

Nature & Society

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Editorial

Early cartographers used to spread a mythical land, Terra Australis Incognita, across the bottom of their maps. Capt Cook's second voyage in 1772-5 was planned to prove or disprove the existence of this land. Cook did sweeps through the Pacific and went further south than anyone else had ever been. He circumnavigated the globe in high latitudes, three times crossing the Antarctic Circle. He conclusively proved that there could not be a large, unknown landmass

outside that circle. He realised that any land inside it would be permanently covered in ice and snow and, not unreasonably, thought it would be useless to humans. However sealers thought otherwise and within a few decades they were

devastating the fur seal population in Antarctic and sub-Antarctic waters. In the process they discovered many of the islands in the area.

Scientific interest in the region as well as national rivalry led to three great expeditions being mounted about 1840, one led by Dumont d'Urville (France), one by Charles Wilkes (USA) and one by James Clark Ross (Britain). Then there was a gap until the three year oceanographic voyage of HMS Challenger, 1872-6. Increasing interest resulted in an International Polar Year, 1882-3. A second IPY, concentrating on ionospheric and atmospheric research, followed in 1932-3. Since then we have had the International Geophysical Year, 1957-8, and are coming up to another IPY, actually two full years, 2007-9. This time there will be a strong emphasis on climate research.

Of the epic journeys of the Heroic age, roughly 1895-1915, almost all incorporated important scientific work. Expeditions were mounted by many countries, not only the ones we normally hear about. Although Antarctica has certainly seen more than its fair share of rivalry it has also seen a quite unusual amount of

cooperation, especially through the various international years.

One of the most hopeful documents we could have is the Antarctic Treaty, signed in 1959. There were twelve signatories originally, mainly countries that laid claim to parts of the continent, some of whose claims were overlapping. They agreed that Antarctica should be a natural reserve devoted to peace and science.

There are now over forty signatories in two categories, consultative states that conduct significant scientific research and acceding states that sign the treaty and adhere to its principles. All territorial claims are frozen and countries set up bases in other's territories.

Scientists from different countries work cooperatively with each other even when their countries are at war, as in the case of Britain and Argentina during the Falklands conflict. All bases and scientific programs can be, and are, monitored by other countries' staff.

The Antarctic Treaty is a wonderful example for the world. Antarctica is of global significance in other ways, too.

The world was shocked in 1985 when British scientists found the thinning of the ozone layer that became known as the hole in the ozone. For the first time it was realised that what

A journey is a person in itself, no two are alike, and all plans, safeguards, policies and coercion are fruitless. We find after years