demands vie for fixed and even decreasing fresh water stocks!

All of a century ago Melbourne actually did this but at the other end of the pipe. The Werribee sewage farm was a model of enlightened sewage treatment and people visited from all over the world. Sure the world was simpler then and the complex infrastructures of modern society were barely in evidence, but managerial skills have advanced and the need for water conservation and the opportunities that go with it are now global. ■

Endnotes

1. A frightening example of this is the oft-proposed national toxic waste incinerator. Bulk toxic waste production is rapidly becoming a thing of the past. Investment in a dedicated toxic waste incinerator would require that it be fuelled with toxic waste for the next few decades (usual operating life of such things). This is well beyond the date we can expect bulk toxics to be around and therefore the presence of the incinerator would act as a brake to structural pressure to do away with the wastes at source. In the interim, existing furnaces could be used for the purpose. (See 'Let's Deal with It in our own Backyards' in Chapter 7: Taking Action.)
2. Note that while this article appears to treat water use separately from other things and therefore may seem to contradict the essence of the new holistic approach, the generalising structural approach is itself the link back to the whole.

# *Being scared of GM*

Adapted from 'Being Scared of GM', published in *Eureka Street*, Mar. 2003, pp.14-15.

Being scared of GM (Gene/Genetic Manipulation/Genetic Engineering) may not be rational but it is reasonable. Here's why.

Humans are still very much taken by their apparent power over nature. The insights of science have heightened both the scope and extent of that power and genetic manipulation represents a quantum leap in both.

Science, however, is not itself power. It is the careful attempt to theorise and build insight that stands the tests of repeated experimentation and open criticism over time and varied practice. The creation of theory is the domain of informed inspiration. Transforming theories into science however, is the domain of rationality. It involves finding and running experiments that fit into what is already accepted as science and then subjecting the results to repeated criticism. In this effort, science is our most noble creation and so the Australian Academy of Technological Sciences and Engineering report (Dec. 2002) that worries about poor science teaching in schools is well justified in its concern.

For all that nobility, science is not and never can be, ultimate truth. It does not aspire to that. It 'simply' is the most able set of interpretations we have at any time and is, by its nature, always open to questions about its insights (laws and accumulated details) and methods. We definitely are not in a situation to say, as Graeme O'Neill does, that we have 'nothing to fear from GM foods' ('GM Scare Hots Up', Melbourne *Sunday Herald Sun*, 29 September 2002). We can only say, as he does a little earlier, that 'GM ingredients have been on our supermarket shelves for six years without a single scientifically reputable report of any adverse impact on human health'. Even then, as a scientist I must have misgivings about how well Graeme knows the field of writings on the topic and about what he regards as reputable.

A more important concern with GM is one that goes beyond direct health implications to humans. It arises from the doubt we must always have about scientific knowledge and the contexts within which it is applied. These are *reasonable* concerns rather than rational ones; one cannot substantiate them with science because both arise outside science and its apparatus of proof.

Science doesn't offer directions or prescriptions although it can be used to *test* directions and prescriptions when testable bases of direction and prescription are

found. Uses or 'contexts of application', on the other hand, arise from priorities applied imaginatively and priorities arise from social and personal expectations.

In common with all fields of innovation, genes are engineered according to the priorities of those with influence. Such priorities are supported by the ways of living of most of us; that is, probably by yours and certainly by mine. While these priorities may well reflect market opportunities offered as a result of scientifically illuminated possibilities, the opportunities are neither science nor necessarily benign. They depend on interpretations and interpretations are, in part at least, idiosyncratic and unpredictable; and most of us would fight for it to remain so.

If we accept evolutionary theory, we might say that organisms develop within the possibilities available to them in their own structures and in the structures of their surroundings, propelled by the mutations which chance brings their way. Genetic manipulation involves imposing the usual two sets of interpretations and priorities on nature: those embodied in existing science (what we know) and those represented by the existing market (what's important to us). These provide new sources of mutations which are the kick or motivator in the evolutionary process. While human manipulation can be regarded as just another evolutionary propellant which the built-in structures of nature can be relied on to accept or reject, the equation is not quite that simple.

Humans are already sufficiently powerful to suppress nature's attempts to reject us, indeed as a sufferer of an auto-immune disease I am a living example of that power. We have become a global or nature-wide influence. This in itself may not be a problem. However, we have no choice but to exercise influence through the interests and interpretations available to us. The influences that attract mass market support command most of our resources and effort and therefore dictate the scale of application. They become world-wide forces with world-wide implications. To the extent that we like them, we buy and invest in them and they become entrenched, part of our vested interests and therefore very difficult to remove quickly. Moreover, because we have vested so much in them we set out to protect them, deliberately making them difficult to change. The devices we use to do this are our world-spanning risk management infrastructures: insurances, legislation, markets, armies and especially, the political policy-making infrastructures that underlie the acceptability of all the others.

So, with only the shallow public assessment structures we currently have to judge what the market presents to us, we are determining the future of something whose implications are very broad. And again, while this is not new – indigenous Australians went ahead and transformed the continent with fire without the benefit of an environment impact statement – we have now established world-spanning systems that make it difficult for nature as a whole to protect us. Worse, many of us who understand the importance of these systems to our everyday lives willfully

disregard the social rigidification they represent in part, I imagine, because they cannot appreciate the *natural* consequences. Of course and inevitably, nature will prevail but it may do so in ways that are unpredictable to us and we may not like them. Indeed much of nature may not like them either!

CS Lewis explained much of this sixty years ago in his punchy little book, *The Abolition of Man* (1996, original 1944). It is still in print. I recommend it as reading for the new century. The most revealing paragraph is below:

> *… if any one age really attains, by eugenics and scientific education, the power to make its descendants what it pleases, all men who live after it are the patients of that power. They are weaker, not stronger: for though we may put wonderful machines in their hands we have pre-ordained how they are to use them.* ■

# *Submission on electro-magnetic radiation*

Adapted from a paper entitled,'Senate Electro-Magnetic Radiation (EMR) Inquiry: Submission', presented to the Australian Senate Environment, Communications, Information Technology and the Arts Committee's 'Inquiry into Electromagnetic Radiation' in May, 2001.

A plea for:

- Government to recognise that EMR is a phenomenon that is 'out of sight and therefore out of mind'. If the Senate's intention is to raise public understanding about EMR, a much more extensive public education campaign about it and its biological implications is necessary than were we dealing with an easily visible phenomenon.
- A public expression of caution.
- Maintaining the current channelling and therefore shielding of electromagnetic transmissions.[1]
- The Government to summon its courage and warn the public unambiguously of potential danger and the need to put caution (and future benefit) ahead of *laissez-faire* and immediate profit.

## *Electromagnetic technologies and political economy*

The context of EMR will be radically affected by three technological changes currently underway. They are convergence of 'information' technologies, 'wireless' or 'Bluetooth' revolution and demise of grid-supplied electricity. These three changes are the result of the following:

- Microtechnological advances of various kinds pushed by the IT market.[2]
- Green technologies (active conservation and use of renewables) and advanced technology generally will supplant centrally generated bulk energy as a way of driving things. This will include much reduced reliance on electricity for bulk energy needs (especially for heating and cooling), improvements in efficiencies of use of electricity and local (household and community) electricity supply from the 'hydrogen (fuel cell) economy'.
- Disappearance of the rigid, massive and vulnerable fossil fuel[3] basis of baseload electricity-generating facilities. This will mean disappearance of extra-high voltage transmission lines and centralised sources of EMR (generated in and restricted to

the immediate vicinity of equipment associated with generation, transformation, switching and monitoring).[4]

The changes imply an increase in the power and spread of all frequencies of electromagnetic 'smog' except the power frequencey (50 Hz) and certain medical applications such as x-rays, which are becoming ever more efficient.

While the efficiency of data transmissions (here watts/byte) will inevitably improve, a law of economics – unavoidable within the social system we currently live in – implies that the cheaper and more energy efficient mechanisms become, the more they will be used and applied (i.e. the greater the range of their application).

## *Electromagnetic technologies in environment and health*

The UK's 'Stewart Inquiry' confirmed that we cannot yet say that increases to the anthropogenic background levels of electromagnetic radiation will not harm human health. (See for example, Fist, S. 2000, 'Mobile safety facts emerge', *The Australian*, 23 May, p.60, plus the letter, 'Cut mobile risks', 2000, *The Australian*, 13 June, p.45.) Furthermore, with the exception of certain spectra, such as x-rays, a few radio frequencies and of course light, virtually no work has been or is being done to determine what the effects of the literally vast spectrum of anthropogenic electromagnetic emissions will be on other biological systems beyond the human body.[5.]

Only bio-scientists (ecologists in particular) seem to recognise the synergistic and/or antagonistic interactions between organisms, and between organisms and the literally infinite numbers of elements of their environments. First, the public is not aware of what science already knows about environments and, secondly, science can only deal with those elements of environment for which it has developed tools. Just as phenomena such as the ozone and heaviside layers did not exist for pre-nineteenth century science (and indeed for most people today the electromagnetic spectrum is itself still meaningless), there will be important elements of environment of which we are currently totally unaware.

## *Electromagnetic technologies and IT itself*

In a special issue of the *New York Review of Books*, Harvard's Elaine Scarry made a very extensive and rigorous case for anthropogenic EMR as a prime suspect in the TWA Flight 800, Boeing 747 disaster off Long Island in 1996 (Scarry, 1998). Today's air travellers are asked to restrict use of EMR-generating equipment while on board aircraft. Further, the French military is having serious reservations about the use of mobile phones, which appear to interfere with its communication channels (Doland 2000).

## Comment

While the category 'waste' does not exist in nature (by definition), it can be said that recognising the existence of waste in human activities is actually a forward step. It recognises that we are functioning inefficiently and that what we are calling waste is going somewhere and has consequences. In the case of EMR, however, very few people would recognise 'stray' or 'leaked' EMR as a phenomenon. Indeed, very few people think twice about deliberate 'broadcasting' as a wasteful or inefficient phenomenon, let alone recognise that which radiates as a consequence of our electricity uses and transmissions. To the extent that we think about it at all, this is partly because the raw energy being broadcast is perceived as small. For all that, the amount gainfully used by our (radio or TV) receivers is a truly miniscule proportion of that transmitted.[6]

We already know that changes to organisms, their elements (e.g. organs and cell structures) and the wider ecosystems of which they form part can give rise to quite unpredictable changes. Nevertheless, we still blithely make alterations to environments in the apparent certainty that our socio-economic priorities as established by laws and economics take precedence over any 'precautionary principle', let alone over any sanctity of environments.

Indeed, this submission itself is likely to be disregarded simply because it is not expressed in terms that have a conventionally acceptable profile in the normal scheme of formal politics; i.e. the position from which I am coming has not only little money attaching to it (at present), but few individuals (electors!) aware enough to subscribe to it.[7] Its primary claim to attention must simply be the coherence of its argument and the legitimacy of those who have gone before who put the same argument (see, for example, Scarry 1998, mentioned above).

## Recommendations

1. All electromagnetic emissions to environment are to be minimised. This means primarily that intensity (wattage) should be minimised, but also that frequency should be minimised since biological damage is related to frequency (although this relationship is both varied and complex).
2. Where possible, all electromagnetic transmissions should be moved as far as possible from all living things (not just humans) – recognising, fortunately, that intensity falls off as the square of distance from the emitter. Canallisation need not imply a plethora of 'canals': cables or transmission lines. It has long been recognised that:
   - fibre optic cables have a huge data-bearing capacity and can carry multiple transmissions at once; and
   - existing wiring running to human habitations and workplaces, notably power transmission cabling, can be used for transmitting data.

3. The Senate make an unambiguous statement of the precautionary principle in relation to the generation and transmission or EMR. Some concrete proposals are:
    - Legislate to require 'Socio-Environmental Impact Assessment' of large scale technological innovations.
- Require the Federal Government to press the States to introduce context curricula into schools along the lines suggested in no.3 of the Government's 2000 'National Action Plan' for environmental education.
- Reinstate the Australian Science and Technology Council (ASTEC) or the Commission for the Future (CFF), or create an Office of Technology Assessment, all to be charged with public awareness building in matters of technology. ■

Endnotes

1 Even when restricted to wires, the shielding is partial. While the electric field is restrained, the magnetic field is not.

2 Bear in mind that the market is 'a great slave but a bad master'; i.e. the market is unaware of consequences as it pushes (demands) change. The demand for reaction to consequences only follows years after the event unless a *metademand* is created that demands action or accounting for the *consequence of demand*, cf. 'triple bottom line' accounting and ethical and green investments and indices! My Centre for Environmental Management at Monash University is engaged in screening organisations to facilitate 'green' investment. That is, it:
    - *recognises* that there is a public demand to invest environmentally responsibly;
    - has *set up a measure* of environmental responsibility to enable the public to invest responsibly; and
    - thereby *legitimates* organisations that seek to operate environmentally responsibly and their investors.

3 Bio-fossils: coal, oil, gas; geo-fossils: nuclear.

4 Vanishing demand for fossil fuels will cause a reduction in oil and coal prices despite other uses (plastics). This will slow the flight from these products. Oil producers are well aware of all this.

5 The natural background radiation for many of these frequencies is zero. Therefore nature has had no 'experience' with them and consequently no opportunity to make Darwinian adaptations to them.

6 This is not to suggest that we should be canallising all our transmissions and narrowcasting them down a myriad of separate wires instead, with all the implications for resource use that would have.

7 Again, this is not for a moment to suggest that I (we) am in any way 'better' or 'more intelligent' than the next person, only that I have been privileged in training and experience.

# *Computers*

Adapted from 'Computers in Primary Schools: Sterile Fruit of Fear?, published in *Green Teacher,* Issue 1, Oct. 1986, pp. 4-6.

My son's primary school recently bought a computer. Now a small school (100 pupils) in a relatively poor Australian suburb doesn't easily come by $1000; so why did they bother and will they get their money's worth? I thought the school could do better things with this money and so, as the sole dissenting voice, opposed the decision along the following lines.

Primary school is not normally thought to be the place to introduce 'hi-tech' devices, yet this is precisely what is happening. We are introducing computers in the hope that our children will be 'switched on' to them and so avoid developing computer-phobia. Now it has been suggested that it is not children who develop the phobias but their parents; who, quite understandably, feel threatened by them. If this is so and if our aim is to encourage an awareness in our children of our 'technological system' – rather than enthuse them to promote a particular technology – then I suggest that simple, familiar machines, whose workings are accessible, would be more appropriate (Ellul 1980). Once a general insight into technology has been acquired through technologies *appropriate* to them, children (and adults for that matter) will more readily and effectively understand the ways of computers.

Certain ways of looking at the world are built into their design and use, for instance that:

- the world can be represented by numbers which can be programmed into a computer;
- there are problems which can be solved by using some clearly discernible 'technical fix' (solutions based on mechanical and quantifiable understandings, such as economic and pharmaceutical as well as engineering) in which the subjective bases for the quantifications are so much taken for granted as to be thought not to exist; and
- problems that cannot be solved this way are not 'properly expressed'.

These three things are consistent with the view that mind and body, 'man' and nature, you and I are all indeed separate *dualisms*. Believing that the world is like this allows us to observe in such a way that we think we do not influence what we observe by looking at it; that is, that we *can* observe objectively. It is a view that contrasts strongly with everyday experience. Consider how scientists, the

bastions of objectivity, fight for (their) ideas and ask yourself how objective is that fighting?

In maintaining that objectivity is not real I am concerned that we close our minds to the subjective basis of our mechanisms and to the ways by which we arrive at agreements on certain subjective understandings or judgments which we then call objective. The sub-title to Weizenbaum's famous book about the social implications of computers: *Computer Power and Human Reason* (1976) exemplifies the point, it is *From Judgement to CalcuIation*! The point I am trying to make is that we are vulnerable to the extent that we forget that what we call objectivity is a social consensus about subjective observations (Albury 1983).

Objectivity is the very essence of computers. In the popular view; they are already everywhere and this very ubiquity somehow confirms their innocence. They look efficient and apparently do our bidding quickly and accurately. Beyond bemoaning job losses, which many respectable people tell us will in any case be compensated for by jobs created in other areas, few question their presence. By default as it were, they have attained credibility and those who work with them participate in the 'aura' and are well-rewarded and well-regarded.

Computers are, however, based on technologies that few understand. Beyond fictional accounts fewer still have thought about their implications as agents of social change (Mathis & Gray 1975). Despite this lack of awareness, once enough of our ways of doing things have been altered by automated information processors, we are unlikely to 'go back', as many people would see such change, to a condition where people were directly responsible for manipulating (note: manus = hand) information themselves. To keep us running, the pragmatists tell us that we can't 'un-invent' the wheel, the bomb or the computer. On the other hand we can make decisions not to introduce them or at least to introduce them slowly thereby inhibiting the vulnerability we presently experience.

I have already suggested that much present vulnerability is hidden, not by any conspiracy but simply by lack of awareness of technology in general. Under the arbitrary and over-lapping headings, material, psychological/social and intellectual, let me list some of those dependencies of which I am aware. Material dependencies range from depending upon a calculator to do household chores through digitised police and hospital files to the total dependency of astronauts on their Houston-based computers. We believe in them for the speed and numbers of manipulations they offer – without asking questions about why we might want to do such things. Indeed, as we shall see, they encourage us to do ever more calculations, as if data were information and information were knowledge. Psychological and social dependency lie in building expectations around them and in the subtle ways investment (financial and personal) in them distorts social contexts, intellectual independence arises from the ease with which we grow to

rely on these machines doing intellectual chores for us. The young often have no knowledge of independent ways of doing these chores and are therefore doubly dependent.

To gain the capacity to handle the new machines, we are obliged to pull up our game (undertake extensive re-training). In fact to work successfully with computers is at present the ultimate test in gamesmanship as computers allow the rules of their construction to change and the rules by which this structure is changed require learning of considerable subtlety. It is precisely the awe in which we hold these subtleties that encourages the popular confusion between the nature of computers and the nature of people.

The more automated, 'fool-proof', 'user-friendly' and error and maintenance free our technologies become, the less aware we are of how they do things or even *that* they do things. Environmentally their effects appear minimal – ever less resource and pollution intensive. Their visible lines are clean and simple; the name micro-*chip* itself (not to mention 'Apple') confirms their superficial simplicity. The term 'software' is used to describe instructions to computers while in another context we would think of such material as quite 'hard', for it is quite uncompromisingly logical and made up of unambiguous instructions expressed in code. In these ways the values and understandings underlying technology are so well concealed that we are not prompted to question their social implications. Indeed should we raise the cowlings on our machines, the daunting complicatedness that confronts us rarely prompts a reaction to stop and start studying it; to the contrary!

Thus, as society automates its processes, its citizens lose access to the levers or self determination (Huxley 1955). The opportunity to be involved in determining the conditions of our own existence diminishes. The control which automation offers to the 'man in the street' is trivial and, further, political power can now only partly be traced to the entrepreneurs, financiers and labour leaders who traditionally made it happen. (See 'Technology and the Loss of Self' in Chapter 1: Response Ability, for an analysis of the loss of power associated with modern technology.)

Finally, boring as it may be to be reminded of it, 'educational computers' in common with most technology, are not, in the first instance, designed for our enlightenment, but rather to sell. Moreover, once sold, they are designed to encourage more of their kind, their accessories and successors to be sold. This may be contrasted to technology designed to liberate its users from dependency upon it … a goal which would, nominally at least, be in harmony with the aim of education; namely to create independent, responsible individuals.

Contrary to Gerver of the Scottish Institute of Adult and Continuing Education, I do not believe that

> … *the most important characteristic of computers… is their neutral power* (1986).

Are we then to spend money and are our children to spend time familiarising themselves with just the face of automation? Won't this only add fuel to the common fallacy with technologies that by familiarising ourselves with a particular aspect of them, we know them? Thus, driving a computer, even more than driving a car, is as much like knowing the systems that support it as knowing the shape of an iceberg is from knowing the shape of the visible tip.

Primary school introduces children to the knowledge our culture offers. Presently this is done by introducing specialised insights and hoping – if any thought is given to it – that somehow children will learn to integrate and transcend the insights to gain a working knowledge of the way the knowledge is itself organised. There seems to be no consistent attempt to introduce the ideas of system and structure, let alone philosophy (e.g. Lipman & Sharp 1978). On the other hand, it is recognised educational practice to build upon things that are close to the everyday reality of students. Here then is a perfect opportunity to introduce technology, simple technology, that is already part of children's lives: the push bike.

It wouldn't be difficult to devise school curricula to illustrate most aspects of our technological system through the example provided by the bike. Bikes are still manufactured in most countries even though parts may be imported. These two factors allow numerous complex issues to be illustrated, such as the nature of trade and international manufacturing; the 'world-bike' assembled from parts made all over the world, for instance. More subtle notions such as technological imperialism, essential safety (the safety in vulnerability) and the status associated with technologies (see 'Safe Cycling' in Chapter 4: Transport).

Unfortunately this article is already well behind events. Many (actually most in 2006) primary schools already have computers and are now vying with each other over the purchase of software. Therefore, let us at least offer some criteria for their use and for those schools still to acquire them:

1. Rent rather than purchase machines and software, so that the equipment:
   - is a continuously visible item in the school budget;
   - will be serviced by directly responsible firms; and
   - may be returned when superceded or should school policy alter.
2. See that users are involved in what is happening to them as they work with the new devices. That is, see that teachers:
   - find ways to stimulate critical understanding in their students;
   - find ways to generalise the understandings about technology gained from computer studies;
   - involve parents; and
   - themselves seek insight into the social consequences of computers.
3. Ensure that the new machines do not become exclusive in any way. In other words see that equal opportunities reign here too!

Is this asking for too much? Will what I have written be seen as romantic longings for the Stone Age or was Australia's national daily paper correct when it headlined an article with 'Millions Wasted in Schools from 'Sheer Unadulterated Fear' (Miller, *The Australian*, 12 Feb. 1986, p.26). And if

> … *parents are (really) afraid that if the kids aren't computer literate, they won't be able to find employment* …

(same article my parenthesis), why not look to the industry itself? It tells us that virtually anyone can learn to programme and that certainly anyone can learn to use pre-programmed computers at any time of life and, more, when it advertises for professional staff, if often advertises for graduates. Not graduates in computer science, just graduates, *good* graduates from any discipline. In other words, they are looking for people who can think. And that's all I'm asking for; the opportunities for our children to develop the wherewithal to think as they leap; for the opportunity to think before they leap is long subsumed into the depths of some computer program. ■

chapter seven

# TAKING ACTION

This chapter contains articles and letters that demonstrate in practical ways how to achieve social change, as well as providing a range of environmental and social proposals, useful in their own right.

'An Effective Way to Act on What Concerns You' is a general guide to making use of an understanding of social construction in any area. It includes detailed instructions for approaching authorities, getting advice, making submissions to inquiries, and being efficient with all this effort.

'Comment on a Transmission Line' is a deconstruction of an Environmental Impact Statement. It exposes the politics of such processes and is a good example of how to phrase comment on them. Specifically, this paper deals with a proposal given in 1985 for a new power line through the heart of inner-city Melbourne. Frank Fisher favoured the 'do nothing' option, which he recognised could lead to power failure but also innovative structural rather than technical solutions. In 1998, much of Victoria's gas supply was shut down for two weeks as a result of a gas explosion at Longford, which did indeed lead to interesting social solutions. These and other options are canvassed in 'Not Forgetting the Gas'.

'Bin Sins Trashed' was written in the context of a major project undertaken from 1991 to 1994 by Frank Fisher's Centre for Innovation in Waste Management (subsequently the Centre for Environmental Management and now Monash Sustainibility Enterprises) in the Graduate School of Environmental Science at Monash University. The Centre worked with the Melbourne City Council to trial a pay-by-weight rubbish collection.

The next articles, 'Lessons from an Award' and 'Waste Minimisation: Dry-Cell Batteries', are examples of individual, rather than group, activism.

Finally, there are the letters. Frank Fisher is a writer of letters-to-the-editor, and hardly a week goes by when one of them does not appear in a broadsheet or popular journal. His letters are often prize-winning and headlined. Those included here are a selection of 'little screams', as he puts it. They illustrate the power of the articulate voice and, just as importantly, how to get it published. What the letters have in common is an unusual angle on a contemporary problem and straightforward arguments in strong, accessible language. They offer good guidance for anyone wishing to reach an extensive audience in an instant.

'Blowback with a Vengeance' is a special case of a letter to an authority, here the Operations Manager of the State rail authority: V-Line.

# *An effective way to act*

Adapted from 'An Effective Way to Act on What Concerns You/Or: Social Change: Millions of People Making Millions of Mundane Decisions', published as 'Understanding the Context of Action' in *Community Quarterly,* no. 35, Spring 1995, pp. 4-11.

Let's say we have a concern that involves social change in some way, a concern that we can't deal with from within our own day-to-day means. Let's also say that it affects us enough to prompt us to do something about it. How should we proceed? How should we decide what is the best way to effectively move on our concern? That is, how to define our concern and determine the possibilities for action? What are our strengths in relation to this definition and how do we select an appropriate course of action for our particular strengths? Which begs questions about what 'appropriate' might mean!

To enable us to see a range of possibilities not normally visible, I will outline an approach to understanding action used in the Graduate School of Environmental Science. From this basis we will be able to deal with the questions I have just asked with greater insight and ultimately with greater effectiveness. The article concludes with a couple of examples.

## *Understanding the context of action*

Humans organise their activities in ways that are consistent with the ways they have developed to understand their worlds. And, since most of our world today comes from the actions of others who have gone before us, it is, to a point, quite knowable. A large catch is that in common with the way we treat nature, even our own bodies, most of our world is known subliminally only. We are familiar with it but do not 'really' understand it For instance with nature, we can spot when we've got a cold and will all have a range of procedures to deal with it… without having much understanding of either the cold or why the remedies (appear to) work. We know a banana when we see one and that when its black it will not, to most of us, be as pleasant to eat as when it is yellow… but few of us know much about its biology or what causes it to go black and how to inhibit its ripening. Similarly, we know how to replace a light globe without knowing what it is, how it gets to us or much about how it is driven. We also know that there is something called the *Equal Opportunities Act* but do not know much about how it is defined or made to work, or how an Act comes into being.

Well, there is a general system behind all these things and I'd like to elaborate something of what we know about these generalised ways of knowing and how they can work for us.

Take the light globe. It is made of glass, metals and one or two other things, such as the fairly rare gas (argon) that stops the filament from burning away. All are carefully assembled so that the globe works for some years. It is accessible to virtually all of us because it is now quite cheap and it is cheap because subtle and very expensive machines have been made to assemble millions of them automatically. Now, it 'plugs into' a socket which in turn is plugged into an electricity grid and, less obviously, into an intellectual and social grid responsible for:

- the expectations associated with lighting that create the demand filled by the globe. These are the desire to work and play in spaces darkened by night, heavy cloud or poor provision of natural lighting, and more recently, the fun we can make out of lighting arrangements themselves.
- electricity, and its safe and reliable maintenance, which drives our globe and creates its dimensions – if we only had gas, we would still have lights but they would look very different.

Assuming now, that you are environmentally aware, what do you do to promote a new type of light that does the job with one fifth as much energy, lasts five times as long but… costs twenty-five times as much as the globes we are used to? Ignore for a moment how the new light appeared on the market. We could buy them for our own home and office and thereby satisfy ourselves and set a good example to those who… visit. We could buy a whole lot ourselves and give them away as Christmas presents, assuming, reasonably enough that our friends would understand their value and use them. We could lobby our electricity supplier to subsidise them to make them more attractive… but then we remember that our electricity bill is primarily made up of a charge for electricity used. As different to the phone bill, the fixed charge, which must be for connection and maintenance is quite a small proportion of the total bill and, so we can surmise, the supplier makes most of its money by charging for what we use and therefore is unlikely to be interested in selling less. What else can we do? How can we influence people to make the change next time they're looking for a new light?

The question boils down to, 'what priorities can we find that are common to most of us and therefore can be assumed to be things people will take notice of in connection with lighting?' Well, there's money of course and legality (what the law says you can/can't use), then there's safe and trouble free operation (convenience), fashion (what those you respect are doing) and environment – first, in relation to one's own health and that of our loved ones and, second, in relation to the wider world. All of these overlap and they tend to define each other and have broad ramifications. Beside the obvious, money can mean that if we decide to go to

candles for light, our home insurances may lapse or, at best, their premiums will rise. Further, if the new lights become fashionable, their prices may initially rise – but then as they become more popular and automated production runs increase, the competition becomes fiercer and prices will drop…

Once we have decided which approach, or which combination of approaches we will concentrate upon, the question becomes what means we will use to get across to people. To be effective we will have to influence a noticeable proportion of society and there are many possible ways of doing this. There are various forms of media and each of these presents various opportunities. There are various forms of education. There is legislation requiring or banning practices; economic measures favour or restrict behaviours and, of course, there is the market itself: we can simply go out and manufacture our own version of the new product and throw it onto the market. Within each of these are numerous possibilities, e.g. if we are wealthy, we can use the media directly, writing and paying for our own programmes or advertising. Modest approaches may begin with writing a 'letter to the editor' of a large circulation daily or a journal which targets the particular audience we seek to influence. Legislation involves finding the appropriate *level* at which our action must be pitched – municipal, state, federal or international – and then working out a strategy to say, 'get the numbers' behind our proposal. Economics is a favoured path in a society that does not want to literally dictate behaviour. In the case of cigarette smoking governments have been induced to tax them heavily rather than banning them. Other economic procedures simply expose the costs or benefits of activities which have hitherto been hidden in some more generalised form of payment (lump-sum water bills replaced by pay-by-volume accounts) or not paid for at all (holes in the ground as landfill dumps).

In the outline I have just given, we can easily substitute almost anything for our efficient light globe. We can substitute a desire for natural items, such as jojoba beans or, more generally, wilderness, and of course we can substitute an artefact, such as equal employment opportunities for the chronically ill. At issue here is not the action we want to take itself but the generalisations we can make about how to initiate action in society at large.

## *Our constructed world*

The first thing to say is that *humans construct their societies*. Sure it wasn't done all in a day (even God took seven to create the earth), but over thousands of years and through the accretion of 'squillions' of small initiatives both 'on the ground' – in hardware – and in our minds and the institutional structures our minds have created we have, for example, our multicultural society. Recognising this does not necessarily give precedence to any particular hardware (a dentist's drill, say) nor any particular way of doing things (watching the magic of footballer Gary Ablett

as recreation). It simply says that we can, consciously, change the way things are done because they were once, consciously, put in place.

This is a very powerful insight and takes most of us a while to accept in detail, let alone be able to work with. It's easy enough to imagine that the way we brush our teeth and the fact that we brush them in the first place arose from a sequence of ideas. It's less easy to see that the way our cities are laid out arose from a multitude of small decisions relating to such diverse things as the expectations we have about 'doing our own thing' on a plot of land, having an independent dwelling to house our families or having immediate access to high-speed, personalised transport. More pointedly, it is almost impossible for most of us to accept that when we look at so-called natural objects (a tree, a face, a carrot or a bacterium), our capacity to recognise them as such is a result of a whole lot of learned frameworks we acquire from birth.

Part of the problem is that we personally seem not to be involved in much of this creation, most of it is simply handed to us. For ourselves, however, we are very much involved. The way each of us sees the world is unique and only slowly 'brought into line' as we are socialised. And it must be so, otherwise we could not communicate and the essence of our humanity, that we are social beings, would not arise. Nevertheless, the intention of this article is to encourage us to recognise that while we might take on and use a myriad of generalising, and therefore liberating, understandings, our own interpretations of the world, our concerns, are also real and may well be worth sharing with others. Indeed, given that most people who were once associated with the reality around us, are either dead or no longer involved, it is we who are now responsible for it and the extent that we are able to shoulder this responsibility is critical to a mature society. How to encourage and sustain such maturity is of course the main issue.[1]

## *Representation*

Second, we must recognise that we no longer live in a society where it is possible to find *the* single person or even group of persons responsible for a thing or an area of concern. We live in a very large and complex society where the objects we deal with have profound historical roots extending in many directions. They have been influenced by many people over many years and in many places. Edison may well have invented the first light globe, but he sought to do so into a society already familiar with the idea of extending daylight; it's just that the ways it did it at the time were more complicated, dangerous and expensive than Edison's 'simple' globe. The materials he needed were already available and the understandings and electromechanical infrastructures were already available to drive it. Similarly – and it appears to be quite a leap – equal opportunities' legislation became a fact because the groundwork had already been done. And so on.

To take responsibility for all the material and social objects around us, then, seems to be a very tall order. As I have suggested, however, we *can* at least be *capable* of it!

## *Recognising organisation*

Perhaps the key to taking responsibility for the world around us is to recognise that societies have continuing organisations to define and maintain their material and social forms or 'structures'. That is, for Edison to bring us his globe he had to 'lock' it into existing material and social forms. It had to be something people could already conceive; it had to accept the type of electricity and light fittings already in existence, and it had to fit the existing safety, marketing, transport, etc. forms available to American society at the time. Once it was well established within these constraints, it itself became 'part of the furniture' of people's expectations and could begin to dictate infrastructures more suitable to its own 'intrinsic' designs. We can call these 'organisations for organisation' a society's political structures, the forms through which action is enabled.

These political forms can be classified in many ways but from the point of view of this article a distinction between *formal and informal* structures is useful. Formal structures are those which society recognises in some explicit way, such as the Australian Constitution which sets out how the Australian Federation will provide for those things it has identified as wanting from government. Another structure is a local government by-law which sets out how a municipality will control one of those things its residents have decided are within its *jurisdiction* to provide. Others might be standards which involve social agreements about the quality of goods say, religious formalities that set out how we will be married within a church and 'Aussie Rules' which provides a framework in which Ablett can weave his magic and actually *enables an Ablett to come into existence*! That is, these structures are enabling as well as controlling. With all of these, one can go somewhere to literally determine just what 'the rules of the (particular) game are'; they are 'formalised'.

Informal structures, such as dress 'codes', eating habits, hair and language styles, are every bit as important in determining the way people act. In such cases, however, there is nowhere one can go to look up the rules; at least nowhere that is socially determined as the home of the rule book cf. Standards Australia and the Australian Football League's Tribunal. Informal structures are isolated by social scientists: the historians, anthropologists, sociologists, political scientists, linguists, etc. whose job it is to bring out these structures in the same way as the physicist or chemist does about the material world. They propose a structure (explanation) and then attempt to test its validity. Sociologists, for example, might be concerned with the ways in which we express a concern to distribute wealth.

So, once they have defined wealth they will look at how we as a population attempt to attain 'distributive justice'. We will maintain charities, develop language forms to express our concerns with equity, make jokes at the expense of the 'filthy rich' and, ultimately, formalise the concern by bringing it under the umbrella of government. So, informal mores or codes precede and create the conditions for the formal, and knowing this is itself an example of what I'm attempting to illustrate. Politicians and those who work with them know this well and are trained (usually informally!) to recognise it and, at least in societies such as ours, assist members of the public to bring informal concerns into the clear (facilitative) light of formality.

In passing, it's worth underscoring that *all* societies, and all sub-groups in societies, organise themselves in this general way; all have informal and formal rules by which those 'in the know' (the *cognoscenti*), at least, can make things happen. What is really wonderful about our society is that, at least in principle, you and I can be one of these people.

To successfully initiate action, then, we are helped by understanding the social structures in which our desired action will have to make its way. While these are different in detail for every initiative, they will be the same in general for all initiatives. Society will have informal categories within which our action will fit and some, usually most, of these will have some corresponding formal organisation which will act as a guiding umbrella for the development of the informal. Knowing this, all we need do is make a start with recognising where our initiative fits and seek out someone who has set up as a representative of the particular interpretation of reality that we are making, either formal or informal, and ascertain if we are on track to mapping out a detailed network of structures that will nurture our initiative. Such acceptance means that our concern has gained the acceptance of someone or some organisation. That is, it is *legitimate* to that person or, better, to that organisation (i.e. more than one person)! This concept is important in that it helps shed light on how people function in society. It will come up often as we proceed.

## *Recognising the actors*

The next task is to find the representatives of the structures. In the first instance, they will be the social scientists who nut out the informal structures and relate them to the formal structures that societies build to enable social organisation. Informally, these 'social scientists' will be our associates and friends, all of whom will have opinions about 'the authorities' to which we might turn. More formally, they will be books and manuals that will explain what we are getting ourselves into. Most formally, they will be the academics who are paid by the public purse (you!!) to do just this, to *be available to answer our questions*. Becoming an

academic requires an extensive and continuous process of legitimating expertise to ensure capability in an (essentially narrow!) domain. Instead, therefore, of asking a friend to recommend a solicitor to facilitate the legalities of purchasing a house ('conveyancing'), we might buy a 'DIY' (do-it-yourself) conveyancing manual or go along to a TAFE college, university or Council of Adult Education course to learn about conveyancing. The lists of possible courses offered by these educational institutions and many other private groupings (e.g. professional bodies, such as the Institution of Engineers Australia or non-government organisations (NGOs), such as the ACF or Australian Conservation Foundation's 'Ecoversity' astounds even me. Moreover, many of these courses provide formally accredited certification to practise the skill you've learned. These certificates (e.g. *degrees* of excellence) are themselves a public recognition, or granting, of *legitimacy* and therefore confer a type of empowerment.

The specialist books and journals one might refer to are, on the whole, written by these same academics, part of whose job definition rightly requires that they publish; i.e. get their research into the public domain for scrutiny and as potential tools to extend and improve the opportunities open to the population that supports them. In addition to the specialised journals, there are many metajournals about journals whose function is to scan and digest the material in the specialist journals. These can be very helpful and your local librarian can guide you to them. One of the most interesting of these is an American magazine called *Utne Reader*. A digest of 'the best of the (American) alternative media', it is a mine of interesting ideas, organisations and products and makes most interesting reading in its own right.

Second, there are the people charged in various ways to act on your concerns or even to act for you. Just as with DIY books and educational infrastructure, these opportunities are literally vast and make up a good part of employment in so-called advanced societies; indeed they constitute a good part of the wealth of these societies.[2] They include politicians whose electorate offices sit waiting for your representations and the many 'authorities' responsible to them. These are all the government and semi government agencies – at all three levels of government. Most have quite formal access points ranging from 'extension' services where they formally go out to meet the public, to complaints desks and even powerful overarching structural change tribunals, such as equal opportunities' boards, parliamentary inquiries (see below) and the office of various Ombudsmen (find out what they do by looking them up in the phone book and ringing[3]). An easy way to find the correct place to turn is to go to your local politician's office (at any of the three levels of formal politics) and ask… that's what they're there for: to represent you!! (See Parliamentary Inquiry below.)

## *The Parliamentary (or Agency) Inquiry*

Virtually every Saturday in the major daily newspapers, the State and Federal parliaments (Upper and Lower Houses) and various government agencies (e.g. the Industry Commission[4] or the Australian Science and Technology Council[5]) advertise the opening of an inquiry into some aspect of their areas of responsibility. Local governments (councils) do the same but usually advertise in the local press. Examples of these diverse inquiries may be into the functioning and jurisdiction of the Australian Patent Office, control of genetic engineering, the role and effectiveness of tertiary education, or pedestrian and cyclist safety.

An inquiry is – on the face of it – an attempt by representative governments to find out what the community thinks about an issue with which it has to deal. Usually it means making a written submission within terms of reference (the outline *it chooses* for the limits of the inquiry), and then perhaps following it up with a verbal submission to the committee of inquiry itself. In the case of the parliamentary/local council inquiry, the committee of inquiry is made up of politicians assisted by various parliamentary aides and the 'Hansard' or parliamentary recording team. Evidence is taken, sifted, discussed, digested and published in draft. We then get another opportunity to make criticisms of this draft before the final recommendations go to government.

Once the final report is published, the matter is by no means dead. While a certain legitimacy accrues to the directions it provides, one of the main exercises fulfilled by the process is that of drawing an issue into the public domain. Groups will be set up to make submissions, the media will focus on the process, and once the final report appears, directions and priorities will be set for those who want to take further action.

The final report should therefore be seen as a beginning or at least as part of a continuing process, rather than an end!

A problem with all inquiries: gaining access to formulation of the terms of reference!

The big issue is participation. *Very few* members of the public participate; most of us feel inhibited for quite understandable reasons. The process is (unavoidably) formidable and appears to be stacked against public participation. In a sense it is, for it automatically favours the powerful and articulate vested interests (remember the legitimacy issue). The trick is, therefore, to hitch yourself to an organisation having a parallel interest to your own and offer assistance on a 'quid-pro-quo' basis: your concern is taken on board in return for your assistance in putting together and defending the organisation's submission. Another effective mechanism is to *lobby* your local member to assist in making a submission.

Next there are the private agencies ranging from solicitors through professional bodies, such as the AMA (Australian Medical Association) and its more 'radical'

sister organisation, the DRS (Doctors' Reform Society), to media operators (reporters and commentators) and the many NGOs set up to look after just about every cause you can imagine. Indeed there are guides to them, such as ACF's *Green Pages* and the catalogue of the Council of Self Help Groups, which in Victoria lists a couple of hundred groups including, even, one for those afflicted with Crohn's Disease (ever heard of it?…Well there you are!). Other large and traditional groups set up to assist in various ways are the churches and their many affiliated charities and ecumenical groups.

Most of these groups will both act on your concerns, e.g. the police or a local government 'dog catcher' have obvious functions of this kind where you simply initiate some prescribed action. A solicitor or consultant (in any area) on the other hand, will work out a plan of action for you which you may not have the expertise or time to fathom and pursue. An NGO may act on your concerns and/or for you, but has another quite profound empowering function and it is to give you the expertise, political basis and therefore *legitimacy* to act yourself.

Third, there are individuals who in one way or another have set up as authorities in certain areas.

## Resources

As a citizen you have command over extensive resources *in kind*, such as those mentioned above and others such as Legal Aid, a certain amount of free or at least subsidised education, and of course basic medical and social insurance which ensures a certain level of competence. It may surprise many to learn that we also have extensive opportunities in both the materially wealthy societies and from the international community generally to access cash to support initiatives. These opportunities may be divided into two formal and two informal groups. The formal ones are government and private granting agencies. Both are very varied and in a country such as Australia involve sums of money totalling many hundreds of millions of dollars annually! Access to these involves some form of legitimacy because each one of the formal granting bodies will have a constituency to which they are responsible. That is, they will have to answer to a group who in turn will have to be responsible to an even broader constituency, such as 'the majority' of society (at election time, say). This is the case for government granting institutions. So, to apply, we have often to be either already legitimate or to generate our own legitimacy. For instance, academics are legitimate applicants to the Australian Research (Grants) Council, an industry can legitimately apply for product development assistance or a pensioner of some kind can apply for Legal Aid or various home energy asssitance schemes through State and Federal governments.

Informally, one can try to raise money by convincing lending agencies that one is a good bet and finally there is the option of throwing ideas onto the market

generally by putting ideas into the mainstream media, say, onto the share market or simply knocking on likely doors. It is not difficult to think of examples of each (scan a daily paper).

Each option has its difficulties and its codes, and, needless to say, there are also variously legitimated advisers to help you enter them all. Libraries will have books that list both the government and the private granting bodies, the conditions they stipulate and the amounts of money they disburse. Banks, stock exchanges, etc. will help provide directions to their services and State governments have departments aimed at assisting people looking to start small businesses.

## *Sorting our way through the maze of possibilities*

Familiarity with public action will demonstrate for you that in a real sense it doesn't matter where or how you begin your action. Given your strengths and the way you see your concern, the processes you hit on will work themselves out to give you more or less the same result. The essence is being able to define our concern in a way that enables us to act and then to begin.

To help me illustrate this process, I will use two small but real examples.

The first concerned the maintenance of a strip of natural vegetation along a suburban beach in the face of a proposed extension to one of Melbourne's most major and spectacular bike paths which would bisect it in the planned – most direct – design. I was asked to participate on the side of those seeking to maintain the remnant bush without the path. The other concern was about encouraging re-chargeable Nickel-Cadmium battery manufacturers to put a notice on the side of their batteries urging users to allow the batteries to completely discharge before recharging. Without proper discharge the capacity to hold an accessible charge is reduced and the batteries become ineffective long before their rated lives are reached.

Defining a concern and finding out what mechanisms to use to act on it are two sides of the same issue: they define each other, so to speak. We can start by setting out our concern *on paper.* Doing it on paper is a bit like having to explain to another just what we mean, but it has the additional virtue of being set out in front of us for subsequent improvement. In a sense, writing it down is a formalisation of our concern. If, of course, we can share the concern with another that's even better, but it should not replace the written stage, only enhance it.

We can now think through what the available social structures are and how best our own strengths can be used to push our concern into the public domain so that it might be acted upon by the social means available. We might also change these social means and it is this that I refer to in the second phrase of the **box** in the section on the parliamentary inquiry (above). This, however, is a task beyond the scope of this article.

## Remnant bush

In this case, part of the work was already done. A council was about to make a decision on the matter. It had to be influenced. A concerned residents' group already existed, the local media were also interested and the local bicycle users' group was not interested in pushing the track through the bush; it could detour around the streets. So the council was the organisation to influence and the political work of influencing the community or 'getting the numbers' (legitimacy in terms a council can accept) was being done by others.

My strengths were:

1. the legitimacy of my position at the university;
2. the years of experience and insight my training and work have given me; that is, my understanding of the science and the politics of the situation; and
3. (arising directly from 2.) the efficiency with which I could make an input.

Thus, I could probably do a creditable job in minimal time and with equipment not so easily available to a community group. This referred to wordprocessing machinery, libraries and the resources of other government departments traditionally wide open to teaching institutions. It is worth noting that the first of these is very much a two-edged sword in that it is sustained only by being careful not to compromise the view *others* (here the beach community and its local government) have of the legitimacy of academics (which is compromised at the best of times in Australia) and of the particular university for which I work. This meant that whatever I did, I would have to recognise the priorities and views of others generally and, in particular, the view they might have of me. My limitations involved the time I could put into this activity given that, as so often, I would not be paid for it and therefore the time involved would literally come out of my nights.

The approach used involved four parts:

1. A letter to the council supporting the residents' campaign and adding three points of my own. These were that the proposed path had little commercial or environmental significance since it was not intended for commuter cycling and that another Melbourne council had just taken similar action to successfully block a large State government department which wanted to drive a similar recreational bike path through another site of environmental significance. Both of these would fit with the council's world views, i.e. both are things that it must note by virtue of the way it is constructed. Finally, to indicate good will, I suggested that should the proposed plan go ahead special maintenance plans be erected to care for the two, now very narrow, strips of bush. There was an ulterior motive here and that was to indicate that the cost of maintaining the two vary narrow strips would be an additional and continuing expense that the council would be honour-bound to accept.

2. A visit to the site with representatives of the council and the residents' group demonstrated:
   - to the council that I was a 'reasonable person', genuinely interested in the on-the-ground problem; and
   - to the residents' group that I was willing to make a personal commitment for them.
3. A more substantial, public 'position statement' was in effect my formal submission to the 'agency (here, council) inquiry'. Finally, I indicated:
4. My availability to provide further advice and support, where needed, on the telephone.

   The initiative was successful.

## *Conditions for charging rechargeable batteries*

In this case (a current concern), the issue is really very simple. Without detailing all the background as I did in the first example, an approach, with a formal proposal to include the information on the batteries themselves – or at least on their packaging – was made to the manufacturers, beginning with the best known/largest companies. (See list below.) I assumed that they might be convinced to make the running by appeals to the honour of their name(s) and the possibility that should they fail to do so, it might result in an appeal to the Australian Consumers' Association (publisher of *Choice*), the Trade Practices Commission or the media generally.

Failing a positive response, these latter avenues could have been taken while always keeping the industry itself continuously informed and sending copies of the initiatives to as many interested authorities and user groups as possible – of which the industry would also be gently informed. A convenient mechanism to inform of 'others watching' is the 'cc.' list at the top of the letter. It is sufficient to indicate that other involved parties are being continuously appraised of the action.

### *To: manufacturers:*

Tech. & Qual Ass'ce Mngr, Eveready, P.O. Box 11, Roseberry, N.S.W. 2018
Marketing Manager, Arlec, P.O. Box l81, Lilydale, Vic., 3140
Rocket Aust P/L, 11 Mary St, Blackburn, Vic., 3130
Sanyo, c/o Master Instruments P/L, 32 Thaxted Pde., Wantirna, Vic., 3152
Slomar Battery lndustries, 15 Colray Ave., Osborne Park, W.A., 6017
Varta, c/o Adeal P/L, 15O Buckhurst St, Sth. Melb., Vic., 3205

### *To: distributors and retailers:*

Australian Batteries Plus, Shop 67, Box Hill Central, Box Hill, Vic., 3128
Australian Battery Co., 216 Bell St, Preston, Vic., 3072

Battery Power Australia P/L, P.O. Box 31/159, Ridge Crop Drive, Castle Hill, N.S.W 2154
Battery Specialities, 2 Dehavilland Rd., Mordialloc, Vic., 3195
Batterymaster, 993 North Rd., Murrumbeena, Vic., 3163
Dick Smith Electronics P/L, 396 Lane Cove Rd., Nth. Ryde, N.S.W., 2113
Jerosh International, 693 Glenhuntly, Rd., Caulfield Sth.,Vic,, 3162
Power Cell Australia, Unit 4, Clayton Industrial Park, 23-25 Bunney Rd., Clayton, Vic., 3154
Precision Group P/L, 87 York St, Sth.Melb.,Vic., 3205
Premier Batteries P/L, Unit 9, 15 Childs Rd., Chipping Norton, N.S.W., 2170
Radio Parts Group, 562 Spencer St.,West Melbourne, 3003
Tandy Electronics/lnterton Aust. Ltd., 1001 Nepean Hwy., Moorabbin, Vic., 3189

*And cc.*
Trade Practices Commission
Australian Consumers' Association
Standards Australia
Mr. Dick Smith, Aust.Geographic
Mr. B. Carbon, (Commonwealth) E.P.A.
Chief of Staff: THE AGE, *The Sydney Morning Herald, The Herald Sun, The Australian*

27 June 1995

**re: Helping Customers get the Most from ReChargeable Batteries and so Improving the Image of Suppliers of R/C Batteries**

Dear Colleagues,

Rechargeables have different charge/recharge characteristics which, if not observed, damage their efficiency. Notably, NiCads need to be discharged before charging while Lead Acid gel batteries should not be completely discharged.

Few clients realise this when they first begin using rechargeables, therefore I suggest that a brief notice drawing attention to any particular discharge characteristics be made on the battery or its packaging (preferably on the battery).

*Manufacturers*: Ideally would include a brief message on the battery casing itself such as, in the case of NiCads, 'Discharge fully before recharging'; on the bubble package, a brief explanation such as, 'To maintain maximum charge capacity, discharge fully, before recharging.'.

*Distributors*: Where manufacturers do not include any directions about discharge status prior to charging, a note such as, in the case of NiCads, 'Discharge fully before recharging' could be built into any label used to 'Iocalise' the product, e.g. in a price sticker. At worst this may mean requesting overseas providers to do it for you (see last paragraph).

I strongly suggest that while it is clearly in everyone's short-term interest *not* to do as I suggest here, in the long term, future sales of discharge-status-sensitive rechargeables will suffer if users find that the batteries do not maintain their rated function.

Eventually, of course, other electrochemicals not saddled with these hysteresis (or memory) effects will render such labelling requirements unneccessary.

In the interim however, I urge you to act on my request.

If I can be of assistance in the process, such as by writing to battery manufacturers (overseas), please let me know, e.g. by sending me the names and addresses of your overseas suppliers/manufacturers.

Yours sincerely,

P.S. 2006
This initiative failed and the predictions in the fourth and third last paragraphs have indeed occurred. The memory-less chemical was Nickel Metal Hydride, whose batteries populate many portable devices (mostly computers). ■

Endnotes

1 In the past few years, numerous good books have appeared that shed extensive light on this late twentieth century insight. Three of them are Mary Douglas's *How Institutions Think*, 1990; Paul Watzlawick's *The Invented Reality: How Do We Know What We Believe We Know?*, 1984; and Anthony Wilden's *The Rules Are No Game*: *The Strategy of Communication*, 1987.

2 Which, incidentally, is an exciting development in that it means we are increasingly willing to put value on advice and education rather than on physical innovation, which is, in principle at least, more resource consuming and polluting than the provision of intellectual services.

3. Or, in today's world, 'Googling' them!

4. Today, the Productivity Commission.

5. Closed by the Liberal government. It was Australia's national technology assessment organisation; therefore one fewer level of public criticality in our complex society.

# *Comment on a transmission line proposal*

Adapted from 'Comment from Outside: Generalised Comment from a Community Health Centre's Criticism of an Environment Impact Statement for a Large Engineering Development', published in *Transactions* of the Institution of Engineers, Australia, Multi-Disciplinary Engineering, 1986, vol. GE10 no.2, 2 November pp. 96-99.

## *Introduction*

This brief article is a somewhat generalised version of a community health centre's comment (by the author of this paper, Collingwood Community Health Centre 1985) on an Environment Impact Statement (EIS) for a proposed inner urban 220 kV transmission line (State Electricity Commission of Victoria 1985). It is offered on the basis that the criticisms made here can be generalised to the majority of proposals for developments in environment. It concludes with four suggestions for altering the EIS process to elicit public criticism and thereby make it better represent known sources and types of criticism.

The impact statement under consideration covered some 200 pages. It established need for the transmission line in four pages then proceeded to detail physical characteristics of the proposed line (hardware alternatives above and below ground) and route in some fifteen pages. Seventy pages were devoted to proposals for handling visual considerations in various sectors and nine pages dealt with a bundle of considerations, such as effect on other land uses, access, housing, broadcast transmission and archaeology, Finally, human health effects, the issue upon which most public attention had been focused, also received extensive cover: seventy pages. However, nearly all of this was devoted to technical background and references from which the effects were detailed in only three pages.

Community health centres have a major interest in prevention – rather than cure – of disease. The larger centres are set up to deal with the general run of health problems using their curative role as the primary vehicle to interest their local communities in prevention of disease. Staff may run to all major health specialisms, such as nursing, dentistry, physiotherapy, social work, medicine, podiatry and pharmacy. Various particular specialisms will be represented in each major area, and if the health centre is particularly fortunate, it will have a health research officer. A variety of preventive health programmes are carried out in conjunction with individual and institutional interests that arise in the community. Such interests

are brought to the notice of the health centres through their staff, clients or boards of management which comprise diverse members of the community. At the risk of stating the obvious, most engineering developments will have health effects ranging from direct improvements or impairments to physical 'well being', to the indirect effects of noise, visual disturbances and non-consideration of the sensibilities of others. Therefore, while not being competent to examine the technical detail of an EIS, a health centre will certainly be interested in the underlying basis (used) for the project as a whole and in its biological and health implications.

This brief paper begins then with an examination and criticism of how the proponent dealt with the standard EIS requirement to establish need. It then evaluates treatment of the zero or 'do nothing' option and concludes with criticism of the proponent's treatment of health issues. It is critical of the approach taken by the proponent, but more importantly it uses this criticism as basis for a more general critique of what society expects of those who design and build major projects in environment; i.e. of the EIS procedure itself.

## *Need for the development*

Need for the transmission line is based, first, upon the history of growth in demand, forward projections incorporating conservation measures being introduced, and, secondly, on the risk of a break in supply – an outage. The reader is provided with no further figures nor analyses of either basis.

In regard to load growth, no actual figures are given; one must simply assume that some attempt has been made to predict how technological, demographic and social factors will change in the next decades. Experience in other developed countries is showing not simply a decline in the rate of growth but an absolute decline in demand for electric energy (Lonnroth *et al*. 1980). The basis of the risk mentioned is in no way clarified. Nor are references given for the bases of the supply authority's calculations. Considerably more space, however, is allocated to descriptions of the outcomes of a break in supply, as if the scare value of such material would better convince readers of the need for the proposal than would hard data and clear analyses.

In confirmation of the frightening implications of an outage, a survey conducted by a parliamentary committee into how the community perceived them was mentioned as follows:

> *… repercussions… could be extremely severe. Thousands of people could be stranded on public transport and in lifts. Loss of ventilation and water supply… overflowing of sewers… community services overloaded. Refrigerated food… lost… and preparing food increasingly difficult* (pp. 12-13, part A).

No details were given. There was, therefore, no possibility of assessing how the survey was constructed or administered, nor could we know who responded. Thus, questions could easily have been 'leading' (answers conditioned by questions or presentation), thereby generating a more severe perception of risk than otherwise.

Of considerably greater interest, however, is the more general issue of the assumption by both community and proponent that the proponent has responsibility for the technologies that interest him. This occurs in various ways:

- Choice of type of technology and emphasis given them in the EIS.
- Choice of parameters of the technologies and their effects to receive consideration.
- Selective presentation of data and details of origins of those data (as above) and the analytical frameworks (methodologies) used in their analysis.
- Presentation of the proponent as *the* authoritative source of information on the effects, e.g. the proponent will *provide the opportunity for members of the public to attend information sessions on electromagnetic fields* (p.66, part B) (emphasis added).

This is of concern for it is no longer the mandate of a supply authority to promote its product nor to promote a particular way of providing the product. Since both of these phenomena occur, it is appropriate to ask why this happens and how it clouds the judgment of the authority to simply provide the public with less biased technical description, allowing for a more broadly informed public. Questions of technological determinism arise and require answers (see, for example, Ellul 1980; Winner 1976 and 'Technology and the Loss of Self' in Chapter 1: Response Ability).

Given that the proponent appears willing to take responsibility for the wider ramifications of the technologies used, one may in turn legitimately ask further questions, such as:

- How much might additional economic and conservation measures depress Central Business District demand and thereby, both the requirement for the new line and the extent of the risk of breakdown and its effects?
- What preparations for the present level of risk does the proponent take, i.e. how is the community prepared for it? Under this rubric we may note such things as:
    - The severity of breakdown increases with decreasing frequency of breakdown in that a lower frequency of outage is in practice accompanied by a decline in vigilance and preparedness for breakdown (conversely a greater dependence upon supply).
    - The noted severity of events following an outage must have been of that order for some time and it might be expected that the community would have been continuously informed about it and some independence of supply encouraged.

The point I am trying to make here is simply that taking responsibility does not imply an arrogation of power *to* the responsible but a *devolution* of power (no pun intended) to the dependents. This will mean that situations in which *thousands of people could be stranded in public transport and in lifts* (p.11, part A) would not arise.

## *Doing nothing*

On the face of it, the requirement in EIS guidelines to investigate the 'do nothing' option appears first as a *non sequitur* and secondly, as an option that action-orientated – or more particularly, investment-orientated – developers find difficult to countenance. This is the case because, in our society, it is simpler to attract and control investment into hardware and environment-related projects than into non-material social or intellectual projects.

Given the need established by the proponent however, the 'do nothing' option may be considered as a requirement to:

- work toward an understanding of the implications of the situation described in need establishment, free of the biases imposed by 'pushing a proposal'; and
- seek ways of dissolving the untoward implications uncovered in the above point through means other than environment, i.e. by manipulating the context or social setting of the need.

Now, there is no doubt that our society in general prefers the juvenile option of the new (toy?) to the more mature but often more difficult-to-perceive options of maintenance and refinement (changes from within). Further, returning to the apparent contradiction in an imperative to *do nothing*, organisations like electricity authorities are set up to *do* things – to take technological steps to fulfil social needs which have been defined for (and by!) them in material terms. We are beginning here to uncover a much more substantial contradiction, namely that the EIS process requires its only substantive document to come from the project proponent while the proponent is also required to canvass across-the-board implications of not providing a (its!) material input. Such an imperative may be thought of as an enjoinder to the proponent to develop a non-material option despite a known mandate – and therefore structure – arranged to provide exclusively material responses.

The terms of reference of an EIS do not allow for – let alone encourage – the proponent to examine how they are interpreting the Act upon which it is based; that is, to determine, for instance, whether the Act is being interpreted to encourage use of the product of the development or to promote particular ways of deriving the product over others.

The upshot of the present interpretation of EIS procedure is simply that proponents will quite justifiably suppress serious consideration of the zero option

because it threatens the straight-forward development into which they have vested resources and upon which they see their organisation's legitimacy (status) resting.

## *Specific issues – health*

Pathology produced by environmental pollutants often shows characteristics not at all consistent with the commonly understood disease patterns. For instance, numerous diseases (such as cancers) known to arise from contact with pollutants have the following characteristics:

- Probabilistic occurrence. A certain dose of the pathogen will give rise to a probability of outbreak; it cannot for instance, be said that smoking forty cigarettes of brand X for ten years will give a person of given characteristics lung cancer – all that can be said is that the probability of contracting it will rise by a certain amount.
- Long latency periods. The onset of discernible symptoms occurs many years after exposure.
- Non-linear relationship between intensity of exposure and onset of severity of related diseases. This applies in particular at low levels of exposure where, invariably, little is known of the pathogenic consequences of exposure. A much-discussed example is that of ionising radiation.
- A further complication is that the diseases that manifest themselves at different exposure levels may be different.

In addition to such complicated and unpredictable aetiology (causation), research into the pathogenic consequences of pollutants is itself fraught with difficulties, e.g. it requires:

- Epidemiological techniques, rather than physiological, chemical or similar. These take time, extensive and laborious work and therefore money.
- Special support arrangements since, as a direct result of the lengthy commitments of time, money and personnel required by epidemiological research, few organisations and fewer individuals can contemplate it. A consequence of this is that epidemiological work may be funded by organisations with powerful vested interests, risking either deliberate bias or bias arising from unconscious ways of thinking necessary for the cultivation of those interests. In addition to the mechanical impediments to epidemiological research, there are others based on the way it is perceived. Traditionally it is held in low esteem by the hard-science (physiology, biochemistry, etc.) based medical profession for it requires social science techniques and years of laborious work. Further, funding institutions are not inclined to pay conventional medical researcher rates for work perceived as lying in the realm of social survey - which, erroneously, is not regarded as requiring the same degree of training or professionalism. Therefore, epidemiological analyses risk being light on medical insight.

A consequence of these six issues is that not only can the type of disease potentially associated with transmission equipment emissions not be rigidly linked with them, but there is inadequate evidence to indicate even the presence or absence of a probability of 'contagion'. Therefore, a document based on the same conditions and studies used by the proponent could equally well be written with a bias towards concern. Moreover, it is interesting to note:

- the declining exposure levels required by the World Health Organisation (WHO) in respect of that most thoroughly tested 'pollutant': ionising radiation; and
- the proponent's over-use of the WHO's recommendation to *limit exposure… to levels as low as can reasonably be achieved* (p. 65, part B).

Given the foregoing, we are left with two questions regarding health effects of electrical transmission:

1. Why expose people to potentially hurtful influences when there are other options within the realms of political acceptability?
2. Why not give equal weight in the impact statement to the other options which would include the 'do nothing' option of social change to cope with supply breaks?

A final thought in the matter of coping with supply breaks is worth mentioning. A sudden change in availability of a unique service will itself create pathology. The interesting difference between such pathology and that which may be caused by transmission emissions is that it is relatively predictable without extensive epidemiological study and may be minimised by providing supply arrangements which do not engender total dependency.

## *General recommendations*

The aim of the EIS procedure is not to impede development. It is rather to develop community awareness of the implications of developments so that a broader spectrum of the population can more comprehensively make decisions on developments that alter their environment. This means, among other things, accepting the limitations of eco- and social systems to handle pollutants and accepting the costs and limitations this implies in the same way costs and limitations of other infrastructure are accepted.

On the other hand, it is no longer a requirement of services that they promote themselves. Indeed they are now required (somewhat perversely – see below) to encourage their clients to conserve their products (water, gas, 'electricity'). This may conflict with the reality of recognition and funding in government departments (and in society at large). Nevertheless, these real pressures to promote themselves or their chosen projects should not be allowed to structure the alternatives presented to the public in such a powerful way as at present.

To widen and strengthen the scope of impact statements, the following proposals are suggested:

- The proponent be required to give realistic (within the realms of technical and financial resources) technical alternatives equal cover (and status) in the EIS. Some effort should also be made to give economic comparisons, exposing assumptions used.
- Relevant government departments acting in their own right and not as consultants to the proponent will assess critical areas of environment as chosen by the environment assessment branch of the Ministry concerned with EISs. In the example used in this paper, the local health department would provide the health effects statement for each alternative (and in fact, in the present case precisely this has been done, but in addition to the proponent's own health effects statement).
- A special branch of the Premier's Department or, better, a joint municipal government consultative body (viz. the Municipal Association of Victoria) be empowered to write the 'do nothing' alternative. Such a body would have sufficient social scientific insight at hand to canvass the social changes required to obviate pressures arising from not filling the stated need and even to test the validity of the need as perceived by the proponent. Additional benefits of such requirements would be, first, formal involvement of concerned departments in the conceptual stages of major developments. Secondly, that organisations which find it difficult to separate their commitments to their own technologies or briefs from a commitment to the EIS process, be spared the compromising difficulty of artificially criticising their own schemes. It might be said of this latter benefit that the present exercise is enlightening for the individuals concerned and even the organisation as a whole. However, I believe that it is not realistic to require conflicting levels of (public) accountability within an organisation whose structure is not designed for it. Such resolution must occur at a level designed to handle it, such as government itself. Hence:
- The final 'draft EIS' published for public comment might be assembled by the Environment Assessment branch itself.

P.S. 2006

In the final EIS which includes comment from outside, it could be expected that options including 'doing nothing' receive substantial exposure. This will hardly be the case in practice because:

a) the proponent invariably does most of the work on the proposal in which s/he has an interest.
b) governments will invariably have vested interest in material developments, especially those of the kind being proposed by an existing, established player already known (to be a wealth creator in the sense understood by government) in the area. ■

# *Not forgetting the gas*

Adapted from 'Not Forgetting the Gas', published in *Eureka Street*, vol. 8, no.9, Nov. 1988, pp. 13-14.

Melbourne's *THE AGE* editorial (3 Oct. 1998) was right: infrastructure disruption,

> *… can… adversely affect the financial outlook of the nation and has disturbing social, economic and even defence implications.*

However, the solution is not – as the editorial went on to suggest – to have such a physically secure supply that we then take it for granted because, if we did, it would surely slide into political oblivion. Political oblivion is not the right place for essential services in an open democratic society.

As gas supplies are reconnected in Victoria, the opportunity to consider how we deal with breaks in the provision of essential services is again fast slipping out of our grasp. While it may seem tedious that we only learn about infrastructure when it fails, it is precisely our consequent frustration and vulnerability that makes us interested in robust infrastructure. Our emotional responses provide the *political constituency* for robustness. And nothing teaches like real experience – the more so if you also have a productive intellectual framework in which to think about it.

Gas-fired homes discovered that solar and electric homes down the street were willing to share their temporary good fortune. This discovery did a lot for us all, both as communities and personally. We learned that there is such a thing as social capital waiting to be recognised and used.

The crisis helped in two ways. It forced us to find other ways to do things, such as heat water, but also demonstrated that we could get by without it. Suddenly a little BO was OK.

The type of social infrastructure thus generated is called empathy or trust. It too is easily taken for granted, and it also fails through lack of use – it loses its constituency. Trust is a sorely needed community attribute and one we should be loath to play fast and loose with. The political concerns we associate with the rise of One Nation[1] neatly underscore the need for trust just as our infrastructure crisis was helping to restore it.

No one could oppose a call for a more cautious initial design for gas supply, but we should not allow ourselves to be frightened into striving vainly for fault-free infrastructures at massive expense. Each marginal improvement to the physical robustness of electricity or gas supply is likely to cost exponentially more than the preceding one and will not help at all with, say, security of petrol or water supply.

By contrast, enhancing the social experience of temporary independence from any of these infrastructures could give us a generalised level of community confidence that would be socially transformative.

The starting point for such a new way of organising for emergencies – that is, a social or civil defence system – would be precisely the 'constituency of the occasional crisis'. When crises are far apart, our social and political memories atrophy to the point where we do not allocate the resources for adequate defence. Consider what would happen to our fire brigades or our ambulance services if they only had to deal with one event per year.

National service went years ago, and while few now want a return to universal military training, many would agree that it is a good thing to cultivate an understanding of what it takes to keep society going if infrastructure fails. So here is the impetus for civil defence training – a national service that would provide training for all emergencies, military included. It would encourage application of its principles to all the present emergency services, such as fire brigades, surf lifesaving clubs, neighbourhood safe house schemes, first aid and the many other voluntary organisations that attempt to pick us up when our resources fail. A civil defence service would not compete with them but would dramatically enhance the social context in which they work. Training would help us understand our communities, their natural resources and the social and technical infrastructures upon which they are built. Because the expertise would be in our heads and in our social frameworks, it could be mobilised anywhere, any time, in any emergency.

If we were organised to deal with break-down we'd all know a lot more about what it takes to run a hi-tech society like our own. Social responsibility would improve. Our technical infrastructures could be built more flexibly, cheaply, and with much greater openness, enabling simpler repair and simpler transformation as inevitable obsolescence overtakes them. It is not difficult to imagine the many other spin-offs, such a community-based programme would generate from skilling to export sales of the very programme itself, its detailed training procedures and, inevitably, a new level of locally maintained material infrastructures. Just ask the Scandinavians who, to some extent, already do it.

Curiously, such a national service could also enable a level of privatisation of infrastructure hitherto undreamed of – because we would then be able to see to its monitoring and maintenance at a level simply unavailable at present. Enhanced community responsibility could give new meaning to the honest market economist's dream: consumers with much improved and more generally accessible information about their own (infrastructure) market. ■

Endnote

1 An ultraconservative, but short-lived political party, started by Queenslander Pauline Hanson.

# *Bin sins trashed*

## *Background*

During the Melbourne City Council's pay-by-weight rubbish collection trial, the rubbish bins of 1000 households were fitted with a microchip identity tag, and the lifting arms of the Council's rubbish trucks were fitted with a weighing device. Over a many month period, the Council measured the weight of each household's rubbish bin, then sent out an individual monthly report to households, detailing the quantity of rubbish they put out and comparing this to average quantities in their area. The report also contained information about how to reduce rubbish. A control group of households had their bins weighed but were not sent reports. Education for waste minimisation was also carried out across the municipality. During the whole project period (four years from 1991 to 1994), the total quantity of waste decreased from 300 tonnes per week to 200 tonnes per week. However, problems with the weighing technology prevented accurate measurement of results in the trial areas, along with removal of most of the residential areas from Melbourne City (brought about by a new state government). This meant that the trial did not proceed to implementation stage.

The primary aim of the pay-by-weight trial was to expose the mechanism of payment for rubbish collection and thereby provide a social (in this case, financial) incentive to reduce waste.

One positive spin-off from the trial was the media coverage it received. It provided a handle to focus on the huge quantities of rubbish Australians produce (a space the size of the MCG every eight weeks) and what we can do to reduce it. The next article appeared in an extensive story about the rubbish issue run by Melbourne's *Herald Sun* over a number of days in 1993 that received front page coverage under the banner 'Rubbish revolution'.

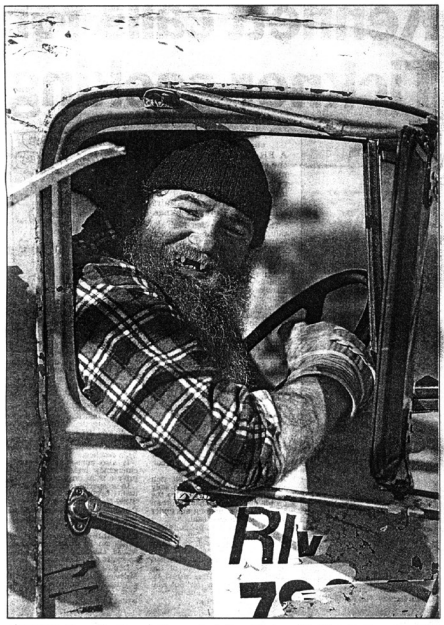
Herald Sun

Monday, July 19, 1993. NEWS PICTORIAL City: Fine. 14. (Page 66) 606



# Rubbish revolution

# USER PAYS MOVE



*SMILING Greg Prestage is happy to talk rubbish — it's his job. As one of the characters of the tip scavenging business, he's helping to control Victoria's massive volume of refuse.* **Report Page 5.** **Picture: CRAIG BORROW**

**EXCLUSIVE**

By DAN McDONNELL and JIM TENNISON

**City of trash: P4-5**

TWO Victorian councils are on the verge of making residents pay for the amount of garbage they create.

The trend is expected to flow across the state as authorities battle a throw-away culture that sees the people of Melbourne fill a space equivalent to the MCG with garbage every eight weeks.

Already hit with gas, water and power rises, Victorians can expect to pay councils according to either the weight or volume of their kerbside rubbish.

Melbourne City Council is already testing bins fitted with microchips, laying the groundwork for a computerised pay-by-weight scheme.

Within weeks, Northcote City Council is expected to vote on a system where residents will pay according to the volume of their waste.

A *Herald Sun* investigation has found widespread agreement among councils, industry and environmental groups that user-pays is inevitable.

They agree that — at an average of about $85 a year — most Victorians are not paying the true cost of disposing of their garbage.

Most councils pay out more than $100 for each a tonne of garbage collected and dumped at a tip, including direct landfill fees of up to $30 a tonne.

**CONTINUED Page 4**

**STAR DIVER PLUNGES TO HER DEATH — PAGE 3**

*Printed with permission. The Herald Sun, 19 July 1993.*

# *Bin sins trashed*

Adapted from 'Bin Sins Trashed', published in the *Herald Sun*, 4 August 1993, p.12.

Most people agree the rubbish mountain we generate is a problem that needs to be dealt with urgently.

It is also generally agreed that if one does the 'right thing', one should be recognised for doing it and if possible be rewarded for it, but at the moment if you put out no rubbish at all (only recyclables), you still pay your share of council rates which include a charge for garbage disposal. At the same time, the person who makes no effort to recycle or compost their rubbish will still pay rates, but is getting more garbage removed for the same money. In other words, the extra garbage is being subsidised.

Now, along come mechanically lifted bins to save the garbos' backs, some cheap electronic name tags or microchips and some very clever electronic weighing devices and a recorder. With these, we have the means of exposing for the first time the immediate consequences of putting out our rubbish. Your garbage is weighed and the cost of its disposal can be charged to you. But even if a council does not charge by the weight, it can at least let ratepayers know how much rubbish they generate and what sort of demand they are making of the municipality's waste handling system.

We also have a fantastic opportunity to glean all sorts of information.

Critics have said the Melbourne City Council is testing this user-pays system of garbage collection with the idea of penalising ratepayers who throw out too much garbage, but the reverse is true. The intention is to reward those who reduce the rubbish they put out. If the scheme goes ahead, the mechanism will show everyone how many kilograms of rubbish they put out (just as we now know how much gas, water and electricity we use). The large proportion of householders who produce around the average weight of rubbish will not see any change to their rate notices – until they begin to reduce that weight. Householders who reduce the amount they put out (by recycling, composting or simply by not bringing the stuff home) will be rewarded for their efforts. An excess charge will probably be levied on a small proportion of ratepayers who produce considerably more unseparated rubbish than the average. This is intended as an incentive to reduce rubbish, not as a penalty.

Big waste producers must recognise that neither municipal resources nor the environment are infinite. Despite extensive recycling schemes, there is still too much paper and glass in our rubbish. This gives us a good opportunity to reduce our waste bill. The needs of single breadwinners with large families and flat dwellers are already well understood.

The Melbourne City Council's project is also focusing half its research effort on showing everyone interested in the system how they can benefit from it.

Then there is the question the *Herald Sun's* Keith Dunstan raised of 'garbage rustlers' – the people he thinks will dump in other people's bins to lower their garbage charges. I do not think it will be like that for four reasons:

- It is not easy to consistently dump into other people's bins.
- The amount of money actually charged by councils per kilogram of garbage is very small, so you would have to dump a lot to make much of an impact.
- We reckon most Australians are fair-minded and will not dump once they know their neighbours are paying for the weight of garbage they put out.
- It is illegal.

If rustling becomes a problem, the law could be enforced or, at worst, we could build an automatic lock on bins.

There is no point going on about how difficult it is to reduce one's garbage when we are trying to meet the 50 per cent waste reduction target our government has committed us to by the year 2000!

Few councils can be accused of not trying to help their residents – there is a flood of waste- minimisation literature around. In fact, there is so much that the obvious question about its ultimate destination springs only too readily to mind. ■

# *Lessons from an Award*

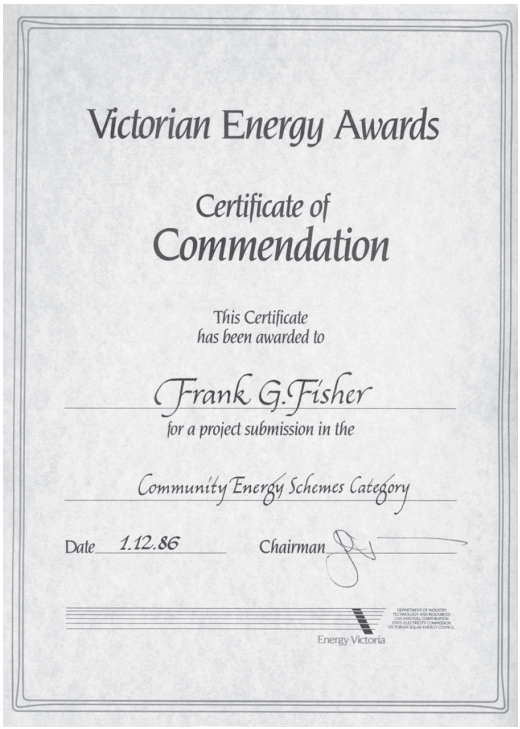
Adapted from 'Getting the Environmental Message Across: Lessons from an Award', published in *Eingana*, vol.11 no.1, 1987, pp.11-12.

It is an awkward fact of environmentalists' lives that in order to achieve short-term goals we often must use mainstream means. These means of disseminating information often appear to contradict the message we seek to convey. We may feel that it is only for urgent and short-term campaigns, such as the Franklin that we need to struggle with the media. As I shall show, however, the immediate understandings people hold form the contexts within which long-term changes form. Therefore, for all the subversion of our noble aims that associating with the media seems to bring with it, I believe that we lose if we don't, and that on the other hand, we can present our message through it in such a way that all will not be lost. What follows is a short account of what I believe was a success in this direction. It is written as a plea to environmentalists to remain open-minded about the ways our ideas may be presented.

In the following example, the medium that was used successfully was government process.

Some years ago, *Monash Reporter* (a university newspaper directed at the internal community as well as the public) carried comment and correspondence on the University Council's deliberations over the vexed issue of travel to and from Monash University. I participated in this debate by pointing out that combining bicycles with suburban trains allowed one to work at Monash and live far away without incurring travel times that were significantly different from those associated with the car, and at a considerably lower cost. I did not belabour the obvious, namely that this path obviated the need for car parks, reduced the debt produced by public transport and the requirement for oil, health and environmental dollars. The response to my letter was overwhelming… silence.

Not easily deterred, I flogged the idea around. It was not for the Australian Conservation Foundation nor even Melbourne's radical Energy Action Group – both being concerned with 'bigger' issues. Aware of (the misleadingly named) counter-intuitive measures and having failed with media nominally appropriate to my message, I now tried the mainstream. I submitted the idea to the (then) State Department of Industry, Technology and Resources for a State Energy Award and… received the commendation in the Community Energy Schemes category;




*Victorian Energy Awards*
*Certificate of Commendation*
*1 December 1986.*

the only award to an individual in 1986. Further, an article based on the submission was enthusiastically accepted… in Britain.

The actual presentation was a staid affair, held in Parliament House in the presence of the Minister. It was announced in the morning papers by half-page advertisements but did not attract a word of news or comment in any paper, not even the conservation movements' papers. Still, the word was out.

The question now is, what was it about the entry – which offered no new technology and indeed no apparent technical innovation of any kind – that attracted the judges' attention? Could they have appreciated its primary intention, which was to show that the major issues blocking energy conservation have to do with the social and philosophical structures that condition perceptions of nature and self? Well, no; unlikely.

In addition to cost and energy comparisons, the entry described numerous spin-offs that accrued as it went into practice. One of these was a proposal for a computer-based optimisation of public-private transport route combinations, which would provide a travel plan according to the requirements of the individual commuters. Journey to work constraints would be the individual commuter's input. The output would build on diverse route data, such as frequency of service, parking at public transport termini, public transport route service reliability and

so on, to optimise trip time, cost, energy use and perhaps even pollution impact. Apparently this suggestion impressed the judges and so it seemed that it was gimmickry that won the day, not my 'deep' ideas.

Now, the tone of this last comment may have you believe that I feel that this is bad and indeed part of me does feel that way. Another part of me, however, feels that my irritation with this reality is sad and indicative of the juvenility of my thinking on change. For social change must logically begin from where a society finds itself and subsequent movement away from an existing state is complex.

Every social institution (such as a single person, community, public transport system or new service) overlaps with others and in turn is embedded in larger social institutions. Each institution at each level is relatively autonomous and capable of creating and maintaining itself. This immediately explains why it is so difficult to change a given institution in any one of these levels. The institution that concerns us is always a component of other parallel and higher level autonomous systems whose stability in turn depends on the stability of their components. To maintain themselves, the higher level organisations automatically control their component organisations *by virtue of their structures*. (This incidentally, is the basis of GAIA, the Earth-System of James Lovelock.) Therefore, if change is to occur without actually destroying the system, it can only happen when all the component sub-systems are conditioned for the change and move in cascade to some new metastable state.

Thus, as many before me have learned, to become an innovation, an invention must meet its host population 'where it's at' and take it roughly where it believes it's going. It seems to me that this is what we are trying to do in any case: sharing our view of life.

And so, the computer-aided route planner, while not a 'pure' reflection of my entry's intentions, did serve to drag the rest with it. It provided the jigsaw piece to fit with the perceptions of the judges and in that sense did not compromise the intentions I built into my submission as a whole. Nor did the many other jigsaw pieces I used, quite unwittingly, such as my typed (rather than hand-written) submission! None of which is to deny the influence of these aspects in their own right. But like the vegetarian who tolerates a meat-eating husband, the relationship is not so much demeaned by the 'backing down' of her principles, but made stronger by her being forced to realise another person's reality and accommodating it.

The story should not end here, however. What the judges and the State government (the media) have done, is to provide me, and anyone else interested, with a very powerful jigsaw piece. Namely, the legitimation its good offices or approval lend to the holder of an award to promote the design further. In a way I am doing that right now, although here it is the process I am trying to promote, not the content. ■

# *Dry-cell batteries*

Adapted from 'The Social Construction of Design: A More Comprehensive Path to Waste Minimisation', published in Chapter 6, Environmental Management Industry Association of Australia, 1994, *EMIAA Yearbook*, pp.96-98.

Three years ago the nascent Commonwealth EPA issued a discussion paper called 'A National Waste Minimisation and Recycling Strategy'. It was concerned to,

> … *reduce waste by reconstructing social forms that give us our institutions, ways of doing things, etc. so that they do not generate waste in the first place.*

In other words, emulate nature, which organises itself not to produce waste other than energy, which is always 'renewable'. Our approach at Monash [University] goes one step further. It seeks to ensure that participants in change are involved in the process rather than being restricted to its end product. The discussion paper did not recognise the necessary and synergistic connections that exist between action and understanding!

The Monash approach to waste minimisation is based on the notion that public involvement in social change offers benefits to do with reduced material (environmental) and social infrastructure – quite aside from the direct personal benefits that arise from participation. The approach favours waste management as a business monitored by government, which also acts formally to enable the public to be involved in the business. Approached in this way, waste management becomes a social way of being rather than simply a way of doing business (see Scitovsky's *The Joyless Economy*, 1976). Knowing how to bring this about involves recognising and working with the social frameworks underpinning our actions and therefore the products of action.

To illustrate, let's look at one simple example highlighted in the discussion paper: the vexatious waste management problems associated with portable electricity, i.e. with dry-cell batteries.

The past two decades have seen the advent of rechargeable dry-cell batteries. From a waste minimisation point of view these batteries have obvious advantages. However, in the marketplace they are not really succeeding, for they have three major problems:

- The usual problem of 'environmentally-friendly' products viz. high purchase price and invisible (therefore discounted!) long-term savings.

- A 'natural voltage' some 15 per cent lower than the traditional 1.5 volt standard.
- A requirement for ancillary equipment, such as a battery charger, voltmeter etc. and the understanding and commitment to use it.

In the above context how can we use these insights to reduce waste?

Given that rechargeables have survived in the marketplace despite slow sales and given the increasing desire to eliminate the toxic stream of small throw-away batteries, understanding the social and technical construction of the battery scene can lead us to some quite unusual waste minimisation options:

1. Encourage consumers to buy rechargeables and manufacturers to make them more attractive.

   Now we know that no one wants to buy batteries for themselves – we want the product the batteries drive or even the work done by the product. Therefore, let's incorporate batteries into the product 'package'. This might be done by encouraging manufacturers to build batteries in and make the devices they power suitable to plugging into a centralised multi-purpose charger! This is already happening with torches and the lap-top I'm 'writing' this on, although the chargers are 'dedicated' to these appliances and, worse, to particular brands of appliance. While a minor disadvantage in doing this is the commitment of the device to a particular type of rechargeable, the relative speed of developments in the various fields will probably mean that the appliances will be obsolete *before* the battery technology!

   How to bring this about? Government might encourage product standards and regulations to recognise the new opportunity. For instance, building regulations (a social construction) might require a centralised, articulated (i.e. complete with meter) battery charger in all homes and businesses, just as we now require insulation. Government might also adjust its own building and purchasing specifications (social constructions) to demand such equipment options. Federal government departments now specify compact fluorescents!

2. Deal with the voltage deficit.

   This is currently a serious problem, particularly where a high voltage is required and it is produced by stringing a series of standardised, low-voltage batteries together. The overall deficit can render a device unworkable. There are three ways around this,

   - As already suggested, dedicate devices to built-in rechargeables.
   - More sophisticated: adjust electrical circuitry to compensate for the lower voltages of rechargeables.
   - Fund research aimed at finding another combination of energy dense, rechargeable electro chemicals that have a natural voltage of 1.5 V per cell. Note, by the way, that research funding is based on politics = social priorities

or social constructions. Such an approach, incidentally, is less satisfactory because it would probably force us to sidestep chemicals with higher specific energy densities.

Again, the government could 'encourage' the market to favour such option in the ways outlined above.

The problem associated with rechargeable batteries and their non-standard voltage is a good example of the tyranny of successful design. The first successful design in a new field tends to shape the future of associated activities and to restrict innovation to the standards set up around it.

The lesson here is that we might seek to structure technical innovation so that it does not tie us irreversibly to particular designs. You see how powerful social constructions (here standardisation) can be?

3. Design for rechargeables.

   The ancillary equipment required to use rechargeables involves, at minimum, a charger. Inevitably, it will also involve obtaining a device to measure state of change (a voltmeter) and even spare batteries for use while discharged units are charging. As already suggested, designing appliances to build in rechargeables, then standardising charging attachments, would streamline the ancillary equipment issue. Some indication of the extent of charge can easily be built into the charger (cf. Duracell's less than satisfactory tester built into its battery packaging!).

   Such suggestions deal with 'reduce' and 'reuse'. In respect to 'recycle', however, we must look elsewhere. Currently, most rechargeables are nickel-cadmium and potentially highly toxic. Just as some supermarkets currently accept used plastic bags for recycling, it should not be difficult to encourage shops that sell rechargeables to accept dead returns – provided they can deal with them in a way that enhances their role as responsible traders. Manufacturers, in turn, might be induced to design rechargeables so that their contents could be safely and economically disassembled and recycled.

Once again, there will be various legal, economic and bulk-purchase-specification incentives that government could erect to encourage these changes. The cheap solar cell, for example, comes to us courtesy of government (military) purchasing power.

Returning to the heading 'reduce': more general aspects of the social constructions of devices give us still more opportunities. Increasing the energy efficiency of the appliances themselves is one, and less obvious opportunities are offered by changing the physical attributes of appliances to render the way the appliance is used more efficient. This latter suggestion is by no means beyond everyday innovators. Consider, for instance, existing sophisticated bicycle headlights which have switches enabling different beam intensities, and lap-tops

(like my old '286') which are already designed with energy-saving features built in - and all can be encouraged by government.

Such 'clever country' designs need not be expensive and, more to the point, they encourage users to involve themselves in their sophisticated use … with all the advantages that critical involvement brings. So, let's involve the public; it will help our design process and create a joyful economy as a by-product. ■

# *Reclaiming urban wealth by disowning the* DODO

Adapted from 'Reclaiming Urban Wealth by Disowning the DODO', a prize-winning letter published in *Australian Cyclist*, Mar.-Apr. 2005, p.12.

A continuing debate between cyclists and drivers in the letters columns of Melbourne's newspapers has led to a 'standoff' between them. A standoff is a barren state but its basis is worth clarifying and keeping in mind as we struggle to enhance the profile of cyclists.

Both sides represent just individuals commuting. The first is a person with virtually no on-road, environmental or economic profile. The second is a person with an extensive, if mostly invisible, on-road, environmental *and* economic profile. It is that third category, the economic profile, that gives motorists their legitimacy, the feeling of the rightness of motoring and the right of motorists to the road. It is the awesome capacity to generate wealth and jobs through vehicle manufacture, marketing, maintenance and infrastructure provision.

It is already apparent to some Australians and perhaps the majority of *Australian Cyclist* readers that the present urban economy based on driver-only-driver-owned (DODO) cars must be replaced with a dematerialised economy based on services, entertainment, sport, education and such burgeoning new areas of wealth creation as information processing and communications.

Refloating the huge sunk cost so many of us have in the ownership of privatised hardware which spends most of its time depreciating at the curb while providing free advertising and gutter decoration, would free:

- our roads for buses, bikes, pedestrians and… urban crops; and
- our dollars for developments in the coming dematerialized economy – for fun and, in the odd occasion when personalised transport is needed, for taxis and rented vehicles, e.g. a 4WD for the snow-trip, and an open sports for that old-fashioned, wind-in-the-hair experience. ■

# *Crazy contradictions on carcinogens*

Adapted from 'Crazy Contradictions on Carcinogens',
a headline letter published in *THE AGE*, 23 July 1999.

There are some damned complex ironies hidden in the letter from Robert Burton, the director of the Anti-Cancer Council of Victoria (15 July 1999), in which he expressed concern that tobacco companies had links to a wide range of non-tobacco products, including food and drink.

Mr Burton suggested that, *maybe it is time to check what lurks in your pantry*. Why restrict attention to the pantry? Neither carcinogens nor contradictions confine themselves to pantries.

Only months ago, the council advertised a Ferrari as a prize for diligent donors. It might equally well have offered a lifetime's supply of cigarettes! There is after all, no single device, including those of war, responsible for so much human and environmental misery (including cancers) as the commuter car. And it's early days!

Shouldn't we permit Philip Morris to diversify into less-pathogenic products, or Toyota to move into public transport?

Is the smoke from all those cigarettes blinding the Anti-Cancer Council to the fumes from cars and their vast infrastructures? Or could it be that attachments to their own cars and to offers of cars as 'grand prizes', make them reluctant to speak out?

Not that Prime Minister John Howard's vaunted commercial charity should be denied… heaven forbid. Without it we'd have precious little professional sport, medical research etc, nor the industry and employment built on them.

But an amateur and clean world would no longer fit our topsy-turvy world. It could hardly buy the hours of television advertising or the prizes that attract donors to pay for research to undo the effects of the products advertised.

The gods must be crazy… or perhaps they're sane enough; perhaps even we're sane enough individually, but we have got ourselves into some frightening social binds, haven't we? ■

# *Stop seeing microbes as aliens that must be nuked*

Adapted from 'Stop Seeing Microbes as Aliens that Must be Nuked', a headline letter published in *The Australian*, 22 April 1996, p.10.

Articles such as 'Germ Warfare' (6-7 April 1996) are timely but the language your writers use perpetuates a misunderstanding of life processes that consistently undermines our efforts to deal with the human pathologies generated by microbes: You say,

*… microbes are fighting back after decades of suppression;*
*… the culprit was a pneumococcus bacteria (sic);*
*… the rebellion of the microbe world (set doctors) on a crusade …*

In the light of 'mad cows', declining belief in immunisation, new (?) diseases, such as AIDS and Ebola and, on the other hand, the deliberate use of one organism against another such as in the 'battle' against the rabbit, I believe that the 'battle' metaphor as an approach is itself problematic.

Most of us recognise that there is extensive variation among the individuals of any species. So when the habitat of a given sub-species proves to be lethal it does not mean that it is lethal to all organisms of that species. Given this, the stricken organisms for whom the habitat is lethal disappear, leaving more space for the others and less 'competition'. These others then multiply, but this hardly constitutes a 'rebellion' or 'fightback', and the survivors are hardly 'the culprits' in an environment changed, say, by the species you and I represent.

Healthier would be an approach that sought to insinuate humans into their environments in ways that did not 'attract the attention' of organisms with which we cannot deal. To do this we would have to live more subtly in nature than at present. The intellectual means to do this are already beginning to be available; however, the politics are not, nor are the broad expectations of life upon which the politics would have to be pinned. We already know, for example, that the model of health based on Pasteur's germ theory and Descartes' objective science are no longer sufficient to deal with environmental diseases, such as cancer and the auto-immune diseases with their long gestation periods and statistically-based 'strike' patterns. These diseases are clearly not amenable to simple cause-and-effect theories. We cannot simply 'power our way over' or 'blast our way through' them.

Despite the availability of this knowledge to some, and contrary to our willingness to accept chaos theory's butterfly wing flap as the origin of a cyclone, we still speak of aplying the *full power of biotechnology* to provide *control over devastating insect-borne diseases* (Julian Cribb, 10 April 1996). We assume that genetic transfers can be made to organisms with only the *desired* character changes occurring. Any cyclonic potential of these 'butterfly wing flap'-type changes for the wider biological systems in which our genetically altered organisms will live are ignored in the hope that we will be able to deal with them.

While disease and malnutrition already stare many humans in the face and this inevitably means using the tools available to us at present, plans might now be laid to begin educating the world into withdrawing from the 'massive retaliation and control' approach and choosing instead more subtle, socially involving approaches. After all, who are we retaliating against other than ourselves?

Interrupting the paths by which micro-organisms infect us may be done by more subtle means than nuking the bastards back to the caves with resistance-inducing biocides. The new techniques, however, will involve changing social priorities so that the weak are strengthened through adequate nutrition, AIDS-like awareness to the role of social behaviours in the transmission and even generation of disease is recognised, human pressure on ecosystems is reduced by eating vegetables instead of more meat, and the politico-economic conditions under which man as producer functions are rendered more immediately sensitive than current market forces permit.

Nature might indeed be 'red in tooth and claw', but not because there is a war going on, just a meal, and while the dinner cannot be stopped, there is a balance there, which for omnivores like us can be altered to minimise the 'inevitable retribution other organisms will extract from us'.

Beyond seeing ourselves as enmeshed in 'mortal combat' with other organisms lies a view of ourselves as co-evolving with other organisms and gently, if never quite irreversibly, insinuating our priorities among those organisms not able to articulate their priorities to us. ■

## *In response*

Letter to the Editor

Is Frank Fisher, Head of the Environmental School of Science (sic) at Monash, about to retire?

If not, I am pleasantly surprised. The head of a normally classical-reductionist stronghold has rekindled my faith (Letters, 22/4) in the intelligence of humans to create a better world. Thank You. ■

"Learn to live and let live", Name withheld, *The Australian,* 26 April 1996, p.12.

# *Let's deal with it in our own backyard*

Adapted from a headline letter co-authored by Frank Fisher and Paul Gottlieb, a senior scientist at CSIRO Minerals, called 'Let's Deal with It in our own Backyards', published in *The Sydney Morning Herald*, 14 Nov. 1990.

SIR: In connection with the current paroxysms of public participation in Corowa aimed at moving the proposed toxic waste incinerator (TWI) out of Corowa's backyard, we would like to offer a couple of suggestions.

In common with most large industrialised cities, Sydney and Melbourne have their share of huge relics of an era when we lived more closely with our big and dirty technologies.

Disused power stations such as Pyrmont and White Bay in Sydney and Spencer Street in Melbourne sit on expensive real estate awaiting demolition. So, why not put a TWI onto one of these sites?

First, putting it there would concentrate the attention and expertise of our authorities admirably. Secondly, there are enormous infrastructural advantages in placing it on such a site: central to the waste, and our transport, administrative, monitoring and security (fire, etc.) services. In respect to transport, rail is both materially safer and easier to police than road. Illegal and unofficial disposal of toxic waste is much simpler by road and, in addition to uncontrolled dumps in the countryside, the unmarked trucks bearing these wastes sometimes crash, spilling their unmarked contents out in the open.

One of the greatest problems with toxic wastes is that we have accumulated large quantities from technologies that will be obsolete in the near future. Tomorrow our production of them will decline as our industrial processes learn to recycle them and our commerce learns to avoid the needs that generate them in the first place.

It seems a waste, then, to build a dedicated incinerator to cope with what is largely a once-only problem and indeed, subsequently, to have the thing sitting there, underutilised, just begging to be used by overseas clients who will pay for us to dispose of their waste.

This expensive duplication becomes even more wasteful when we recognise that we already have numerous high temperature furnaces capable of disposing of our toxic wastes; for example, black coal power station boilers and blast furnaces in NSW and in Melbourne, a centrally located gas-fired power station at Newport. All burn at maximum flame temperatures at or above 1,500°C and all are equipped

with excellent infrastructural support. Further, what they burn is already more or less toxic (less in the case of Victoria's gas power station) and it should be possible to 'jury-rig' one of these controlled infernos and their stack emission scrubbers to cope with an occasional injection of toxic wastes.

Either way, we are faced with the problems of convincing the public, and those who handle the wastes, that doing something along the above lines is potentially safer than leaving them to moulder and leak for our children to deal with; or worse, to allow them to be secretly disposed of in unknown neighbours' backyards. ■

# *Blowback with a vengeance*

Adapted from a letter to the Operations Manager V-Line, 8 April 2005, entitled 'Blowback with a Vengeance. Sprinter Toilets: A Design in Need of Replacement'.

The Operations Manager V-Line
Spencer St. Railway Station
219 Spencer St.,
MELBOURNE, 3001

cc. Minister for Transport
Minister for Health
Equal Opportunities Commission of Victoria
(Community Consultant – Disability: Mr Michael Uniacke)
CEOs: Chronic Illness Alliance
Health Issues Centre
Continence Foundation
Public Transport Users Association

Dear Sir,

re: Blowback with a vengeance. Sprinter toilets: a design in need of replacement.

### *Background*

This is not easy to write, I can only do so because I have lived with chronic disease for all my adult life (forty-five years) and have a lot of experience struggling to up the ante for the chronically ill.

I have only 15 per cent of small intestine left; Crohn's Disease and operations for it have eaten away the rest. I live courtesy of forty pills, injections etc. per day and a lot of organisation, fitting in and around the multifarious consequences of malnutrition and dehydration. One of these consequences is permanent diarrhoea of roughly the consistency of water.

I travel by train for three reasons:

- I live in Ararat and work in Melbourne.
- I am an environmental scientist.
- There are toilets on your trains.

### *The problem(s)*

Last week I took the 17.45 Sprinter from Spencer St. to Ballarat and once under way noticed a strong smell emanating from the toilet. Since this was not unusual on the Sprinters I promptly forgot it only to rediscover it – unforgettably – further down the track.

1. In the vicinity of Ballan I went to the toilet to be greeted by a strong blast of air forcing its way back up through the toilet from the sewage collection space beneath and carrying with it… I leave the rest to your imagination. It took me some fifteen minutes to clean up, using approximately 5 cm of the stack of soft (absorbent) toilet tissues.[1] I managed to push the used paper down the toilet, against the 'breeze', with the help of the flush mechanism. There was, as so often, no soap in the dispenser and so to clean myself up I had to use a few more centimetres of tissue and the hand basin water which, fortunately was running. For all that, it took some courage to walk back into the public space of the carriage fearing that I had not scrubbed up exactly smelling of roses.
2. The conductor subsequently barred the toilet and promised to report it… on arrival at Ararat. I suggested that he hold the train on arrival in Ballarat, inform passengers of the problem and permit those who needed it (and there were some) to use Ballarat Station's toilets. For some – inexplicable – reason, this was not possible. I ran around to make the same request of the stationmaster, who also found the request impossible to fulfill. Clearly the problem carried too little meaning – to these continent men – to warrant action. It might have delayed the train by five minutes, which would have been nothing in comparison to the 'signal failure' delays passengers are well used to.

### *Analysis*

In a former life I was an engineer and so this is my understanding of what happened:

The toilet is separated from the sewage collection container by a clapper 'non-return' valve in the throat of the toilet bowl. It is kept closed, except during flushing, by some sprung arrangement whose tension probably declines with age. Some kind of sealed door must normally exclude the train's own slipstream from access to the sewage collection area. It must have been faulty (or at least partially open) permitting the strong breeze to flow over the container and back up past the faulty non-return clapper and into the toilets and 'all points/persons North' of it. This was of course, the reason for the persistent stench in the toilet and its emanations into the passenger seats nearby. The breeze vanished when the train was stationary.

### *Solution*

*Short-term:*

a) Replace the spring/tension device behind the non-return clappers in the toilets.
b) Check the door/seals on the door to the sewage container and ensure that no draught can enter that space.
c) Use smell as an indicator of malfunction and train and *empower* conductors to recognise it and to act on it!
d) Put some interlock in place that senses such faults and automatically locks the toilet and informs the conductor.
e) In the event of toilets being barred from use during a trip, permit passengers to use station toilets and inform passengers about delays that may arise as a consequence.

*Long-term:*

a) Include in toilet maintenance protocols a requirement to regularly check and replace clapper springs.
b) Redesign the toilets. Use airliner experience – airliner manufacturers have successfully resolved problems with their toilets decades ago.[2]

### *Final comment*

Incontinence afflicts a few percent of Australians in one form or another. It is very much a silent affliction that few are willing to go public with – to the great detriment of the very people who suffer it.

If Victorians do not want to consign such people to permanent 'invalidity' with all the costs to the community that this means, including forcing us (the incontinent) to forgo the benefits of public transport, we must improve these facilities. I am only too well aware of the continuing problems of both vandalism in, and careless use of, public toilets. Nevertheless, as a civilized society we simply must find the wherewithal to fund functioning well-maintained toilets before people arrive in the dismal and demeaning conditions I found myself in last week. Public toilets are put there for people who need toilets. To block their access because of the expenses incurred by vandalism and carelessness should not be a penalty visited upon those who need them for what they were designed. And, yes it takes such a miserable episode to prompt the likes of me to approach responsible authorities to change their practices. Now, what can be done? ■

Yours sincerely,

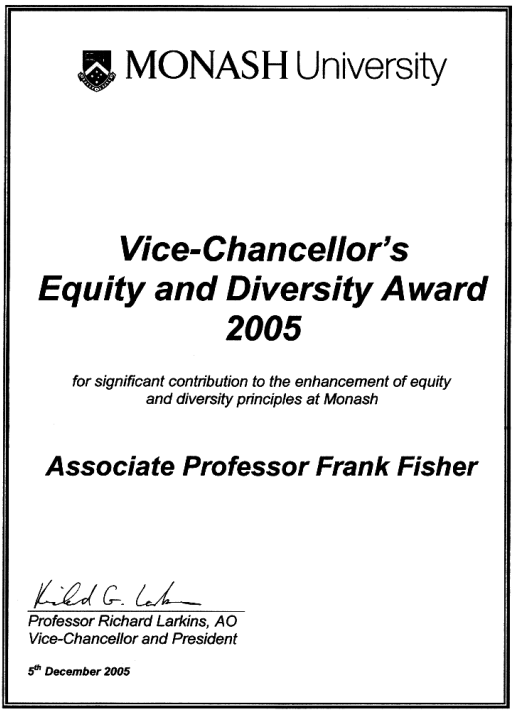
Endnotes

1 Had the paper been the more common 'hard' variety, my efforts would have been almost impossible!

2 Except one: it baffles me how an obese person is to use them…

# *Another award*

Award received in recognition for 20 years' work for the chronically ill and disabled at Monash University.



MONASH University

**Vice-Chancellor's Equity and Diversity Award 2005**

*for significant contribution to the enhancement of equity and diversity principles at Monash*

**Associate Professor Frank Fisher**

Professor Richard Larkins, AO
Vice-Chancellor and President

5th December 2005

*Award received for significant contribution to the enhancement of equity and diversity principles at Monash University, 2005*

The work that lead to the award commenced with creation of the equal opportunities office, went on to enable the chronically ill at Monash University to enter the Australian universities' superannuation scheme without any discriminatory loading, review of the criteria upon which the office was based, acting as mentor for chronically ill staff and students, representative of academics on the university's disability liaison committee for a decade and generalized lobbying to improve conditions for the chronically ill and disabled at the university.

The awards' scheme was initiated in 2005, therefore this award was among the first offered.

chapter eight

# PERSONAL FULFILLMENT

This chapter considers the implications of being dialectically involved in a dualistic world: personal alienation, despair and the apparent contradictions that arise through using a systemic approach in a world that only understands 'fixes'. Frank Fisher asserts that there is a way of being beyond reason and rationality that might be called wisdom.

'Overcoming Despair' examines sources of personal frustration for people working to 'save the world' and offers suggestions to resolve them.

# *Overcoming despair*

Adapted from 'Concerning Concern. Overcoming Despair and the Alienation It Produces', published in *The Australian Journal of Environmental Education*, 1985, vol.1, no. 2, pp.16-20.

Environmental work deals in the most depressing of statistics – measures of damage to our planet and measures of apparent incapacity to change them. Years working to bring about changes in the way people deal with their environment can be very frustrating and ultimately debilitating.

Nearly twenty years ago I became a concerned professional. Over ten years and a lengthy period of re-training and unemployment my concern heightened to the point where I finally became professionally concerned – paid as an environmentalist. Being professionally concerned allowed me to 'maintain my rage' and deepen my concern to the point where I enrolled in a 'despair workshop'. Whether this measure helped me cope with my despair or not is hard to say. However, it and other events did prompt me to re-assess the depressing nature of concern like mine. At the risk of being branded self-indulgent I would like to share my re-assessment with similarly concerned people.

## *Sources of concern*

Our way of life gives us plenty to worry about and plenty of awareness with which to worry. To people like me, in selecting among worries, the things most worthy of concern are the superficially selfless issues that arise from what appear to us to be the sufferings of others. Moreover, we are usually aware that our own interests will also be served by successfully pursuing issues of a more general type. Examples of these are preservation of species, animal liberation, freedom from hunger and that most generalised concern: the suffering of our planet itself. By this I mean the suffering of Nature, the ultimate being of which all organisms are part.

## *External sources*

Generalised concern subsumes traditional concerns with equity, environment and health, and draws attention to the links between them. It fits well with the new insights of systems thinkers who seek to understand the contexts of our immediate concerns (see, for example, Bertalanffy 1968; Society for General Systems Research 1956). It also fits well with the personal alienation characteristic of people in urban

industrialised nations (see, for example, Durkheim 1951, pp.241-276, and more recently: Slater 1971, Sennett 1974 and Lasch 1980). Both are sources of concern in themselves.

Systems thinking encourages awareness to the multitude of structures within which things happen. It offers generalisations about the way systems are organised, which may assist us in understanding the ways of living things. Unfortunately a catch with systems thinking is that it can lead to a virtual incapacity to act. For it shows that it is neither possible to clearly define problems in life nor to find 'solutions' to them. Indeed if we feel we have found a solution we can be sure we are 'wrong', for 'problem-solving' is a concept that can only be applied to systems in which all dimensions and variables are known. Thus, it cannot be applied to real systems except as an approximation and it applies best to existing technical systems that fail and need 'fixing'. It is important to realise that our mechanical systems can be treated in this way for this understanding colours the way we think about systems in general.

Defining things in terms of problems and solutions (a version of dualism) requires the non-mechanical problem solver to make simplifications (conscious or not) which will ensure that the solution simply introduces a new set of sub-problems. Many will not have been predicted, many will be slow to appear and some may actually be relatively trivial.

Systems thinking on the other hand involves accepting that what we perceive as a problem is part of a much wider set of phenomena and interrelationships which includes a superstructure made up of our understandings themselves and a quite limited capacity to deal with many variables. Moreover, systems theory makes us aware that this known super-structure is always deficient. It will always have excluded important variables and relationships between variables. Nor will it include or be able to deal with the contexts, interpretations or levels of organisation within which its components fall. At least it will not be able to do these things in conventionally acceptable ways. Therefore, it can only 'succeed' if we define success very narrowly. Since concerned people know better than to allow themselves to do this, outcomes of their work will always appear to be inadequate partial resolutions which barely get anywhere. Such virtual 'zero-Sum' games are precursors to despair.

Consider the 'Keep Australia Beautiful' approach to litter. Systems thinking suggests that in 'cleaning up' it simply pushes wasteful ways underground, thereby delaying the day when they will have to be dealt with and, in fact, making the effort to do so more difficult by hiding the symptoms. Another example might be encouraging energy conservation under the auspices of an energy supply department. Consistent with systems thinking, the departments which could most easily introduce conservation, because of their demand-side orientation would

be housing, welfare and health. However, at present these departments have little interest in conservation of energy.

These are straightforward examples where resolution is largely a matter of considering wider contexts of much the same type as the one from which we begin. Systems thinking also prompts us to grapple with contexts of different types.

To gain public recognition and support, the concerns I am discussing here should be seen to be selfless or disconnected from immediate (especially material) personal gain to those working on them. However, they also require substantiation in some conventionally recognisable way, such as material loss, recognisable suffering or some scientific measure which might also ultimately be translated into loss or suffering. These two imperatives are in a real sense contradictory. In the present politico-legal environment, we can best represent concerns if we are seen to be legitimately connected with them and yet, if we are seen to gain from the resolution of concerns like ours, others will be less inclined to accept them as genuine.

Consider the Franklin River case. Concern for wilderness is, on the face of it, suitably selfless. It is also, incidentally, the ultimate terrestrial externalisation – far removed from the mire of the day-to-day human condition. To be understood by the political machine capable of quashing the plans to inundate the wilderness, some conventionally acceptable value had to be placed on it, such as tourist and scientific (potential species loss, say) values. Whereas, the issues real to many of us such as,

- the loss to the earth itself (a concept beyond intellectualisation) (see Naess 1985, Bookchin 1985 and Devall and Sessions 1985);
- the loss to the 'selves' or, understandings of personhood of those concerned with wilderness; and
- the perceived capitulation to the autonomy of technology, the so-called 'technological fix' (Mumford 1967/70, Winner 1976);

had to be sidestepped. In doing this, to save a wilderness, we had to betray its essence, which may only be found in ideas like these.

It must be said that numerous day-to-day concerns are continuously being internalised by our 'system': certain types of justice, safety, access to health and so on. Such concerns are like the greater issues in my first examples, while the issues of concern to me here are like wilderness. They are not amenable to recognition in conventional terms. Their essence is simply not amenable to conventionally acceptable valuation. I am not advocating that we should not use conventional valuations as expedients, only that in doing so we are left to handle the new implications of the betrayal of essence – which requires another approach altogether.

Now, while generalised concern is consistent with a systems theoretic world view, it may not be consistent with what that view implies for personal or self-

knowledge. Indeed it can be a source of considerable personal suffering. I refer here to the still widely held view that concern with personal relations and with one's own feelings is somehow suspect. The notion of independent objective reality is still quite current; the idea that objectivity is simply a consensus of subjective notions has few adherents. The upshot is that generalised concern can be a way out of 'being our brothers' keepers' and of evading doing the hard work of alleviating suffering on the ground, in the supposed mire of everyday human activity. The personal anguish engendered by such separation of intellect from feeling (mind from body) is the subject of increasing attention (e.g. Fromm 1976; Rogers 1980).

So far we have discussed an apparent inconsistency in using a new way of looking at the world (General System Theory) specifically developed to deal with failings in the present world view and how it can exacerbate one of the hidden roots of our anguish (personal alienation). We will now turn to some more personal and immediate sources of anguish.

## *Internal sources*

From her own confrontation with the nastiest vicious circle, the arms race, Joanna Macy developed a therapeutic technique called 'despair work'. In workshops with people who feel an almost hopeless anguish about the way the world is heading, she attempts to confirm that such feelings are 'healthy normal human responses'. 'Faced and experienced,' she writes, the power of such despair 'can be used – as the frozen defences of the psyche thaw and new energies are released' (Macy 1983).

A few nights before Dr Macy's Melbourne workshop, I joined an old Yugoslav walking his bike across a footbridge. He wore shabby clothes, was unshaven and on the back of his bike he carried a hessian bag. Clearly he needed to ride that bike (had no option). On making our farewells, I wondered who the hell I was kidding, for I was also on a bike and at the moment am earning a reasonable salary. Fortunately, however, my self-knowledge was sufficient to allow me to answer myself in the following way: I also need to ride as profoundly as he did, cycling is part of me. It reflects my priorities, I enjoy the 'oneness' with my old machine, the weather, etc. etc., much as Pirsig did in *Zen and the Art of Motorcycle Maintenance* (1974). And certainly, it makes a statement I do want to make. Why then can I still not accept the legitimacy of my own needs? Why is my first reaction to undermine myself?

Wondering how despair workshops might help this problem, I related my story to Joanna Macy with the suggestion that rather than 'Weltschmerz' (pain for the state of the world), the pain and despair of environmentalists may simply be a good dose of being ignored, of feeling insubstantial or unable to gain the respect of people they seek to influence. Worse still is generalised knowledge of the type that arises from the insight that, for instance, while to the majority a cyclist is ignored

or merely an irritant, to the aware motorist, the cyclist may well be a source of guilt, which is not the sort of feeling upon which to base change.

Further, how did one cope with the loss of credibility suffered once people knew that one was paid to teach about the way we live and its implications? And, isn't such despair rather a middle class indulgence; just so irrelevant when compared to that of the Ethiopians or Bangladeshis to whom the workshop fee might well have been sent ... along with the tax-deduction? Still further, since self-image is coupled to involvement with one's concerns, doubts work to undermine resolution to continue, how does one deal with that?

Macy was impatient with all this – wanting to get on with it. So we left it and I persisted with her workshop and grew to appreciate her efforts for what she claimed for them. At the time, however, it seemed to do nothing for the concerns I have just outlined.

## *Coping with concern*

About a month after the despair workshop, Huw Evans on ABC TV's *Pressure Point* asked two feminists to discuss the issue of surrogate motherhood in the presence of a surrogate mother. One of the feminists was young, articulate, thoughtful and ardent; a professionally concerned woman. The other was older, 'successfully' self-employed, self-assured and aware of her self-assurance. The third woman appeared self-assured and was quite articulate. Initially I had no trouble identifying with the young feminist. But it was the third woman who changed that and prompted this article. She evidently wasn't fussed about the 'intellectualising' the other three (including Evans) were engaged in over her head. The validity of her view finally occurred to me.

The successful, self-assured feminist argued in effect for the right of the individual to do as she pleased; here, to be a surrogate mother. To me, this was a recipe for potential personal and community (delayed cost) exploitation. I sympathised with the ardent feminist arguing against The System and its technologies which produce alienation and bear inherent, well hidden means of exploitation (Ellul 1980; Weizenbaum 1976). But, to be told you were being exploited when you had already thought through the implications to the best of your abilities was decidedly alienating. I didn't like it and felt angry. I had had enough of such (my own) unrelenting, campaigning concern.

Now, there are more ways of knowing than those mediated by science or, more generally, those which can be expressed in terms of cognitive (intellectualised) thought. I am also aware that education rarely 'radicalises' people – we use the potential education offers in diverse ways. Thinking, as we have seen, that one can fully understand a problem is not only self-deluding but not even 'half the battle' toward solution. For, in order to engage in the 'battle', to gain that initial

understanding, we first need to be motivated, and motivation has little to do with intellect or education *per se* (cf. the concept of creativity). Further, perhaps Voltaire's famous insistence that he would fight for the right of others to profess different ideas to his might also have meant that he actively accepted the validity of the other person's ideas. Such acceptance would not be the patronising acceptance normally granted to those whose capacity to understand is thought to be more limited than our own, but would reflect:

- doubt about our own understandings;
- recognition that understanding develops in personal and cultural contexts that vary from person to person;
- understanding that the other's understanding is unique and representative of that person;
- recognition that such argument derives from failure to perceive the different contexts from which our positions spring, or that much argument is the business of determining and reconciling these differences.

The point about failing to recognise contexts is based on two things in particular. First, the relativity of understanding and the ideas based upon it. The 'power of our own metaphor,' for instance, is the way individual systems of thinking and the artefacts that support them condition us (is a gauche person left-handed, or a competent one adroit or dextrous?). Secondly, that lines of thought and action fall under numerous nested umbrellas of perception. Put in another way, what we do or think can be seen from many angles allowing different interpretation and each angle derives from wider points of view, which also differ.

Points like these draw attention to anguish that derives from efforts to operate with structures inappropriate to the matter at hand. Thirty years ago, Gregory Bateson wrote about a particular pathological source of misunderstanding called the double-bind or *Catch 22* (1973 and Heller 1961). It referred to the impossible situation we put ourselves in when, unwittingly, we try to reconcile irreconcilables. He showed that the cognitive dissonance produced by such efforts can lead to a type of schizophrenia. Our interactions with each other are riddled with it, as a glance at any newspaper or moment spent listening to our interactions with children will reveal ('Don't shout', we yell). From the examples raised in this paper, it is futile, for instance, to look to my salary for understanding of why I ride a bike.

The double-bind is a diabolical source of disease and Bateson described it with a suitably diabolical name: schizmogenesis. By recognising the schisms our world views create, then, both the effectiveness of our work and the way we feel about ourselves stand only to improve.

The structural basis of isolation and alienation is the subject of a massive literature extending from Marx onward. A contributor to this literature was economist Tibor Scitovsky. Quite late in life he turned to the psychology of

economic transactions and eventually wrote, *The Joyless Economy* (1976). Here he reiterated that we do not associate the goods we purchase with their makers; it does not occur to us to look for direct responsibility for them in those who actually make them. Nor would it be possible, given the nature of production in the industrialised world. Equally, providers of goods work for employers, not for the people who purchase their wares. Scitovsky went on to suggest that this situation lends itself to the demise of care associated with both the goods produced and the goods bought. The latter, in that when we buy we do not expect that producers will have considered the persons buying their products. Thus, a joyless business whose joylessness reflects the structure of our economy.

In addition to Scitovsky's point, whether we like it or not, most people work at providing water, spades, take-away food, typed words, drugs, sausages, interest on money and the infrastructure to ensure it all gets through. In addition to all other bases for personal world views, the things people do also impose particular ways of thinking which derive from the strength of the vested interest we have in our jobs. Such job-related contexts will rarely align themselves with those that underlie professionalised concerns.

There is, therefore, the best possible case for working to change the structures of our political economy and the best possible case for bearing them in mind as we work to cope with the anguish of our concern. However, the common element in the split between aspects of our reality is patent (see Shepard 1982 for a particularly novel analysis).

## *Some suggestions*

I shall begin by trying to isolate some easily recognisable motivations for our personal frustration:

- Guilt, feelings of personal responsibility for the (perceived) plight of others. I refer here to the responsibilities of the aware: feelings of returning the trust society put in us when it opened opportunities for us to gain awareness. Plus perhaps, a hope that one might respond honourably to queries like: 'Where were you when they were making the bomb, Dad?'.
- Arrogance, a belief in a capacity and 'calling' to change the lives and understandings of others (a recipe for frustration if ever there was one!).
- A need to gain acceptance for our ideas (upon which, as I have already said, we base assessment of self-worth). This is an example of the context of context, for ideas can only be accepted in ways that we can believe in – in this case behavioural change in others.
- A belief in the changeability of human structures emanating from our familiar prowess in dealing with mechanical structures and its effect on how we deal with ourselves.

- Ways of discussing and publicising concern. Speech, bearing, timing and so on can be used to intimidate and demoralise. The dignity of the people we hope to influence may be threatened. Commitment itself and especially professionalised commitment are like this. Presentation is as important as the ideas themselves (Goffman 1971; McLuhan 1964). We simply cannot divorce ideas or the form of their presentation from the various powerful cultural agendas we all have in our heads. Examples of these are Weber's 'Protestant Ethic', a 'Newtonian world view or a 'male' world view (Weber 1930; White 1968: Rothschild 1983).
- Finally, jobs in professionalised concern require quick outputs (change) recognisable in measurable terms while the change referred to here may be slow and not easily measurable in the short-term. Moreover, our very mortality urges us to seek changes in periods we might live to see.

To deal with the despair arising from this potent combination of guilt, frustration and commitment, Joanna Macy's approach offers a good beginning. She asks us to own (admit to) our feelings, to trust that others feel as we do and to allow others to believe in our integrity. But what then?

For those who intellectualise their paths through life, the following steps are consistent with what I have already said and have been useful to me:

- Work to recognise the contexts of your own concern.
- Accept the validity of the understandings and contexts of others. Corollary - seek confidence in your own.
- Accept that no change is so urgent as to warrant smashing or over-riding the dignity of others.
- Recognise that behavioural change does not immediately follow attitudinal change (look at your own experience).
- Alter approaches used to present ideas so that support for them is not found in discredit and humiliation.
- As awareness of them occurs, work to reveal the biases and contexts of the knowledge and knowledge dissemination structures used.
- Accept that structures involving people cannot be conceived in machine ('technomorphic') terms and that effective change occurs with the collaboration (hence: balance) of those concerned – slow as this may be.
- Recognise the sufficiency of doing the above; that is, that it is all that can reasonably be expected of you.

In conclusion, two philosophical views might be of help. I believe the way to resolving the agony of concern lies in cultivating a new philosophy from which the points listed above arise naturally. The first aid arises from a deeper understanding of system theory, the second from what has recently become known as 'Deep Ecology'.

In his preface to the remarkable book, *Autopoiesis and Cognition* (Maturana & Varela 1980), Stafford Beer points out that a consequence of this powerful new system's concept is that,

> *... every social institution (in several of which any one individual is embedded at the intersect) is embedded in a larger social institution, and so on recursively – and that all of them are autopoietic [capable of independently producing (sic) themselves]. This immediately explains why the process of change at any level of recursion (from the individual to the State) is not only difficult to accomplish but actually impossible – in the full sense of the intention: 'I am going completely to change myself. The reason is that the 'I', that self-contained autopoietic 'it', is a component of another system*. (Square bracket mine.)

In other words, change only comes about once adaptations have been made that reflect a harmonisation of the change with the 'rest' of the individual. We are non-smokers, say, only years after the intellectual decision to quit. In my case, I am still almost entirely alone with my bicycle after fifteen years of daily commuting.

Perhaps this way of thinking extends the insight we can draw from the systems view; it asks us to transcend expectations of system thinking based on the old world view of dualism, linear causality and so on and to seek the personal harmony available in applying systems thinking to our own use of systems understandings.

The other aid is to be found in a new 'eco-philosophy'. The essence of Deep Ecology is cultivation of the capacity to recognise intrinsic value. Father of Deep Ecology, Arne Naess, points out that living with intrinsic value means recognising the meaning of vital (as in 'life') needs. Consideration of vital needs is a call to grapple with the implications of satisfactions whose essence lies in minimising stress on GAIA or Nature as a whole (Naess & Sessions 1984). This capacity is not an exercise in standard western 'objective' and anthropocentric logic. It is more akin to the process by which Zen Buddhists go about the resolution of the apparent paradoxes (koans) they set themselves as exercises; which brings us finally to the insights of modern physics.

Heisenberg's Uncertainty Principle has shown us that all phenomena are intrinsically unknowable, at least: not fully describable. It is not that our tools are inadequate to the task but that unknowability is a property of 'reality' itself, which in turn is the interaction between our Selves and Nature.

Thus the resolution of our personal anguish and ultimately the answer to our approach to change lies in learning to accept what Watts has called the *Wisdom of Insecurity* (1951). That many secular (and science-based) thinkers are realising this is apparent from such recent titles, such as *The Search for Certainty* (Spradlin and Porterfield 1984) and *Order Out of Chaos* (Prigogine and Stengers 1984). From

these titles and the many like them we might well draw some good 'old-fashioned' optimism.

Just as pre-Kuhnian scientists were in the main unaware of the sociological contexts within which they practised (Kuhn 1970; Barnes 1984), so the new profession of concerns seems to be unaware of the contexts in which it operates. It is time that we did recognise the strength of the environmentalists' own metaphor: that of the ecosystem and GAIA, and began to apply it to ourselves. Success will enhance the self-respect of others as well as our own, and do more to confirm the validity of our own concerns than anything else. ■

# *Everyday transcendence*

In the 1990s Frank put together a statement of concern to give students a feel for 'where their lecturer was coming from'. In 2001 it was handed to the audience at an Environment Institute of ANZ AGM talk and published in the Institution's newsletter, *EIA Newsletter*, vol. 35, pp.10-11. It is reproduced here with clarifications.

## *What I recognise and respond to*

### *A statement of concern*

The extent of human-induced environmental change to the planet is:

1. ***Many faceted, extensive and ramified (builds upon itself).***
   Consider the changes to the planet that empirical (experiment-based) science has revealed: to the atmosphere, hydrosphere, pedosphere (soil), geosphere (earth's mantle), biosphere,'electro-magnetosphere' (cf. electromagnetic 'smog', especially the latest addition: 'Bluetooth' = wireless communication between devices of all kinds), 'thermosphere' (earth's surface heat balance – supplemented by energy conversion processes all of which end up as atmospheric and hydrospheric heat) and ultimately to *GAIA*, the living whole whose essence is *self-organisation*.

2 ***Profoundly demanding of:***
   • Educational (intellectual) instrumentation
   Examples:
   i. Consider what it takes to understand meteorological ozone depletion phenomena, let alone the ecosystemic dislocation science suggests it will cause.
   ii. Consider what it takes to assess whether a plastic bag is environ-mentally 'better' than a paper bag.
   • Physical instrumentation
   (NB: Both intellectual and physical types of instrumentation are necessary to enable environment to be apprehended in the first place.)
   Examples:
   i. The only part of the electromagnetic spectrum apparent to us without physical instrumentation is the miniscule visible band.

ii. Carcinogenesis is visible to various instruments but is not something our beings can detect until carcinoma is there in all its malevolence.

3. ***Only knowable reflexively***

In common with all knowledge, environmental change is known through intellectual frameworks and their motivating priorities. While it is obvious to most that the *uses* of science are political and dependent upon the interpretations of power and the mass markets, the politics underpinning the ways we know are little recognised. The most reliable, open and empowering of these ways is science. For all its reliability, however, science and the limited range of reliable knowledge it has generated are interpretation – or *definition*- dependent, i.e. they are *reflexive*. Interpretations and definitions are culture – and time – dependent. Therefore, for all its admirable strivings for self-criticality, science itself is political and unavoidably caught in the wider 'struggle for legitimacy'. In common with all knowledge, then, science must be used with care, for while it does not aspire to creating its own directions or priorities and it cannot assess the market value of its own progress, it is governed by its own history. Therefore, environmental change as we see it is dependent upon this contingent science. We forget this at our peril.[1]

4. ***(Therefore) so far beyond the capacity of all of us to apprehend in detail that it is little wonder that so few of us are perturbed-to-action about what science tells us every day in the media, let alone in the scientific journals.***

We simply do not know – in an empirically provable sense – what we are doing. Moreover, few are willing to acknowledge that we do not know that we do not know![2]

The suggestion of immobilisation inherent in point 4 above is based on (often tacit) assumptions, such as empirical science doesn't know about many things; what empirical science appears to know may still be contentious; and (as maintained in point 3 above), what it knows is contingent upon the interpretive hypotheses (assumptions) upon which it is based, and finally that individual action in the face of all this… is futile.

Some recognise, however, that there is more to knowing than the empirically provable. There are organisational generalisations (hypotheses) about the way the world is put together that can be tested for their validity through practice and critical public scrutiny. Some of these are the critical bases of scientific hypotheses which cannot themselves be subjected to experimental proof. Others are the basis of national constitutions, of legal and medical practices and of everyday household organisation. For example, placebos work; that is, many have long been 'known' and acted upon in medicine without empirical proof. Recently hypotheses have

been devised to test them, and evidence is appearing finally to give the placebo-effect the imprimatur of empirical science.

One of these sets of generalisations is our political structure. Every country has one and some function 'better' than others (see, for example, Fukuyama 1992). Another set of generalisations is the philosophical/religious framework that allows us to frame 'betterness'. Different cultures will have different criteria.

Our authorities, however, are not normally understood to be empowered to know in this way, let alone to research and publicise such contexts. Not knowing, and not having the meta-capacities to know what to do when we begin to suspect that we do not know, implies the inaction mentioned above. A response to this is a 'stiff upper lip' default that maintains 'business as usual' and a 'she'll be right' approach. This stance is reinforced and exacerbated by the absence of:

1. society-wide recognition of a precautionary principle to be exercised within a positive, innovative political economy;
2. structural encouragements to accommodate the equivalent status of caution with innovation and to build in (i.e. incorporate as a positive part of political economy, just as material infrastructure maintenance is today) monitoring and adjustment processes accordingly;
3. educational infrastructures, including curricula, that would encourage people to think contextually and to act on such thinking (politically); and
4. social security that would cover (and therefore engender confidence in) society as it makes big picture changes toward sustainable and equitable social organisations. Certain societies are beginning to develop these, notably Scandinavians who manifest remarkable trust in their own institutions and therefore in each other as citizens (see, for example, Fukuyama 1995).

Most people know that ultimately it is we-as-society who must provide; i.e. we-as-society must provide our own security and, more, tampering too radically with social economy risks social chaos. Consider the traumatic effects of the radical transformation of the USSR to today's Russia, Ukraine, Turkmenistan, etc.

*To be effective*, then, those of us who believe we are beginning to understand social (i.e. not just economic) and environmental dynamics are faced first with liberating ourselves from the despair that recognition of the contingencies of our knowledge base and the parallel inability to make substantial headway implies. It is perhaps worth recognising that despondency itself is an outcome of current ways of thinking and of organising society. Despondency dissipates as we internalise recognition that life is always more complex than we think it is and that humanity-as-a-whole, not just individuals, may have to go through some kind of 'social adolescence' of which despondency about the transition to 'maturity' is part. Thus, we might just be 'inside' an interpretation that itself can successfully be transcended. Tools to enable this everyday transcendence are not difficult to find.

We already use them; it is only necessary to extend our understandings of where they can be applied.

An immediate example arises in recognising that *substantial headway* will be an overestimate of what society is capable of because the explicit models of the task we set for ourselves are necessarily *models*, i.e. simplifications. The transcendence begins when we enter our self-imposed tasks remembering how very few generations it has taken to bring about the sweeping changes we enjoy in open representative democracies. No organism has evolved as fast as human society. Only a couple of hundred generations ago most of us were 'cave-dwellers'. The difficulty here is that we live, articulately, for at best just three generations!

So, being positive about divergent but more sustainable ways of living is not some artificial approach we might foist upon ourselves to maintain enthusiasm. It is consistent with a new kind of responsibility - metaresponsibility that arises when responsibility for the *way* we know becomes the motivator of action rather than 'just' for *what* we know; i.e. when an understanding of context becomes visceral or an integral part of our being![3]

(The transcendental exercise I am getting at here is already the subject of well-known works by Abraham Maslow (1970) and, more recently, Mihaly Csikszentmihaly (1993 and 1997), Howard Gardner (1999, 2000), Richard Sennett (1971 to 2003), Francis Fukuyama (1992 and 1995), Ken Wilber (2000) and, in a different (indirect) way, Robert Putnam (2001). All seek to,

> *… transcend the epistemological fallacy of occidental culture: the abstraction of a separate 'I'* (Gregory Bateson 1973).

Transcendence as we are using it here is about climbing out of our everyday selves and looking around from a more generalised plane. This is usually thought to be the domain of spiritual traditions or… of holidays, and it involves the practice of esoteric procedures, such as… international air travel with its massive greenhouse gas budgets!

This book has tried to illustrate that our lives are shaped by social agreements that enable (new) processes, which can be known critically by other more general agreements. It also suggests that we can operate in both the process and the critical domains comfortably and with efficacy. Recognising that there are always social contexts to our actions gives us metaresponsibility and a type of circumspection and care not generally recognised and, therefore, not generally practised. A small proportion of people, of course, have always recognised what we are talking about here, if not perhaps in quite the same secular terms. These were the shadowy characters who operated behind the scenes, writing and marketing sacred texts of one sort or another; or those who, in the 'West' at least, got themselves crucified. In today's open secular world the task now falls to all who care to be involved and the 'texts' are at best open to us all to criticise and change.[4]

Today, as I write this, the toilet at our farm house is not functioning. This of course makes life difficult for incontinents like me. I live, four days in seven, on a farm a couple of hundred kilometres west of Melbourne. My partner is a farmer. Were I in the city, I'd phone the Body Corporate of my block of flats and ask for assistance. If I thought about it I would remember that my Body Corporate rates would allow me to *expect* professional assistance. Out here, however, there is no such infrastructure and no such expectation; even were there, it would take days to organise. So, we have to know the system we rely on and, fortunately, my partner, at least, does. Being a farmer makes her an innovative, if relatively inexperienced, plumber, mechanic, builder, veterinarian, but also operator of various social situations, such as handling tourists visiting the windfarm or itinerant shearers or grain harvesters, along with all the complex details of running a business geographically isolated from the usual supports, i.e. isolated from occupational health monitoring, matters of taxation and the accounting required to maintain a positive (triple!) bottom line in a globalised market.

She simply *has* to have a rudimentary knowledge of the systems she relies upon, sufficient at least, to keep going until professional assistance arrives. Much of her innovative insight rests on recognising just what is wanted from a system and, then, in the event that the conventional system fails, finding an alternative but adequate way to provide it. If water fails, she can transport it with her old but well-maintained fire truck. Most importantly, when her first lines of on-farm alternatives fail, she knows that she can rely on neighbours, as they can rely on her to pull each other out of scrapes. It all means that her infrastructures are well-maintained and very much include relations with neighbours and local organisations, such as the Country Fire Authority. A characteristic of all this is that the scrapes one or other are in have to be mutually recognised. So, where, say, we are trying to preserve a locally threatened indigenous species and the assistance of neighbours may be necessary, we may just have to struggle alone because there may be no common language or *currency* between us and our neighbours on this issue.

In the wider world, a group of the six major Asia-Pacific greenhouse polluters have just completed a conference on minimising greenhouse gas production, *outside* the Kyoto framework. The media have had a field day reporting and commenting, yet nowhere, at the conference or in the popular media comment, could I find discussion of the social expectations that generate current energy demands. Bush-the-Elder's famous edict at the time of the first Iraqi war comes to mind (roughly),

*America's lifestyle is not negotiable.*

Unknown to the conferees, the journal *Nature* had just published an article indicating that trees generate methane – a much more serious greenhouse pollutant, kilogram for kilogram, than carbon dioxide. One of the many upshots

of this is that planting 'green deserts' (monocultures) of (in southern Australia at least) fast-growing Tasmanian Blue Gums may not give us the same greenhouse offsets that investors in these techniques expect. That such techniques only further the illusion that we can persist with our fossil-fuel hungry lifestyles, provided we plant trees, was never part of mainstream public debate. With *Nature*'s most recent contribution it may now be.

In the preceding paragraphs I have tried to elaborate structures that come from applying more general frameworks of thinking to everyday phenomena. In the last case my emphasis is not on the technical inappropriateness of trees as greenhouse offsets but on the inappropriateness of the notion that we can persist in dealing with consequences of our actions by yet other actions of the same type. Such action is 'natural' because it is consistent with nearly all of the social and therefore epistemological frameworks that enable us to make sense of our world. *Trees as greenhouse effect offsets* fits neatly within our current expectations about wealth generation. In Chapter 7 the little piece about the place of the DODO (commuter car) in societal wealth creation illustrates this, and the two following short pieces illustrate it more explicitly again. One is about another technology (the 'whipper snipper'), while the other picks apart a couple of social frameworks: the notion of public space or 'the commons', and the structures of academic review for publication that underlie one of our best known environmental polemics, 'The Tragedy of the Commons'. ❑

## *'Whipping the 'whipper snipper''*

Response to: 'Which kind of 'whipper snipper' would you suggest purchasing for use on weeds in an urban residential garden, petrol or electric?' Unpublished (November 2003) but used scores of times in lectures and public talks.

1. Neither; i.e. don't have a garden at all if in an urban residential situation – try using or creating public/community gardens, OR:
2. Redefine weed. Get used to things growing as 'they' like.
3. If insisting on a garden, grow things that are edible/satisfying in ways that don't need a 'whipper snipper'.
4. If insisting on cropping - borrow and train (for example, with fences) a herbivore (e.g. a lamb).
5. If not disabled, do the job with a flat hook, hand shears etc.; you'll be fitter for it.
6. If all that fails, here are things to think about and you make the decision:
   a) An electric device will be quiet (neighbours!?)

b) From an energy efficiency point of view,
   - in mainland Australia one is as bad as the other;
   - in Tasmania/NZ use the electric device, it uses efficient hydro-power..

c) From a cutting perspective, probably the petrol device is more 'powerful'.
d) The electric one will have a cable and there is a minor safety risk to the user in that s/he might cut the cable.
e) From a user perspective the petrol one will be noisier, heavier and require petrol and more maintenance.
f) The petrol one is more flexible – can be used anywhere except upside down where the electric one will still function (although you mightn't!!?) ❑

## *Climbing out of the tragedy of 'the tragedy of the commons'*

Comment on one of the most famous articles in the environmental literature.
Unpublished response to emailed query, December 2005.

Garrett Hardin's famous paper from *Science* (1968) plays out, without recognising it, more general issues of the way we (currently) organise our society. One of these is that it takes a very long time and a lot of heartache to organise a political constituency around 'internalising' a new priority (such as – the current 'externality' of – greenhouse gases emanating from car-driving or electricity generation). Internalising hitherto 'invisible' aspects of privatised commerce or, more generally, of privatised living, *must* be difficult and, in democratic society, represents a process that must be gone through before people will accede to the legitimacy of the new insight or 'visibility'.

Garret Hardin's 1960s environmental classic piece on 'The tragedy of the commons' probably only became famous because none of the reviewers for *Science* at the time understood that Hardin was not talking about human nature in his reflections on the treatment of the commons, but just one particular way of dealing with a common 'inheritance'[5]; i.e. the eye cannot see itself seeing without some external aid such as a mirror. And even then it can only do it if 'it' knows what a mirror does, viz. that it is seeing *itself* in the mirror and not just another eye. A mind is the same; it can recognise its capacity to think about itself provided there are other minds around to give it the tools to do so. Many minds never gain the opportunity to do much of this, and that of course is a social failing, in part based on the political difficulty of facilitating a critical society.

So, in Hardin's case the commons would not be tragically destroyed were we to build into our individual ways of dealing with public space, or public property in general, some deeper mechanism of social responsibility. Such metaresponsible behaviour would avoid Hardin's imperative to privatise the commons with all the

downsides of doing that, cf. arrogation of the commons into the hands of those who can afford bits or even (and this is interesting) ALL of it! An aggregate of bits doesn't have the same metavalue as the whole and, in that a privatised whole excises that whole from the public domain, its privatisation spells, first, a denial or annihilation of a public asset and, then, much more, the denial of its being as nature. All of which could raise questions about the nature of *property* which, if recognised at all in our post-Marxist era, is just regarded as 'too difficult' or too contentious to address.

An interesting extension of this thinking might be the consequences of 'debt-for-equity' schemes in which wealthy Western individuals buy up Third World space to 'preserve' it. This appears to be well-intentioned and indeed may well be done in that spirit but…

In the preceding two cases, I have urged that we should 'climb out' of taken for granted frameworks of thinking to recognise something more general. In the next cases, we do the same but go on to do something with that knowledge. ❑

## *Litter… as advertising*

Initial project and travelling exhibitions of the new Monash Science Centre unit, The Understandascope – Interpreter of the Mundane, underway in early 2006.

Currently we control malaria by 'waging war upon' the 'vector', i.e. the organism (mosquito) that carries the problem. The solution lies in the work being funded by the Bill and Melinda Gates' Foundation that is striving to vaccinate people against the organism that actually causes the disease; i.e. we will soon, it seems, have the means to stimulate our own immune systems to finally liberate ourselves from this most widespread of diseases (*The Australian*, 21 January, 2006, p. Careers 21). Similarly, we address litter by seeking to control the litterer. Were we to address the generators of the litter, we might finally be able to co-opt them in such a way that litter does not arise. This would mean creating systems that inform users that the containers in which their products arrive, for example, were also valuable and therefore worth returning. South Australia has enacted beverage container deposits which give containers a value worth returning them for.

To create an environment in which the companies that generate packaging that becomes litter would in turn recognise the cost of the consequences of their 'worthless' litter, we must find some way to make it important to them. It occurred to me that since litter actually still advertises itself as it lies there in public space, we could charge for that advertising. All that would be necessary would be that we assess the extent of its presence, measure the area of public space that it occupies and the time that it lies there, then, with the going rates for advertising in public

places, calculate the extent of the public subsidy being made to the 'offending' companies. This data would then be made public at travelling exhibitions and where the legal and accounting infrastructure were available, it could be turned into a charge made to the littering companies. The associated public shame may itself be enough to make the companies act to provide their customers with a reason to really 'dispose of their containers thoughtfully' and, where this is not enough, the charge would finally provide explicit or measurable means.

The freedoms this social-context-based thinking offers will now be elaborated. Again it will be done by elaborating from a few more papers and, as usual, they will span a diversity of interests. ❑

## *Light switch at knee height, a prompt*

Internal project, School of Geography and Environmental Science, 2004.

A tutorial room with seating for some two dozen people, opposite my room, was equipped with an overly generous 700 watt bank of fluorescent lights – partly to compensate for a complete lack of natural light. The room was often vacant but had a sink and fridge and so doubled as a tea room for many staff on my floor. Each time a staff member wanted to use the room's facilities s/he flicked on all 700 watts. Observing this, I bought a small 5 watt light and placed it next to the sink/fridge area and the first person entering in the morning turned it on and left it on. Inevitably a few staff members didn't notice the small light and/or couldn't help themselves and reflexively flicked on the main bank. How could one inhibit this reflex action and induce the next level of response: a context-sensitive one?

Put the fluorescent bank switch at knee height along with a visible-in-poor-light sign saying: 'Do you need all 700 watts worth?'

This would work even after it became second nature for people using that room because it would be a unique situation for that room and, assuming good will on the parts of users, would always prompt thoughtful action.

The proposal needed very little extra wiring but did need Occupational Health and Safety approval. A grant for the cost was quickly offered and would not have taken long to repay itself in energy savings alone. However, the idea foundered on the OHandS approval – there simply wasn't the flexibility of mind available at the time to attain it, and my tenure in the School ran out before I was able to overcome this blockage.

Other mundane areas in which 'metadefault' thinking are useful are illustrated elsewhere in this book. These include, of course, transport options. Instead of the standard default for all travel: the DODO or 'vehicle for all seasons', metadefault thinking is the next level in which travellers automatically aggregate various contexts

and choose the appropriate form(s) of transport for the demand. Appropriate form(s) may well be a mix of vehicles as in the case illustrated in the small piece, 'A Bicycle Diary' in Chapter 4 and 'Technology and the Loss of Self' in Chapter 1. Another area in which such thinking is now quite common is meal preparation where people are often familiar with sorting among sustainability contexts of eating and these are brought to bear on choices of foodstuffs, their acquisition, storage, preparation and presentation (cf. Chapter 3, 'Crossing the frozen waste of refrigeration'). ❑

## *On: 'Bicycle maintenance as a social skill'*

Adapted from an article in Bicycle Victoria, vol. 8, no. 2, (1990) pp. 27-29.

The fragmentation and privatisation of society, on the one hand, and the dramatic increase in disposable household incomes in the industrialised world, on the other hand, has led to extensive privatisation/commercialisation of services once provided by families or society at large or even unknown as a demand. An example of the former is child-care, now formally provided by private firms or local government services; an example of the latter is the emergency 'breakdown' service for the motorist.[6] The bicycle world does not generate the wealth to afford such an emergency breakdown service; therefore the cyclist must either be self-reliant or, much more interestingly, rely on society for assistance.[7]

The tricks here or, in our terms: the social constructs of interest, are associated with recognising both how society sees one when one is a cyclist and especially a 'broken down' cyclist and, what is wanted of society by the 'broken down' cyclist. In Chapter 4 we looked at the nature of cyclists' vulnerability, but the broken down cyclist presents a different picture. Here the vulnerability is without reservation. My own experience has been that the very nakedness elicits immediate response even from those who have to halt their ton's worth of steel, climb out and then engage with the cyclist's plight. Indeed, motorists seem to respond more readily than their footpath-faring cousins. This phenomenon may be explained by the work of Darley and Latane on the infamous Kitty Genovese analysis which suggests that the more people there are at the scene of an accident, the less likely any one of them is to assist. That aside, and provided the cyclist is relatively unharmed, they tend to be left to fare for themselves for the simple reason that the damage in motoring terms is 'trivial'. Various other agendas will also be present such as,

> *Well, if s/he is that crazy (as to be on a bicycle) let her/him fend for her/himself;*
> *we (motorists) pay for our roadside assistance, cyclists should do the same…*

Where the cyclist is not injured physically, s/he may want assistance to get moving again, perhaps sympathy if s/he is in shock. Most of all, s/he will be seeking some recognition that s/he is a valued member of the commuting world and that her/his position is legitimate (see later). S/he will not appreciate the response of,

*Jeesus you really bring this stuff on yourself, don't you?!*

Part of this response comes from the guilt trip that the cyclist represents in a community making its adjustments to a world where motoring is now increasingly being seen as socially and environmentally vexatious. While understandable in the context to be illustrated later, it makes the efforts of the cycling vanguard of change-agents even harder (see Chapter 7).

It should also be a case of *noblesse oblige:* a priviledge of power. These kindnesses aside however… the opportunities society offers the cyclist are varied and rewarding. One can think of them as falling under a few categories:

- Assistance as a fellow traveller, i.e. from other cyclists, from *calceati* (people who travel in shoes) and yes, sometimes even, from motorists.
- Systemic assistance, i.e. from society's formal breakdown and emergency service mechanisms.
- The world at large.

The last category is the interesting one. It is basically facilitated by the cyclist her/himself and, in a big city, covers a broad range of possibilities. In common with the next story, provided the change-agent realises that it is up to her/him to make the position s/he is coming from obvious to the potentially helpful public, the help is almost invariably provided. It will range from being bandaged up at site to lifts for cyclist and bicycle to on-site or near-to-site repairs.

One of the most interesting and revealing aspects of tapping into all these possibilities is that it is fun and it provides fun for others! It is a joy to elicit giving from people, not just to give, and most of us know it when it is provoked from us.

All these opportunities lie there, waiting to be uncovered and drawn out. But, the cyclist must explain! ❑

## *A travel guide for the incontinent*

Adapted from two articles in Voice, 2000, 3, 2, 10-11 and Link 2000, 9, 4, 16-17.

The point here is that incontinence is an experience we have all had and therefore can all identify with; moreover in contemplating someone suffering from it we do not experience feelings of guilt, rather, most of us will empathise. Nevertheless, incontinence can generate feelings of revulsion. The situation, then, is one in which the incontinent need to put their plight in such a way that the people they

seek assistance from will experience feelings of empathy rather than revulsion. The exercise becomes one in which the traveller must plan ahead and just as s/he chooses warm clothes for the coming cold climate of a high latitude destination, one can choose the appropriate psycho-social garments to clothe oneself in when confronted by a different society. In Japan, where toilets are often a hole in a porcelain floor, the incontinent traveller might prepare by doing exercises that will enable her/him to squat easily very close to the hole. On the other hand, there are, of course, toilets everywhere there are humans, only most of them are private. The exercise then becomes one of convincing oneself that there is no shame in being incontinent and then of putting the condition in such a way that others will neither be repulsed nor overcome by fellow-feelings so strong that they will not want to embarrass you! ❑

## *The* hairshirt, *living with inconsistency and a couple of slices of cheese in a packet*

The other day, on a whim, I bought a couple of slices of cheese. It did not escape me, even as I paid for them, that the weight (and expense?) of plastic I was buying was possibly greater than that of the cheese. The prickles of the 'hairshirt' could have begun to itch but being well-versed with this problem they didn't. I simply ate the cheese and, after a glance at the recycling code, dropped the (non-recyclable in Australia) plastic in the rubbish.

Getting to this point has taken me many years, for the hairshirt (intellectual and emotional baggage) I wore was as heavy as the best of them. Once social context concepts were to hand or, more to the point, to mind, however, it was not all that difficult to divest myself of that baggage. How does that work? Well, first there's the business of the intellectual and emotional baggage (the hairshirt), what it does and why, then there's the place of spontaneity in the context of the everyday world in which we live.

By baggage, we think, usually, of the overarching behavioural frameworks or agendas society appears to impose upon us to guide everyday decision-making. Maturing is the process by which these are internalised or rejected and a personal state of being at peace with them results. They remain baggage or hairshirts only while we are struggling to make our peace with them; appearing as impositions that can be dispensed with 'when society's not looking', so to speak. The rules of a football or cricket match are not usually thought of as baggage by the players; they simply accept them *as* the game, internalise them and get on with it. For a sponsor, however, the rules may well be very much part of the 'game', and changing them for the 'better' (for the sponsor) will be a continuing issue. For the sponsor, therefore, the rules are 'baggage' continuously nagging to the point where changes are made

and finally peace is at hand and, in the case of Kerry Packer, one-day-cricket is born.

Those who simply internalise agendas uncritically (as we all do initially), may live peaceful lives, but such peace is politically naïve and therefore inarticulate (i.e. 'ignorance is bliss'). On the other hand, the critical internalisation recommended in this book involves acceptance-in-awareness such that the stress of imposition vanishes but the meta-awareness within which the acceptance is made permits the structure to resurface when the culture appears ripe for change; this latter state being perceived by other meta-awarenesses.

It is worth noticing here, again, that all intellectual structures are anchored in emotions of one sort or another. Syntax, the organisation of words, and semantics, the meaning or clout associated with words as expressions (note that word) of ourselves, are inevitably and always flip-sides of each other; just as the rules of a game *are* the game but only when it's played![8]

How now do we live comfortably with these baggages? The answer at one level is simple: we do it by devising and learning to live with personal metabaggages that take care of them. These are the recipes of endless 'how to live (with yourself)' books which, at best, help us to sort overarching priorities in a way that permits critical involvement of ourselves while, at worst, imposing a new (insidious) level of determinism that lulls us to sleep. The catch with the majority of them is that they make no attempt to illustrate the baggages upon which they themselves are written. They are like the old testament of the Christian bible, desperately calling for an interpreter who might empower all of us to critically find 'the right way'.

And where does spontaneity fit in this calculus? Spontaneity is, of course, an 'eye of the beholder' phenomenon, but, still, in the sense we know it today, where we are still 'social juveniles' struggling to make our peace with increasingly numerous social rules, it is an understandable and usually acceptable response to 'overload'.[9] Given this, then, how do we 'put the baggage on hold' without losing it? Well, the metabaggage will say, for example, that, within limits, spontaneity is good. Indeed the very word carries with it a certain control, namely that it is only occasional although of course not regular and not to be rigorously accounted. One of the metacontrols might be to recognise outer limits, such as it being okay to permit oneself an occasional outburst of anger directed at an insensitive motorist, a bratwurst hotdog or a flight to the Whitsundays. ❑

## *Esteem, self respect, legitimacy, substance, bootstrapping and why these are important.*

The famous studies by epidemiologist Michael Marmot (2000 and 2003) have shown us how vital the esteem of others is to our health. Recently Geoffrey Brennan of the Australian National University put the social scientist's case for recognising and using it in *The Economy of Esteem* (2004) and in an Academy of Social Sciences in Australia paper (1/2005) titled, 'The Esteem Engine: A Resource for Institutional Design'.

Most of us living well-fed, well-clothed and well-housed lives, in societies that offer more than a little security of access to all of these, will recognise esteem as a defining 'driver' in our lives. Esteem is the measure of our legitimacy and substance in the eyes of those people significant to us. Many social scientists have also pointed to the multifarious ways in which our political economy renders esteem scarce, selling it off, so to speak, as a product. The 1960s and 1970s generated a spate of such works by the likes of Fred Hirsch, Vance Packard, Kenneth Galbraith and Christopher Lasch, although the subject has been recognised by many writers on the human condition down the ages. For all that, no one seems to spell out the reasons for this hunger for affirmation. The explanation I have found is simple and adds to the approach developed in this book.

To the extent that we live 'inside' our social constructions, we are artefacts of them, i.e. we 'emerge' from them. That concept, 'emergence', in systems theory refers not just to the birth but to the shaping provided by the structure from which the emergent entity comes. And the emergent can be anything from a life form to a technology to an idea or theory. In other words, things develop in intimate dances with their 'enabling frameworks'. This book has been at pains to point out that the process of recognition is one in which the recogniser is enabled to recognise. In order for us to mature we have to assume a raft of constructs that enable us to be critical. In particular, in order to arrive at what we call mature self-awareness in which we manifest confidence without arrogance, measures of esteem must be provided that fit what we have become as social beings while simultaneously permitting us to be critical of their basis and opportunities to be involved in adjusting them. So, to esteem ourselves we must be provided with a set of criteria and a way of applying them. This is initially done by society through some local agent like parents, peers and formal social systems in general (e.g. 'the law'). And here lies the vulnerability from which the search for esteem rises.

Most of us will be tacitly aware that the criteria by which we make an assessment of ourselves comes from society and not from inside oneself. In other words we

know that we are dependent on others for the way we think about ourselves. Given this, it becomes necessary to continuously affirm one's interpretations and to check for changes to them. Knowing this explains a lot of affirmation-seeking behaviour. Much of it is interpreted as a failure of 'confidence', which is interpreted as psychological inadequacy. I am suggesting that it may indeed be a feeling of inadequacy that drives it but that feeling is entirely justified and necessary. We simply have no option but to check and recheck where we are in the complex, ever-changing social world of which we are part and that search, inescapably, persists almost till the day we die.[10]

It takes a lot of struggle to make one's peace with these structures, to be critical of them and to exercise one's own personality on them to create more appropriate ones. Interestingly, one can only do that effectively once one has achieved a certain level of confidence with oneself. We who, one way or another, attain that are indeed blessed.

Arriving at a state of 'oneness' with one's society's mores gives one a certain solidity or substance from which we can in turn invent and add to the sum of our society's or culture's inheritance. This place, so to speak, is the basis of the confusing term 'bootstrapping' which refers to the notion of lifting oneself by one's bootstraps. The notion here is that we retain and enhance our integrity as persons by building on what we have by ourselves. That does not mean literally by ourselves but by ourselves to the extent that we feel substantially involved and that the totality of what we feel defines ourselves has grown. In a recent article on the Search for Extra-Terrestrial Intelligence (SETI) I suggested that, were we to make substantial contact with an ETI, there would be a risk of it completely shattering the basis of our hard-won self-definition since it is likely to be much more 'advanced' than we are.[11] The likelihood of this happening would be small because, being much more 'intelligent', it would necessarily be confident in its own understanding and also would know that, were it to reveal itself to us, it would spell our demise. Therefore it would remain quiet and never reveal itself to us – permitting us to continue to make our own way even if that may mean our own demise. ❑

## *Transcendence, the next levels – a comment*

Most discussion about transcendence concerns itself with capital 'T' transcendence; this book has deliberately used the term transcendence (small t) to underscore the magic of our everyday capacities to climb out of the contexts we are in to something more general, more revealing and more rewarding. While this book does not intend to address God or her existence, I would like to conclude with a comment on where I stand in relation to the ultimate transcendence since it is revealing of the wider context we have been striving to develop.

The idea of a greater being in the wholeness (GAIA?) we recognise and of which we are self-distinguishing parts, appeals to me. I do not presume to know what this means in any final sense and I am sceptical of all attempts to reveal it while appreciating the reasons that such attempts are made, adhered to and even foisted on 'unbelievers'. Social scientists have been at pains to reveal the power plays that underwrote religions, and for my part, I am pleased to see these give way to the more open representative democracies that allow a place for books such as this one to receive whatever critical comment it is able to attract without it being found to be doctrinally outside socially accepted terms of reference.

Extra-intellectual ways of appreciating nature in general, and perhaps that wholeness, are certainly worth experimenting with. Spiritual traditions have all focused on these and it's not difficult to see why. However, again, the knot of political manipulation is something that I am grateful not to have succumbed to. These ways, most notably meditation, allow one (again) to climb into other ways of appreciating our world and ourselves, enabling heightened sensitivity. In living with the many complications my disease has led me through, such heightened sensitivity to my own body and the ways I had - and now have - to appreciate it has, in the most direct way, enabled me to live longer and more relaxedly with it. It has also enabled me to more easily identify with the ways others approach the same conditions and to offer them a modicum of liberation.

The works of Ken Wilber are notable for the comprehensiveness with which he deals with these matters. Since I have learned much from him and find it easy to subscribe to the approach to knowing about these matters that he has developed, I recommend readers to him for more (see the list of related writings). ❑

## *Learning about learning and the line beneath the triple bottom lines: social and epistemological context*

In *The Evolution of Cooperation* and *Trust: The Social Virtues and the Creation of Prosperity*, political scientists Axelrod and Fukuyama have shown quite convincingly how people are able to climb out of the restrictions of their individuality while in no way compromising it, rather! Bateson, and many others before and since, have all sought to illustrate how learning to learn, or learning the principles of learning, is liberating. Peter Senge (*The Fifth Discipline*) built an illustrious career as a business advisor upon it.

Typically, for things that arose from the environmental movement and in common with Garrett Hardin's 'Tragedy of the Commons', the triple bottom line accounting structure has ignored the existence of the line that enables all the rest: social and epistemological context. This book has attempted to show how liberating and therefore useful it is to recognise it. ■

Endnotes

1 Two quotes illustrate this well:

- *If the only tool you have is a hammer, every problem you encounter looks like a nail* (Mark Twain (date unknown)).
- *If humanistic science may be said to have any goals beyond sheer fascination with the human mystery and enjoyment of it, these would be to release the person from external controls and to make him less predictable to the observer…* (Abraham Maslow, 1966).

2 As fate had it, this little piece was inadvertently submitted for review by a journal editor. The reviews screamed, as it were, *how can he say such things…*?

3 We are, after all, not 'human beings' but human becomings.

4 By texts we mean

5 More, in common with the authors of Genesis, Hardin accepted without recognising that he had done so, the notion of a commons as *our* (*i.e. humans'*) inheritance, to do with as we please. He simply assumes this, arrogating non-private property to our will – actually without arrogance, only ignorance – because it would not have arisen with him to question the permission we might ask to 'graze a commons'.

6 It is interesting to note that while childcare is, in the main, provided by the formal infrastructures mentioned, extensive networks have sprung up to provide informal child-care among such groups as gentrified upper-middle class inner suburbanites. It is interesting to note that these groups are fine examples of the return of community (if quite select 'community', i.e. they are in a sense 'gated'), but may well operate without the formal assurances that go with the commercial and local government operations (see for example, the works of Ulrich Beck on 'risk society', in 'Related Works').

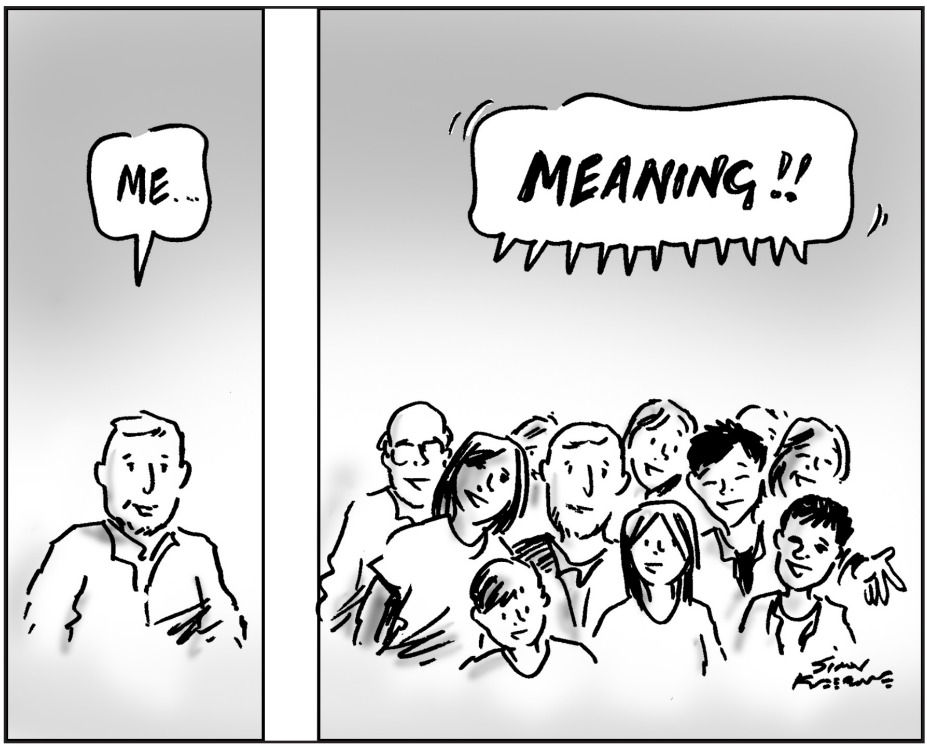
7 It is worth noting that members of the motorists' emergency breakdown service may now request a similar service when they breakdown as cyclists; i.e. the automobile clubs have found it in their interests to extend their breakdown services to their members rather than to their members' cars! Indeed, urban cyclists without cars may now draw on the same service for a small fee ($A15 in 2006). In a sense this co-opts the cyclist into the motorists' world confirming the adjunct status of the bicycle to the DODO. The bicycle is a kind of 'lifeboat' to the DODO, NOT a vehicle in its own right. In a planetary sense the legitimacy of this metaphor is more than sustained, it is profound!

8 With science, which strives to concern itself exclusively with syntax (the order of the Universe), the semantics is suppressed…

9 It is interesting and optimistic to note that while we are spawning huge numbers of new formalisms (legal, economic, normative (e.g. standards) etc.) to deal explicitly with our new concerns (environment, health, equity… ) part of the transformation is to metalaw that subsumes detailed regulation while another is to the atrophying and even extinction of old, detailed controls (cf. the control of spitting). This is very much a process of social maturing.

10 'SETI: A Very Terrestial Pursuit', *Australian Sky and Telescope*, 2006 Jan/Feb, p.97.

# RELATED WRITING



*G. Bateson 1979, Mind and Nature. A Necessary Unity, Dutton, New York.*

In this book, which follows from his earlier collection of essays *Steps to an Ecology of Mind*, Gregory Bateson distinguishes a 'pattern of patterns' in thought and evolution to demonstrate that these two great processes are part of one whole, which he calls mind. This is a system which exists in relationships rather than individual entities. Mind transcends the individual self to incorporate all of nature. Bateson was a scientist with specialties in anthropology and biology, and his book follows sometimes difficult but painstaking scientific reasoning.

*M. Hillman 2004, How We Can Save the World, Penguin, London.*

Mayer Hillman uses a systemic approach to analyse the greenhouse effect and propose radical social solutions. This is social constructivist thinking applied comprehensively to a pressing and complex problem.

*C.S. Lewis 1996 (1944), The Abolition of Man, Touchstone, New York.*

This succinct and passionate book by the Christian author is an argument against scientism – the reduction of value to objectivity – and in praise of a higher reason, what Lewis calls 'the Tao' as a way of identifying the core of both Eastern and Western conceptions of moral truth. In relation to nature, his central proposition is that, in trying to manipulate or coerce nature, we merely manipulate and coerce ourselves.

*H.R. Maturana and F.J. Varela 1987, The Tree of Knowledge, Shambhala, Boston.*

This book describes in biological terms how we know and construct the world. The authors assert that the world is brought forth through the mutual adaptation of living beings. Therefore, the central facet of life is co-operation or love. The explanations of Maturana and Varela are critical to an understanding of the social construction of reality, and this book is engaging and accessible for a general readership.

*M. Thompson, M. Warburton and T. Hatley 1986, Uncertainty on a Himalayan Scale, Milton Ash Editions/Ethnographica, London*

This is essential reading for complex decision-making. The practical approach described here to tackle the problem of deforestation in the Himalayas demonstrates both the effectiveness and beauty of using systems thinking to analyse difficult problems, and the devastating consequences of ignoring such thinking.

*WILBER, Ken, 2000, A Theory of Everything, Shambhala, Boston.*

Unpacks the epistemologies behind thinking and behind thinking about thinking (ontology). It is the most compact presentation of Wilber's thirty plus years of work and personal experience. I am grateful to Prof. Richard Slaughter, the British/Australian futures' thinker who introduced his work to me some 15 years ago.

*WILDEN, Anthony, 1980, System and Structure: Essays in Communication & Exchange, 2nd ed., Tavistock, London; and*

*1987, The Rules are no Game: The Strategy of Communication, RKP, London.*

Both books by Wilden look at the social construction of communications from a systems perspective. Fairly heavy going but rewarding.

# REFERENCES

Albury, R. 1983, *The Politics of Objectivity*, Deakin University Press, Geelong.

Appleyard, D., K. Lynch & J.R. Myer 1964, *The View from the Road*. MIT Press, Cambridge, Massachusetts.

Axelrod, R. 1984, *The Evolution of Co-operation*, Basic, New York.

Barnes, B. 1984, 'Models and Revolutions. The Man Who Shattered the Myth of Rationalism', *Australian Society*, March 1984, pp.16-18.

Barnes, B.& Edge D. (eds) 1982, *Science in Context*, Open University Press, Milton Keynes.

Barrett, W. 1986, *Death of the Soul: From Descartes to the Computer*, Anchor Press/ Doubleday, Garden City, New York.

Bateson, G. 1973, *Steps to an Ecology of Mind*, Bantam, New York.

Bateson, G. 1979, *Mind and Nature. A Necessary Unity*, Dutton, New York.

Baudrillard, J. 1970, *La Societe de Consommation*, Gallimard, Paris.

Beder, S. 1997, *Global Spin*, Green Books, Devon, UK.

Beer, S. 1980, 'Preface' in *Autopoiesis and Cognition: The Realization of the Living*, H. Maturana & F. Varela, Reidel, Dordrecht.

Berger, P. & T. Luckman 1967, *The Social Construction of Reality*, Penguin, Harmondsworth, Middlesex.

Berman, M. 1982, *The Re-enchantment of the World*, Bantam, New York.

Berry, W. 1983, *Standing By Words*, North Point Press, San Francisco.

Bertalanffy, L. von. 1968, *General System Theory*, Braziller, New York.

Bohm, D. 1980, *Wholeness and the Implicate Order*, Cambridge University Press, Cambridge.

Bolton, G. 1981, *Spoils and Spoilers*, Allen and Unwin, Sydney.

Bookchin, M. 1982, *The Ecology of Freedom: The Emergence and Dissolution of Hierarchy*, Cheshire, Palo Alto, California.

Bookchin, M. 1985, 'Toward a Philosophy of Nature, the Bases for an Ecological Ethics', *Deep Ecology*, eds. M. Tobias, Avant, San Diego.

Borgmann, A. 1984, *Technology and the Character of Contemporary Life*, University of Chicago Press, Chicago.

Borgstrom, G. 1972, *Too Many: An Ecological Overview of Earth's Limitations*, Macmillan, N.Y.

Boulding, K. 1961, *The Image*, University of Michigan Press, Ann Arbor, Michigan.

Boulding, K. 1985, *The World as a Total System*, Sage, Beverly Hills, California.

Brooks, F. Jr. 1975, *The Mythial Man-Month: Essays in Software Engineering*, Addison-Wesley, Reading, Massachusetts.

Caldecott, L. & Leland, S. 1983, *Reclaim the Earth, Women Speak Out for Life on Earth*, Women's Press, London.

Capra, F. 1977, *The Tao of Physics*, Bantam, New York.

Capra, F. 1997, *The Web of Life: A New Synthesis of Mind and Matter*, Anchor Books/Random House, New York.

Carr, M. 1985, *The A T Reader*, Intermediate Technology Publications, Longmead, Shaftsbury.

Cheney, J. 1987, 'Ecofeminism and Deep Ecology', *Environmental Ethics*, vol.9 (Summer), pp.115-45.

Clark, E. T. Jr. 'Believing is Seeing -Not the Reverse', *The Quest*, Autumn, 1988, pp. 49-57.

Club of Rome 1974, *Limits to Growth*, Pan, London.

Club of Rome 1975, *Mankind at the Turning Point*, Hutchinson, London.

Collingwood Community Health Centre 1985, 'Comment on EES by SECV; Proposed 220 kV Transmission Line Brunswick – Richmond', *Letter to Victorian Ministry for Planning and Environment*, Collingwood Community Health Centre, Collingwood.

Collins, P. 1995, *God's Earth. Religion as if Matter Really Mattered*, Harper Collins, Sydney.

Collins, H. & Pinch T. 1998, *The Golem: What You Should Know about Science*, Cambridge University Press, Cambridge.

Crump, T. 1981, *The Phenomenon of Money*, Routledge and Kegan Paul, New York.

Daly, M. 1979, *Gyn/Ecology: The Metaethics of Radical Feminism*, Women's Press, London.

Davis, P. & Hersh, R. 1986, *Descartes' Dream. The World According to Mathematics*, Harvester Press, Hassocks, Suffolk.

Davison, G. 1993, *The Unforgiving Minute: How Australia Learned to Tell the Time*, Oxford University Press, Melbourne.

Departments of Agriculture and Health (Victoria) 1984, *Making Healthy Choices Easy Choices: Towards a Food and Nutrition Policy for Victoria*, Victorian Government, Melbourne.

Descartes, R. 1975 (1637), *A Discourse on Method*, Everyman's Library (Dent), London.

Devall, W. 1988, *Simple in Means, Rich in Ends: Practising Deep Ecology*, Peregrine Smith Publishing, Salt Lake City, Utah.

Devall, W. & Sessions G. 1985, *Deep Ecology, Living as if Nature Mattered*, Peregrine Smith, Salt Lake City, Utah.

Doland, A. 2000, 'Bluetooth Gives French Army a Major Headache', *The Australian*, 27 June, p.55.

Douglas, M. 1990, *How Institutions Think*, Routledge and Kegan Paul, New York.

Drengson, A.R. 1983, *Shifting Paradigms: From Technocrat to Planetary Person*, LightStar Press, Victoria, British Columbia.

Drengsen, A.R. 1984, 'The sacred and the limits of the technological fix', *Zygon*, vol.19, no.3, pp. 259-275.

Dreyfus, H. 1979, *What Computers Can't Do* (revised edn.), Harper and Row, New York.

Dreyfus, H. & Dreyfus, S. 1986, *Mind Over Machine*, Free Press, New York.

Dumont, R. & Cohen N. 1980, *The Growth of Hunger. A New Politics of Agriculture*, Boyars, London.

Durkheim, E. 1951 (1897), *Suicide: A Study in Sociology*, trans. by J.A. Spaulding & G. Simpson, The Free Press of Glenco, New York.

Elliott, D. 2003, *Energy, Society and Environment*, 2nd edn., Routledge, London.

Ellul, J. 1964, *The Technological Society*, Knopf Publishing, New York.

Ellul, J. 1980, *The Technological System*, Continuum Publishing, New York.

Etzioni-Halevy, E. 1985, *The Knowledge Elite and the Failure of Prophecy*, Allen & Unwin, Boston.

Evans, C. 1980, *The Mighty Micro*, Coronet, London.

Evernden, N. 1985, *The Natural Alien*, University of Toronto Press, Toronto.

Ewen, S. 1996, *PR!*, Basic, New York.

Farb, P. & Armelagos, G. 1980, *Consuming Passions: the Anthropology of Eating*, Houghton Mifflin, New York.

Fensham, P., R. Gunstone & White, R. 1988, *The Content of Science: A Constructivist Approach to its Teaching and Learning*, Falmer, London.

Foerster, H. von 1984, 'On Constructing Reality' in *The Invented Reality*, F. Watzlawick, W.W Norton and Co., New York.

Frankel, V. 1963, *Mankind's Search for Meaning*, Pocket Books, New York.
Fromm, E. 1968, *The Revolution of Hope*, Bantam, New York.
Fromm, E. 1976, *To Have or to Be*, Abacus Press, Tunbridge Wells, Kent.
Gerver, E. 1986, *Humanising Technology, Computers in Community Use and Adult Education,* Plenum, New York.
Glasersfeld, E. von 1984, 'An Introduction to Radical Constructivism' in *The Invented Reality*, P. Watzlawick, W.W. Norton and Co., New York.
Goffman, I. 1971, *The Presentation of Self in Everyday Life*, Penguin, Harmondsworth, Middlesx.
Grimshaw, J. 1986, *Philosophy and Feminist Thinking*, University of Minnesota Press, Minneapolis, Minnesota.
Gross, P. & Levitt N. 1994, *Higher Superstition: The Academic Left and Its Quarrels with Science*, Johns Hopkins University.
Habermas, J. 1979, *Communication and the Evolution of Society*, Beacon Press, Boston, Mass.
Hanson, F.A. 1993, *Testing Testing: Social Consequences of the Examined Life*, University of California, Berkeley.
Harris, E. 1988, *The Reality of Time*, State University of New York, New York.
Heidegger, M. 1977, *The Question Concerning Technology*, Harper and Row, New York.
Heisenberg, W. 1958, *Physics and Philosophy*, Harper and Row, New York.
Heisenberg, W. 1971, *Physics and Beyond*, Harper and Row, New York.
Heller, J. 1961, *Catch 22*, Corgi, London.
Hirsch, F. 1977, *Social Limits to Growth*, Routledge and Kegan Paul, London.
Huxley, A. 1955, *Brave New World,* Penguin, Harmondsworth, Middlesex.
Ihde, D. 1983, *Existential Technics*, State University of New York Press, Albany, New York.
Illich, I. 1971, *Deschooling Society*, Harper and Row, New York.
Illich, I. 1973, *Tools for Conviviality*, Harper and Row, New York.
Illich, I. 1974, *Energy and Equity*, Boyars, London.
Illich, I. 1977, *Towards a History of Needs*, Bantam, New York.
Illich, I. 1981, *Shadow Work*, Boyars, London.
Jacobs, J. 1965, *The Death and Life of Great American Cities*, Penguin, Harmondsworth, Middlx.
Jantsch, E. 1980, *The Self-Organizing Universe*, Pergamon Press, New York.
Jonas, H. 1984, *The Imperative of Responsibility*, University of Chicago Press, Chicago.
Jung, C. 1958, *The Undiscovered Self*, Routledge and Kegan Paul, London.
Keller, E. 1985, *Reflections on Gender and Science*, Yale University Press, New Haven, Connect.
Klein, N. 2000, *No Logo*, Picador, New York.
Knight, E.W. & Scott. A.J. 1980, *Square Pegs Square Holes: Employing the Handicapped*, David Syme, Melbourne.
Kuhn, T.S. 1970. *The Structure of Scientific Revolutions*, 2nd edn., University of Chicago Press, Chicago.
Labonte, R. 1997, *Power, Participation and Partnerships for Health Promotion*, VicHealth, Carlton.
Laing R.D. 1982, *The Voice of Experience*, Allen Lane/Penguin, London.
Lakhoff, G. & Johnson, M. 1980, *Metaphors We live By*, Chicago University Press, Chicago.
Lasch, C. 1980, *The Culture of Narcissism*, Abacus, London.
Leakey, R. & Lewin, R. 1995, *The Sixth Extinction*, Doubleday, New York.

Lefebvre, H. 1991, *The Production of Space*, Blackwell, Oxford.

Le Guin, U. 1976, *The Dispossessed*, Panther, London.

Le Guin, U. 1986, *Always Coming Home*, Bantam, New York.

Leiss, W. 1978, *The Limits to Satisfaction*, Boyars, London.

Leopold, A. 1949, *A Sand County Almanac*, Oxford University Press, Oxford.

Levins, R. & Lewontin R. 1985, *The Dialectical Biologist*, Harvard University Press, Massachus.

Lewis, C.S. 1996, (1944), *The Abolition of Man*, Touchstone, New York.

Lilienfeld, R. 1978, *The Rise of Systems Theory*, John Wiley and Sons, New York.

Lipman, M. & Sharp, A.M., eds. 1978, *Growing Up with Philosophy,* Temple University Press, Philadelphia.

Livingston, J. 1981, *The Fallacy of Wildlife Conservation*, McLelland & Stewart Pubs, Toronto.

Lonnroth, M., Steen, P. & Johansson T.B. 1980, *Energy in Transition: A Report on Energy Policy and Future Options*, University of California, Berkeley.

Lovelock, J. 1979, *GAIA: A New Look at Life on Earth*, Oxford University Press, Oxford.

Lovins, A. 1977, *Soft Energy Paths: Toward A Durable Peace*, Penguin, London.

Lovins, A.& Price, J. 1975, *Non-Nuclear Futures: The Case for an Ethical Energy Strategy,* Friends of the Earth, San Francisco.

Macy, J. 1983, *Despair and Personal Power in the Nuclear Age*, New Society, Philadelphia.

Macy, J. 1991, *Mutual Causality in Buddhism and General Systems Theory: The Dharma of Natural Systems*, State University of New York Press, Albany, New York

Marmot, M. 2005, *The Status Syndrome: How Social Standing Affects Our Health and Longevity,* Times Books, London.

Maslow, A.H. 1966, *The Psychology of Science*, Harper and Row, New York.

Mathis, J.C. & Gray D.H. 1975, 'The Engineer as Social Radical', *The Ecologist*, vol.5, no.4, pp.119-125.

Maturana, H.R. 1978, 'Biology of Language: The Epistemology of Reality' in *Psychology and Biology of Language and Thought*, eds. G. Miller and Lenneberg, Academic Press, N. Y.

Maturana, H.R., 1985 'The mind is not in the head', *Journal of Social and Biological Structures*, vol.8 no.4, pp. 308-311.

Maturana, H.R. 1988, Ontology of Observing: The Biological Foundations of Self-Consciousness and The Physical Domain of Existence, unpublished paper.

Maturana, H.R. & Varela, F.J. 1980, *Autopoeisis and Cognition. Realisation of the Living*, Reidel, Boston.

Maturana, H.R. &. Varela, F.J. 1987, *The Tree of Knowledge. The Biological Roots of Human Understanding*, Shambhala, Boston.

McLuhan, M. 1964, *Understanding Media*. McGraw Hill, New York.

Meadows, D. H, Meadows D.L., Randers J. & Behrans W. III 1972, *The Limits to Growth*, Pan, London.

Meadows, D. H., Richardson J. & Bruckman, G. 1982, *Groping in the Dark: The First Decade of Global Modelling*, John Wiley and Sons, New York.

Melkman, R. 1988, The Construction of Objectivity: A New Look at the Child's First Month of Life, Karger, Basel.

Merchant, C. 1983, *The Death of Nature. Women, Ecology and the Scientific Revolution*, Harper and Row, New York.

Miller, J.G. 1978, *Living Systems*, McGraw Hill, New York.

Miller, S. 1986, 'Millions Wasted in Schools from 'Sheer Unadulterated Fear', *The Australian,* 12 Feb., p. 26.

Ministry of Fuel and Power, Victoria 1977, *Green Paper: Energy*, Victorian Government, Melbourne.

Moore Lappe, F. 1982, *Diet for a Small Planet*, Ballantine, New York.

Morin, E. 1977, *La Methode*, *vol.1: La Nature de la Nature*, Seuil, Paris.

Mulkay, M. 1979, *Science and the Sociology of Knowledge*, Allen and Unwin, London.

Mumford, L. 1967 and 1970, *The Myth of the Machine,* vols. 1 & 2, Harvest/Harcourt Brace Jovanovich, New York.

Nader, L. 1981, 'Energy and Equity. "Magic, Science and Religion" Revisited', *Proceedings, 51st. ANZAAS Congress*, Brisbane, May 11, p. 28.

Naess, A. 1974, *Oekologi, Samfunn og Livsstl* (Ecology, Community and Lifestyle), Universitetsforlaget, Oslo.

Naess, A. 1985, 'Identification as a Source of Deep Ecological Attitudes' in, *Deep Ecology*, ed. M. Tobias , Avant Books, San Diego, California.

Naess, A. & Sessions, G. 1984, 'The Deep Ecology Platform of Naess, Devall and Sessions' (also called 'Basic Principles of Deep Ecology') in 1985, *Deep Ecology, Living as if Nature Mattered*, W. Devall & G. Sessions, Peregrine Smith, Salt Lake City, Utah.

Nelkin, D. 1989, *Dangerous Diagnostics: the Social Power of Biological Information*, Basic, N.Y.

Nelkin, D. & Tancredi, L. 1989, *Dangerous Diagnostics: The Social Power of Biological Information*, Basic, New York.

Olson, D.R. 1976, 'Culture, Technology and Intellect' in *The Nature of Intelligence*, eds. L.B. Resnick, Lawrence Erlbaum and Associates, Hillsdale, New Jersey, pp. 189-202.

Open Systems Group 1981, *Systems Behaviour*, 3rd edn., Harper and Row, London.

Piaget, J. 1959, *The Social Construction of Reality in the Child*, Basic, New York.

Pinch, T. 1993, ' "Testing -One, Two, Three… Testing!" Toward a Sociology of Testing', *Science, Technology and Human Values*, vol.18, no.1, pp. 25-41.

Pirsig, R. 1974, *Zen and the Art of Motorcycle Maintenance*, Bodley Head, London.

Planck, M. 1932, *Where is Science Going?*, W.W. Norton and Co., New York.

Planck, M. 1936, *The Philosophy of Physics*, Allen and Unwin, London.

Polanyi, M. 1958, *Personal Knowledge*, Routledge and Kegan Paul, London.

Polanyi, M. 1969, 'Knowing and Being', in *Knowing and Being, Essays,* ed. M. Grene, *by M. Polanyi*, University of Chicago Press, Chicago.

Polanyi, M. & Prosch, J. 1975, *Meaning*, University of Chicago Press, Chicago.

Postman, N. 1987, *Amusing Ourselves to Death*, Methuen, London.

Prigogine, I. & Stengers I. 1984, *Order Out of Chaos. Man's New Dialogue With Nature*, Bantam, N. Y.

Rafoth, B. & Rubin, D. 1988, *The Social Construction of Written Communication*, Ablex, Norwood, New Jersey.

Rittel, H. 1982, 'Systems Analysis of the "First and Second Generations" in *Human Energy Factors in Urban Planning*, eds. P. Laconte, J.E. Gibson, & A. Rapoport, NATO Advanced Study Institute, Series D, BSS, no.12, Nijhoff, pp. 35-63.

Roberts, A. 1979, *The Self-Managing Environment*, Allison and Busby, London.

Rogers, C. 1980, *A Way of Being*. Boston, Houghton Mifflin, Boston.

Roszak, T. 1986, *The Cult of Information*, Pantheon, New York.

Rothschild, J., ed. 1983, *Machina Ex Dea*, Oxford University Press, New York.

Sacks, O. 1986, *The Man Who Mistook his Wife for a Hat*, Picador, London.

Sacks, O. 1989, *Seeing Voices. A Journey into the World of the Deaf*, Picador, London.

Salner, M. 1986, 'Adult Cognitive and Epistemological Development in Systems Education', *Systems Research,* vol.3, no.4, pp. 225-32.

Sandall, R. 1995, 'Science and Superstition', *Engineering World*, June, pp. 18-22.

Scarry, E. 1998, *The Body in Pain: The Making and Unmaking of the World*, Oxford Uni Press, N.Y.

Schrodinger, E. 1958, *Mind and Matter*, Cambridge University Press, Cambridge.

Schrodinger, E. 1992, *What is Life? The Physical Aspects of the Living Cell;* with, *Mind and Matter*; and *Autobiographical Sketches*, Cambridge University Press, New York.

Schumacher, E. 1973, *Small is Beautiful*, Abacus Press, Tunbridge Wells, Kent.

Shumacher, E. 1978, *A Guide for the Perplexed*, Harper and Row, New York.

Scitovsky, T. 1976, *The Joyless Economy*, Oxford University Press, Oxford.

Searle, J. 1984, *Minds, Brains and Science*, British Broadcasting Commission, London.

Searle 1999, Mind, Language and Society. Doing Philosophy in the Real World, Basic, New York.

Sennett, R. 1971, *The Uses of Disorder*, Vintage Books, New York.

Sennett, R. 1974, *The Fall of Public Man*, Cambridge University Press, Cambridge.

Sheldrake, R. 1981, *A New Science of Life. The Hypothesis of Formative Causation*, Paladin, Lon.

Shepard, P. 1982, *Nature and Madness*, Sierra Club, San Francisco.

Singer, P. 1975, *Animal Liberation*, Random House, New York.

Skinner, B. 1971, *Beyond Freedom and Dignity*, Penguin, Harmondsworth, Middlesex.

Slater, P. 1971, *In Pursuit of Loneliness*, Penguin, Harmondsworth, Middlesex.

Slaughter, R. 1988, *Recovering the Future*, Graduate School of Environmental Science, Monash University, Clayton, Victoria.

Snow, C.P. 1959, *The Two Cultures*, Cambridge University Press, Cambridge.

Snyder, G. 1983, *Axe Handles*, North Point Press, San Francisco.

Society for General Systems Research 1956-83, *General Systems*, vols. I-XXVIII.

Spradlin, W.W. & Porterfield P. 1984, *The Search for Certainty*, Springer, New York.

Stanley, M. 1978, *The Technological Conscience*, University of Chicago Press, Chicago.

State Electricity Commission of Victoria 1985, *Environment Effects Statement, Proposed 220 kV Transmission Line, Brunswick to Richmond*, Parts A and B, Vic. Government, Melbourne.

Stauber, J. & Rampton, S. 2001, *Trust Us We're Experts*, Tarcher/Putnam, New York.

Stone, C. 1974, *Should Trees Have Standing? Towards Legal Rights for Natural Objects*, Kaufmann, Los Altos, California.

Stone, C. 1988, *Earth and Other Ethics. A Case for Moral Pluralism*, Harper and Row, New York.

Suzuki, D. & Knudsen, P. 1988, *Genethics*, Stoddart, Don Mills, Ontario.

Thompson, M., Warburton M. & Hatley, T. 1986, *Uncertainty on a Himalayan Scale. An Institutional Theory of Environmental Perception and a Strategic Framework for the Sustainable Development of the Himalaya*, Ethnographica, London.

Tuan, Yi-Fu 1974, *Topophilia: A Study of Environmental Perception, Attitudes and Values,* Prentice Hall, Englewood Cliffs, New Jersey.

Tufts University 1990, *Report and Declaration of the University Presidents' Conference*, Tufts University, European Centre, Talloires, France.

Turbayne, C. 1971, *The Myth of Metaphor*, revised edition., Uni of South Carolina, Columbia.

Turner, F. 1984, 'Escape from Modernism: Technology and the Future of the Imagination', *Harper's*, November, pp. 47-55.

Vanderburg, W. 1985, 'Technology, Society and Culture. A Framework for Understanding', *Technology in Society*, vol. 7, pp. 411-422.

Van Matre, S. 1983, *The Earth Speaks: An Acclimatisation Journal*, Acclimatisation Experiences Institute, Warrenville, Illinois.

Veblen, T. 1994 (1899), *The Theory of the Leisure Class,* Penguin, New York.

Vickers, G. 1983, 'Human Systems are Different', *Journal of Applied Systems Analysis*, vol. 10, pp.3-13.

Waddington, C. 1977, *Tools for Thought*, Paladin, London.

Watts, A. 1951, *The Wisdom of Insecurity*, Vintage, New York.

Watzlawick, P. 1984, *The Invented Reality: How Do We Know What We Believe We Know?*, Norton, New York.

Weber, M. 1930, *Protestant Ethics and the Spirit of Capitalism*, Allen and Unwin, London.

Weizenbaum, J. 1976, *Computer Power and Human Reason: From Judgement to Calculation*, W.H. Freeman and Company, San Francisco.

Wernick, R. 1987, 'Where there's fire there is smoke – and usually a chimney,' *Smithsonian*, vol. 18, no. 6, pp. 140-152.

White, L. Jr. 1968, *Machina Ex. Deo*, MIT Press, Cambridge, Massachusetts.

White, D., Sutton, P., Pears, A., Mardon, C., Dick J. & Crow, M. 1978, *Seeds for Change: Creatively Confronting the Energy Crisis*, Conservatn Council Victoria/Patchwork Press, Melbourne.

Whitehead, A.N. 1985, (1926), *Science and the Modern World*, Free Association Books, London.

Wilber, K. 1983, *Eye to Eye: The Quest for the New Paradigm*, Anchor Press/Doubleday, Garden City, New York.

Wilber, K. 2000, *A Theory of Everything: An Integral Vision for Business, Politics, Science and Spirituality*, Shambhala, Boston.

Wilden, A. 1980, *System and Structure. Essays in Communication and Exchange*, 2nd edn., Tavistock, London.

Wilden, A 1987, *The Rules Are No Game: The Strategy of Communication*, Routledge and Kegan Paul, London.

Williams, H. 1991, *Autogeddon,* Jonathan Cape, London.

Winner, L. 1976, *Autonomous Technology*, M.I.T. Press, Cambridge, Massachusetts.

Winner, L. 1986, *The Whale and the Reactor*, University of Chicago Press, Chicago.

Winograd, T. & Flores F. 1986, *Understanding Computers and Cognition*, Addison-Wesley, Reading, Massachusetts.

Worster, D. 1977, *Nature's Economy*, Cambridge University Press, Cambridge.

Yoxen, W. 1983, *The Gene Business: Who Should Control Biotechnology?*, Pan, London.

# PUBLICATIONS & COMMITTEES

## Monographs

2006, *Response Ability: Environment, Health and Everyday Transcendence*, Vista Publications (in press).

1999, Krouskos, D. et al., *Community Participation in Community Health*, Dept. of Human Services (Vic) (~40pp).

1995, Macdonald, F., Fisher, F., Holmes, D. & Girardi, G., *'Wising Up to Weight'. A Waste Minimisation Scheme for the City of Melbourne. A Research & Development Program,* G.S.E.S., Monash Uni., Clayton (80pp).

1990, Pleteshner, C. & Fisher, F., *The Periodicals Access Network. A Directory of Overseas Periodicals Held by Environmentally & Socially Concerned Organisations & Individuals in the Melbourne Metropolitan Area,* Nat. Centre for Research & Development in Australian Studies, Monash Uni., Clayton (58pp).

1989, (Ed.), *Tutorial Papers in Science & Systems Theory (1988), G.S.E.S.,* Monash Uni., Clayton, (60pp).

1987, (Ed.), *Sustaining GAIA. Contributions to Another World View,* G.S.E.S., Monash Uni., Clayton, (237pp).

1982, (Ed.), *Concerning Environment: A Book of Environmental Communi-cations,* G.S.E.S., Monash Uni., Clayton, (138pp).

## Edited Research Reports

## *all published by G.S.E.S., Monash University - series discontinued 1990*

1989, *Renewable Energy Sources & Appropriate Technologies: A Case Study of a Small Island Nation* [E R. 32].

1986, *Occupational Cancer. A Worker's Guide to Chemicals and Cancer Risks in the Workplace* [published in collaboration with the A.C.T.U./V.T.H.C. Occupational Health & Safety Unit with a grant from Workcare].

1983, *Management of Arboreal Species in the Wombat State Forest* [E.R. 16].

1983, *Vietnamese Settlement in Springvale* [E.R. 14].

1982, *Nutrition in Sec. Schools. Student Awareness and Teacher Training in Melbourne* [E.R. 10].

1981, *Transport Energy Conservatn: Some Options for Australian Cargo Transport* [E.R. 7].

1981, *Environmental Education. Tertiary & Secondary Aspects* [E.R. 4].

1980, *Mt. Stirling - Another Alpine Resort* [E.R. 2].

## Monograph Chapters

2006, 'CYCLE IN: Making the "Bike-Rail" Connection. Uncovering Melb's best kept secret', in D. Carpenter, & W. Filho, *Sustainability in the Aust. Tertiary Sector* (in press).

2006, 'Environmental Science' in *Nelson Junior [Year 10] Science Teacher Manual*, Nelson Aust. (forthcoming).

2006, 'The Genius of the Chronically Ill' in *Chronic Illness* [working title, forthcoming], ed. E. Corcoran.

2005, 'Environmental Science' in *Nelson Junior [Year 10] Science*, Nelson, Aust.

2000, 'Environmental Science as a Social Science' in *Reader's Guide to the Social Sciences,* ed. J. Michie, vol. 1, Fitzroy Dearborn, London, pp. 487-490.

1996, 'Transdisciplinary Teaching: Overcoming the Inevitable Dislocation in Applying Science Without Regard to its Context' in *Social Agency. Dilemmas & Education Praxiology.*

*The Internation al Annual of Practical Philosophy and Methodology,* eds W. Gasparski et al., vol. 4, pp.157-176.

1995, 'From Being Precious to Precious Being' in *Cappuccino Papers #1, Imagine the Future* (Australian Conservation Foundation), ed. J.Lee, Fitzroy, pp. 61-65.

1994, 'The Social Construction of Design: A More Comprehensive Path to Waste Minimi-sation' in *E.MI.A.A. Yearbook: 1994,* ed. J. Cole, E.M.I.A.A., Brisbane, pp. 6-98.

1987, Salleh, A.K. & Fisher, F.G., 'Difference - The Importance of Other Ways of Being' in *Sustaining GAIA,* ed. F.G. Fisher, G.S.E.S., Monash Uni., Clayton, pp. 77-86.

1986, 'Technology as World View: Towards an Emancipatory Technology' in *Technology & Social Responsibility,* eds R.Badham & C. Creevey, S.S.R.E./C.T.S.C., Wollongong Uni., Wollongong, pp. 19-23.

1982, 'The Individual Response' in *Quarry Australia? Social and Environmental Perspectives on Managing the Nation's Resources,* eds R.Birrell, D.J. Hill & J. Stanley, Oxford U.P., Melbourne, pp. 296-309.

1982, 'Reinstating Paradise? - What Can I do?' in *Concerning Environment,* ed. F. G. Fisher, G.S.E.S., Monash Uni.,Clayton, pp. 94-127.

## *Special Issue of Journal [section editor]*

2001, 'Systems Thinking & Practice', Special Feature #2, *A Journal of Environmental Education*, 17, pp.105-134.

## *Reviewed papers*

2006, 'Taking Responsibility for Standards', *A.J.Environmental Management* (draft complete, pending finalisation).

2006, 'From selling Megawatts (brute force) to selling Megabytes (intelligence), A Transformative Overview of the 21st Century Electrical Industry', *Organisation & Environment* (draft complete, pending finalisation).

2006, 'Chronic Illness: organisational superfeat and the bicycle path to health', *BMJ* (draft complete, pending finalisation).

2006, 'Soft Cyclists in Hard Streets', *Internl Journal of Environmental Consumerism* [in review].

2006, 'What I Recognise and Respond to', *Environmental Values*, (draft complete, pending finalisation).

2005, 'Ecoliteracy & Metaresponsibility: Steps to an Ecology of Mind', *Systemic Practice & Action Research*, 18, 2, pp.133-149.

2001, 'Environmental Responsibility Through Social Construct Analysis', Special Issue, *A.J.Environmental Education*, 17, pp. 105-110.

1996, 'The Fourth E: *Educating* for Energy, Environment & Economics', *Trans. Multi-Disciplinary Engineering,* GE20, pp. 19-29.

1995, 'The Fourth E: Educating for Energy, Environment & Economics', *Transactions, Int. Symp. Energy, Environment & Economics,* ed. E.J. Colville, Uni. of Melbourne, Nov. 1995, Research Publications, pp. 117-126.

1993, 'Dissolving the Stranglehold of the Fix: a Role for Social Construction in Dealing With Environmental Dislocation', *Futures,* 25, 10, pp. 1051-1062.

1993, 'Emergence of a Circumspect Society: Introducing Reflexive Institutions', *Futures,* 25, 10, pp. 1077-1082.

1992, Keen, M. & Fisher, F.G., 'Environmental and Outdoor Education: Some Australian Views on

a False Distinction', *World Leisure & Recreation J,* 34, 2, pp. 37-41.

1992, 'A Sound Mind in an Unsound Body: Comment on Social Security's Issues Paper No. 5 on Enabling Policy for the Disabled', *New Doctor.* Accepted pending minor alterations to the title… still not been done!?

1991, 'Non-Violent Technology' *Problemi Di Bioetica,* 13, Ottobre, pp. 21-38.

1991, 'Safe Cycling: Uses of Limited Vulnerability', *Social Educator,* April, pp. 17-26.

1990, 'Bicycling Out of the Greenhouse, A Problem of Substance. On the Social Resolution of Environmental Problems', *The Trumpeter, J. of Ecosophy,* 7/1, pp. 38-44.

1989, Fisher, F.G. & Hoverman, S.J., 'Environmental Science - Strivings Towards a Science of Context', *Int. J. Environ. Ed., & Information,* 8/1, pp. 11-30.

1989, 'Technology and the Loss of Self: An Environmental Concern', *Environments, A Jrnl. of Interdisc. Studies,* 20/2, pp. 1-17.

1988, 'Comment on "Helping" Ethical Professionals', *I.E.E.E. Technology & Society Magazine,* 7, 2, pp. 26.

1987, 'Content Without Context - The Problem With Science. A Review of *A Natural Legacy, Ecology in Aust',* 3rd edn, *Aust Journal of Environmental Education,* vol. 3, pp. 28-29.

1987, 'Bikes and Trains for Low-Cost Commuting', *Town & Country Planning,* 56/6, pp. 185-186.

1986, 'Towards a Food and Nutrition Policy for Australia. An Environmentalist View', *Food Policy,* 11/4, pp.274-278.

1986 'Comment from Outside: Generalised Comment from a Community Health Centre's Criticism of an Environmental Impact Statement for a Large Engineering Development', *Multi-Disciplinary Eng'g Trans.,* GE10/2, pp. 96-99.

1985, Higgs, H.J. (Convenor), Burton, J.R., Fisher, F.G et al., 'Environmental and Social Aspects of Energy Policy', *Energy and Environment Interaction. Selected Contributions to the Energy '83 Conference,* Dept. of Arts, Heritage and Environment, A.G.P.S., Canberra, pp. 7-27.

1985, 'Concerning Concern. Overcoming Despair and the Alienation it Produces', *Australian Journal of Environmental Education,* 1/2, pp. 16-20.

1985, 'Cultural Context in Heritage Conservation', *Heritage Australia: J.A. Council of National Trusts,* 414, pp.34-35.

1985, 'Non-Violent Tools', *Peace Studies,* June, pp. 9-12.

1984, 'Conservation Strategy: Making it Conserve', *Urban Policy and Research*, 2/3, pp. 26-31.

1981, 'The Hidden Majority: The Plight of the Non-Visibly Disabled', *New Doctor,* 21, pp. 37-40.

1980, 'Entropy and Environmental Change - A Qualitative View', *Trans. Institution of Engineers Australia, General Engineering,* GE 4, pp. 33-37.

## *Conference papers*

2004, Najbar-Kaszkiel, A.T. et al., 'Interactive workshops for GPs and Pharmacists at Monash and Central Bayside Divisions of General Practice', *National Medicines Symposium*, Brisbane.

2004, 'EcoLiteracy & Metaresponsibility: "Steps to an Ecology of Mind"', *Program & Conference Abstracts: Effective Sustainability Education Conference*, U.N.S.W., 18-20.02.2004, 82.

2000, 'Transforming Social Structures: The Ultimate Source of Sustainable Energy', *Sustainable Energy Day – 2000*, S.E.A.R.G., Dept. of Elec. & Comp. Syst. Eng., Monash Uni., 12 July, (abstract).

1997, 'Consumer Empowerment: the Legitimate Involvement of the Chronically Ill in their Own Care', *Proc. HIC Nat'l Conf. 1996: Diagnosing Consumer Care for the Future,* Health Issues Centre, Melbourne, pp. 20-25.

1994, 'Liberating Energy: On the Social Construction of Energy', in *Proceedings, Students, Science & Sustainability Conference,* ed. H. Greenham, Uni. of Melbourne, 13-15 July, 1993, S.S.S.C. Organising Collective, Hawker, A.C.T., pp. 93-102.

1993, 'Soft Cyclists in Hard Streets: Through the Social Dynamics of Traffic to Safe Cycling and so, to a Safer World' in *Changing the Climate of Opinion, Greenhouse 91, Community Conference,* ed. P. Clements, Adelaide, 30 Aug–1 Sep., Greenhouse Assn. of S.A., Adel.

1993, 'Public Participation: A People Intensive Activity in a Resource Scarce Age', Workshop Address in *Changing the Climate of Opinio*n, *Greenhouse 91,C'ty Conference,* ed. P. Clements, Adelaide, 30 Aug-1 Sep., Greenhouse Assoc. of S.A., Adelaide.

1993, 'Greenhouse in Perspective' in *Greenhouse & the Energy Regions. Conference Report,* eds S. Pfueller, M.A. Hooper & D.H. Harvey, Monash Uni., Gippsland Centre for Environ'l Sc., Churchill, pp. 15-18.

1991, Witness to 'Genetically Modified Organisms' Subcommittee, Standing Committee on Industry, Science & Technology, House Of Representatives, *Official Hansard Report,* Melbourne, 21.11.1990, Australian Parliament, Canberra, pp. 268-280.

1990, 'Technique and the Illusion of Potency: Towards an Elegant Society' in *Changing Directions. Proc. ECOPOLITICS IV,* 21-24 Sept., Uni. of Adelaide, G.C.E.S., Uni. of Adelaide, pp. 447-459.

1990, 'Toward Community Understanding of "Greenhouse-appropriate" Transport' in *Greenhouse. Towards Sustainable Transport,* ed. P. Clements, Greenhouse Assoc. of South Australia, Adelaide, pp. 20-24.

1990, 'Transdisciplinary Teaching: Overcoming the Inevitable Dislocation in Applying Science Without Regard to its Social Context', *Out of the Crucible Proc.,* ed. A. Reichel, 12-14.12, CHAST, U. Sydney, pp. 65-73.

1989, '"Engineering - Development of a Profession", An Environmental S c ience Initiative in Engineering Education', *Proc. World Conference on Engineering Education,* 13-17 Feb., U. Sydney, I.E.A., Canberra, pp. 86-791.

1988, 'Ways of Knowing & the Ecology of Change: Understanding Non-Tech. Barriers to AT', *Proc. UNESCO Reg'l Sem'rs on Barriers to Change,* eds D. Stewart & D. Mansell, D.,11-14.11.1987, U. Melb., pp. 63-80.

1988, 'The Complexity of Environmental Management, Why Environmental Problems Can't Be Solved', *Proc. Industrial Environmental Engineering Seminar,* May, S.A.E., Melbourne, pp. 1-15.

1988, 'The Appropriation of Technique: Transcending the Red Herring of Conservation', in *Energy Strategies for Aus. & N.Z.: Kicking the Fossil Fuel Habit* [ANZAAS, 1988, U. Sydney], ed. S.White, FOE, Sydney.

1988, 'What is Environmental Improvement? Can Solar Energy… Limit… Environmental Impact?', *Proc. Solar '88:Environ'l Improvement Through Solar Energy,* Nov., 1988, A.N.Z.S.E.S., Melbourne, 4.1-4.10.

1987, 'Environment, Does it Compute?', *Computing & Social Responsibility, Public Symposium,* ed. G. Wrightson, Macquarie Uni., Nth. Ryde, pp. 37-44.

1986, 'Safety With Tools - Part 1: General Issues', *Nat. Bicycle Safety Conf.,* Newcastle, May, DoT, Canberra (2pp).

1986, 'Safety with Tools-Part II: Bicycle Commuting', *Nat. Bicycle Safety Conf.*, as above (2pp).

1986, 'Non-Violent Technologies', *Toward a World of Peace, People Create Alternatives: Proc. First International Conference on Conflict Resolution & Peace Studies,* eds J. Maas et al., U.S.P., Suva, 271.

1985, 'Are Solar Technologies "Appropriate"?', *Proc. Annual Conf. ANZ § ISES, UNSW, 14-15/11,* I.S.E.S., pp. 124-134.

1983, 'Realizing the Slogan: Think Locally Act Globally. One School's Search for Tools to Encourage Holistic Thought & Sustainable Lifestyles', *First Conf. Env't, Ethics & Ecology, 1983,* ANU, Canberra (30pp).

1981, 'The Use of Fuels - Personal and Social Aspects', *National Conference on Fuelfrom Crops - 1981,* S.A.E./A.E.S.A., Melbourne, 19.1-19.7.

1980, 'An Example of Post-graduate Environmental Science Training: the Master of Environmental Science Program at Monash Uni.', *Proc. First National Conference, Australian Association for Environmental Education,* Aust. Assoc. for Environmental Education., Bridgewater (Sth. Australia), pp. 78-87.

1980, 'Household Energy Use and Its Relationship to Socio-Economic Variables', *Petroleum Policies and People,* Austn Institute of Energy, Wahroonga (N.S.W.), pp. 126- 136.

## *Articles*

2006, Radiating Invisibly: a submission to the Senate's EMR inquiry (draft being finalised).

2006, Energy Conservation Mining: Thinking With Context In Mind, *Yes* (in press).

2006, 'Annual transport levy may help to clear some hot air', *THE AGE*, 6 Feb, p. Business 10.

2006, 'SETI: A Very Terrestrial Pursuit', *Australian Sky & Telescope*, Jan/Feb, p. 97.

2005, 'Renewable Energy Realities & the (Mis)Place of Biomass as Autofuel', *Australian Rationalist*, 70, pp. 32-36.

2005, 'The Commuter Car – an Environmental Disaster', *The Independent Australian*, 6, pp.21-22 (reprint).

2005, 'Conservation, Renewable Energy & the Ecology of Energy Transformations', *The Independent Australian*, 5, pp.19-21 (reprint).

2005, 'A bicycle diary', Perspective, *Ride On*, Feb.-Mar., pp. 44.

2004, 'Conservation, Renewable Energy & The Ecology of Energy Transformations', *Chain Reaction*, 91, pp. 31-32 (reprint).

2004, 'Conservation Mining Should Shape Our Lives', *Ethical Investor*, 38, p. 30.

2004, 'Renewable energy misconceptions', *Dissent*, 15, pp. 9-10.

2004, 'Conservation, Renewable Energy & the Ecology of Energy Transformations', *Dissent*, 14, pp. 49-51.

2004, 'Technology Assessment & the TGA', *Australian Health Consumer*, 2, pp. 35-37.

2004, 'Renewable Energy: A Misleading Notion', *STEP Matters*, 122, pp. 3-4 (reprint).

2003/4, 'Renewable Energy: A Misleading Notion', *Engineering World*, 13, 6, pp.10-11 (reprint).

2003, 'The Ecology of Energy Transformations', *Ethical Investor*, 27, p. 34 (reprint).

2003, 'From Being Precious to Precious Being', *Sustainability Network Update – No. 32E* [CSIRO Sustainability Network, Glen Osmond, SA], pp. 11-17 (reprint).

2003, 'The myth of the efficient car', *Sustainability Network Update – No. 31E* [CSIRO Sustainability Network, Glen Osmond, SA], pp. 1-4 (reprint).

2003, 'Renewable energy & the ecology of energy transformations', *Sustainability Network Update*

– *No.30E* [CSIRO Sustainability Network, Glen Osmond, SA], pp. 14-19 (reprint).
2003, 'Renewable energy & the ecology of energy transformations', *Nature & Society*, Aug./Sept., pp. 9-10 (reprint).
2003, 'Being Scared of GM: an Environmental Scientist Responds to a Science Writer', *Eureka Street*, March, pp. 14-15.
2002, 'Tax, not tickets: a public transport vision', *Monash News*, 5, 7, 5.
2002, 'Renewable Energy & the Ecology of Energy Transformations', *Energy News, J.A.I.E.*, 20, 3, pp. 303-4.
2002, 'How to get the public back into the transport system', *THE SUNDAY AGE*, 11 August, p.15.
2002, 'How to get the public back into the transport system', [*In-house mag. RTBU*] (reprint).
2002, 'Widening the Definition of Environment for Responsible Urban Commuters', *Urban Policy Research*, 20, 3, pp. 311-314.
2002, 'DHAC's National Public Toilet Map. Two steps toward liberation', *The Aust. Health Consumer* 1, pp. 31-32.
2001, 'Environmental Responsibility Through Social Construct Analysis: Insights from a Twenty Year Experiment', Special feature #2: 'Systems Thinking & Practice', *A.J.Environmental Education*, 17, pp. 105-110.
2001, 'Behind Privacy Matters', *Health Issues*, 69, pp. 5-6.
2001, 'What I Recognise and Respond to', *Environment Institute of Australia Newsletter*, 35, pp. 10-11.
2001, 'The Coming Water Wars', *Consuming Interest*, 89, pp. 16-17.
2001, 'Electricity from Biomass', *Nature & Society*, April/May, pp. 7-8.
2001, 'The Myth of the Efficient Car', *Nature & Society*, February/March, pp. 6-7 (reprint).
2000, 'Achieving quality of life via social constructs of health and disease', *The Aust. Health Consumer*, 3, pp. 41-42.
2000, 'Facilitating Community Advice by Depowerng the Health Institutions', *Health Issues*, 65, p. 6.
2000, 'Environmental Science for the Third Millenium: Development of a Metascience', *Eingana*, 23, 3, pp. 3-5.
2000, 'An incontinence problem can make long-distance travel a daunting prospect, especially so if it is an overseas jaunt!', *Voice*, 3, 2, pp. 10-11.
2000, 'Planning can reduce problems of incontinence and long-distance travel', *Link*, 9, 4, pp.16-17.
2000, 'A Discriminating Act: Disability Discrimination', *Consuming Interest*, 84, pp. 24-26.
2000, 'Commuting the Car', *Green Connections*, 30, pp. 30-1.
2000, 'Constructing Wisdom', *Green Connections*, 27, pp. 22-23.
2000, 'Privacy Matters: An Overview of Electronic Data Security', Monash Division of General Practice Website, May: http://www.monashdivision.com.au/html/data/consumer.pdf.
2000, 'The Myth of the Efficient Car', *Fleet Magazine*, 1, pp. 16-17 (reprint).
2000, 'The Myth of the Efficient Car', *Business Motoring*, 7, 4, pp. 12-13 (reprint).
1999, 'Bothering About the Bother of Y2k', *Community Quarterly*, 48, 3pp. 9-44.
1998, 'Not forgetting the gas', *Eureka St.*, 8, 9, pp. 13-14.
1998, 'Needed: a new way of thinking', *Eureka St.*, 8, 7, pp. 25-27.
1997, 'Gridlocked?: Why Not to Invest in a Global Electricity Network', *Community Quarterly*, 44/45, pp. 61-66.

1997, 'Consumer empower't: the legit. involvement of the chronically ill in their own care', *Health Issues*, 52, pp. 12-15.
1997, 'Seeking to Fill a Blind Spot', *Conservation Gazette*, Sept./Oct.., 18, pp. 19 & 22.
1997, 'The myth of the efficient car', *Engineering World,* 7, 1, pp. 34-35.
1997, 'Genetic Engineering: Brave or Foolish New World', *Bogong,* 17, 4, pp. 16-17.
1997, Mackenzie, M.A. & Fisher F. G., 'A Salary for the Earth', *Rainbow Alliance Newsletter, 10,* 1, pp. 6-7.
1996, 'Safety Net: Community, Technology and Safety in Everyday Life', *Arena Magazine,* 26, pp. 47-49.
1996, 'Maintaining Independence for the Chronically Ill: Replacing Expensive Permanent Assistance with Cheap Occasional Assistance', *Health Issues,* 46, pp. 16-17.
1996, 'Engineers need to understand society', *Engineers Australia,* 68, 8, p. 36.
1996, 'A Disability Awareness Week Contribution', *Law School Gazette (Monash Uni.),* 11, pp. 3-4.
1996, 'Social implications of technique', *TheABN[Aust. Business Network]Report,* 4, 4, pp. 6-7.
1996, 'Profile: Monash Uni.'s Grad. School of Environ. Sc.', *Community Plng Bulletin,* 4, 3.
1995, 'Understanding the Context of Action', *Community Quarterly,* 35, pp. 4-11.
1995, 'Fairs Fare: the case for a public transport levy', *Arena Magazine,* 18, pp. 8-9.
1995, 'Study Green Themes', *The Conservation Gazette,* Aug./Sept., p. 8.
1994, 'Crossing thought borders', *The Australian (Higher Education),* 8/6, p. 26.
1994, 'Wrong Switch', *Consuming lnterest,* 61, pp. 28-29.
1994, 'Electric Blues', *Arena Magazine,* 14, p. 7.
1994, 'Liberating Energy: On the Social Construction of Energy', *Aust. Inst. of Energy News J.,* 12, 5-6, pp. 10-14.
1993, 'Crossing the Frozen Wastes of Refrigeration: Social changes for efficient, urban, household refrigeration', *Green Fridge Quest Newsletter,* 5, pp. 2-3.
1993, 'Bin sins trashed', *Herald Sun,* 4 August, p.12.
1992, 'Laptops, Bicycles, IVF & Level Playing Fields… Towards Responsible Understanding of Tech.', *Score,* 2, 1, 12.
1991, 'Opinion: A Public Transport Levy?', *Transit News and Views,* 15/2, p. 9.
1991 'Society, Not Science, Should be the Arbiter', THE AGE *(Education Age),* 29 Oct., pp. 20-19
1990, 'Bicycle Maintenance as a Social Skill', *Bicycle Victoria,* 8/2, pp. 27-29.
1989, 'Technology and the Vanishing Self: Steps to Appropriating Technology', *Environmental Discussion Paper, No. 9,* G.S.E.S., Monash U., Clayton (29 pp.).
1989, 'Irresponsible Computing, How the Present Use of Technology Exacerbates Environmental Breakdown', *Aust. Assoc. for Environ. Ed. Nwsltr.,* 39, pp. 4-5.
1989, 'On a Matter of Urgency: Greenhouse Effect & Devel't of a Sc. of Context', *A.I.E. Energy News J.,* 714, pp. 94-97.
1989, 'Environment & Collingwood. Problems & Opportunities', *Collingwood Council News,* Oct., p. 2.
1988, 'Technologies for Strike-Proofing: A Comment', *Aust. Inst. of Energy News Journal,* 6(2), pp. 3-4.
1987, 'Changing Attitudes to Ch'g Att's - Why Systemic Change Appears So Slow', *Feldenkrais Nwsltr,* 2/4, pp. 6-10.

1987, 'Dual Mode Commuting Plan', *Bicycle Victoria,* 5/4, pp. 18-19.

1987, 'Getting the Environmental Message Across - Lessons from an Award', *Eingana,* 11/1, pp. 11-12.

1986, 'Consistency - Reconciling Saying and Doing', *Environment Victoria,* 60, p.12.

1986, 'Personal Pathways to Deep Ecology', *The Deep Ecologist*, 20, pp. 5-6.

1986, 'Computers in Primary Schools: Sterile Fruit of Fear?', *Green Teacher,* 1, pp. 4-6.

1986, 'Non-Violent Tools', *Pedal Power*, 4, 2, pp. 12-15 [reprint from *Peace Studies*, June, 1985].

1986, 'City Cycling: making one's peace with the city', *Pedal Power*, 4, 1, p. 16.

1985, 'Solar Bandwagon: Ambulance in Search of a Solar Principle?', *Solar Progress, J.A.N.Z.,* §I.S.E.S., 6/2, p. 25.

1984, 'Environment and Human Disease - Optional Unit C', *H.S.C. Course Description, Environmental Science,* V.I.S.E., Melbourne, pp. 12-14.

1984, 'Food Wealth and Poverty - Optional Unit D', as above , pp. 14-15.

1984, 'An Afterword on Approaches to Conserver Society', *Environment Events,* July, pp. 3-4.

1983, 'Thoughts on Technology', *Australian Social Welfare Impact,* 13/3, pp. 2 & 31.

1981, 'Alternative Fuels? The Critical Questions', *Solar Progress, J.A.N.Z.*§ I.S.E.S., 2/4, pp. 22-25.

1981, 'Why Study Environmental Science?', *Why Study ... ?*, Careers & Appts Service., Monash U., Clayton, Ch. 13.

1980, "'Energy 2000' - Another View', *Energy Resources and Technology,* Nov. 16.

## *Book reviews*

1999, 'Climbing Mt. Improbable by Richard Dawkins, Penguin, 1997', *Environmental Values*. 8, 1, pp. 114-116.

1992, 'The Wealth of Nations Exposed: Under the Henderson Socio-Environmental Arc-light', Review of *Paradigms in Progress. Life Beyond Economics,* Hazel Henderson, Knowledge Syst. Inc., 1991, *21C,* 7, pp. 24-25.

1992, '*Environmental Research in Australia. The Issues* by ASTEC, Canberra, AGPS, 1991' [a review], *The Australian Universities Review,* 35/1, pp. 54-56.

1991, 'Beyond Environmentalism. A Review of: Sustaining the Earth. The Past Present and Future of the Green Revolutn by John Young, N.S.W.U. Press, 1991', *Habitat,* 19/6, pp. 34-35.

1988, 'Review: *Time Wars: The Primary Conflict in Human History* by Jeremy Rifkin, Holt N.Y., 1987', *The Deep Ecologist,* 29, pp. 12-13.

1985, 'Renewable Energy. The Power to Choose: A Review', *Environment International,* 10, pp. 476-477.

1982, 'Human Scale: A Review', *Chain Reaction,* 28, p. 39.

1981, 'Conserver Society - Four Approaches: Reviews', *Aust. Assoc. for Environmental Education Newsletter,* 8, pp. 12-13.

1980, 'A Natural Legacy - Ecology in Australia: A Review', *Eingana,* 413, pp. 16-19.

## *Poster Papers*

1987, 'Appropriate Technology and the Redundancy of Technology Assessment', *Technology, Education and Society: Future Directions; R.M.I.T.'s Centenary International Conference*, Melbourne, 10-15 May.

1986, 'Technology and Vulnerability. Re-Appropriating Technology', *Conference on Science Technology*, A.N.Z.A.A.S./A.I.S.T., Macquarie Uni., N.S.W., July.

### Letters

***Scores, published in:***

- *newspapers* such as THE AGE, *Sydney Morning Herald,* and *The Australian,* (since 1960s, with regular headlines in the letters' section), for example 1996:
  - 'Stop seeing microbes as aliens that must be nuked', *The Australian*, 22/4, p. 10 (and responses on 26/4, 12).
- journals such as, 1986:
  - 'Wondering in Morphogenetic Fields', *Australian Natural History,* 22/1, p. 19.
  - 'Oneness - A View of Nature', *Search,* 18/9-12, p. 308.
  - 'Life Expectancy, Quality of Life, Care', *Search,* 17/5-6, p. 158.

### Monographs in preparation

- Dancing in the Light of Metaphor. Transcending the Social Autism of the Twentieth Century.
- (Ed.) Readings in Social Construction: A Source Book for Environmental Scientists.
- Responses to Science & Systems Practice Assessment Tasks [Departmental publication only].
- Jobs in Environmental Science [to be prepared in collaboration with environmental science graduates].
- Little Screams: Letters for Environmental [an edited book of 'letters to the editor'].
- Effective Photocopying[first in a series of booklets on effective actions, based on an understanding of the social constructions of the named activities].
- Effective Commuting [second in the series].
- Effective Energy Use [third in the series].

## Professional Affiliations and Committees

### Professional affiliations

Fellow, Environment Institute of Australia

Fellow, Australian Institute of Energy

Member, International Society for the Systems' Sciences

Member, Institution of Engineers Australia

### Committees [current and recent past]

### Boards of Management/Governing/Advisory Councils

- Faculty of Engineering, Monash University: Arts Faculty Representative
- Consumers' Health Forum
- Southern Metro. Region Divisions of General Practice
- [National Resource Centre for Consumer Participation in Health, disbanded Aug. 2004]
- [Health Issues Centre (HIC) Board, retired Oct. 2002]
- [Continence Foundation of Australia (CFA) Board, retired Dec. 2001]

### Committees

- Monash Uni., Faculty of Medicine: 5 Year U/grad. Curriculum Theme II: Society, Population, Health & Illness
- Monash Uni., Faculty of Arts:

- [Postgraduate Coursework Committee, ret. 2004]
- [School of Geog. & Environ. Sc., Admin. Committee, ret. 2004]
- Mentor for: i) chronically ill, ii) women

- Monash Uni.: Disability Advisory Committee.
- [Monash Uni.: Reference Group for Project on Staff with Disabilities, compl. 2004]
- Medical Services Advisory Com'ee: Supporting Committees:
  - Prostate Cancer Screening
  - Visual Electrodiagnosis
  - Photodynamic Therapy with Verteporfin
  - Multifocal Visually Evoked Potential Using ObjectiVision (Ref. 13)
- Ministry of Health & Ageing:MRI [Magnetic Resonance Imaging] Monitoring & Evaluation Group
- Therapeutic Goods Admin.: Medical Device Evaluation committee and subcommittees.:
  - Bioengineering & Biomaterials
  - Implantable Medical DeviceTracking
- National Health & Medical Research Council: Expert Advisory Group on Antimicrobial Resistance.
- Dept. of Human Services [DHS]: "InformED": Health Promoting Emergency Depts Prog.
- Melbourne Health:
  - Community Advisory Committee
  - Quality & Safety.
  - Clinical Review Group
- Consumers' Health Forum Advisory Panels e.g.
  - Australian Health Consumer (editorial)
  - Consumer Representatives selection

## *Divisions of General Practice:*

Monash: Consumer Reference Group

Monash: Quality Use of Medicines [NPS] Subgroup.

[Sherbrooke/Pakenham: Facilitator, Redirection of C.R.G. Completed:12/01]

- Dept. of State and Rural Development: Review of the Environmental Management and Renewable Energy Industries
- [Nat. Resource C. for Consumer Participation in Health: Consumer Ref. Group. Disbanded 2004]
- City of Yarra: Disability Advisory Committee
- City West Water: Community Liaison Committee
- Vict. Curriculum & Assess't Authority: VCE Environ. Science Reference Group
- Australian Instit. for Primary Care:judge - Primary Health Innovation Awards, 2000
- United Nations Assoc of Australia: Judge - World Environment Day Awards, 2000 - 2003

## *Research & Project Steering/Advisory Committees*

- Monash Division of General Practice: Quality Use of Medicines Subgroup
- Consumers' Health Forum: E-health or 'HealthConnect' project

- Swinburne U.T.; Nat. C. for Sustainability: Grad. Cert. Sustainability.
- [National Public Health Partnership:Public Health Evidence Project, completed: 2003]
- [Aust. Greenhouse Office - CERES: Com'ty Greenhouse Action Centres, completed: 2002]
- Journal Review Committee: Systems Practice & Action Research

### *Occasional requests to participate in community committees at all levels*

E.g. 'People Together Project: Shaping Victoria's Future' 1999; 'Future Leaders Discussion', from 2000.

Life Member: C.E.R.E.S.; M.E.F.L. (Moreland Energy); N.S.F. (Nature & Society Forum)

# THANKS TO OUR SPONSORS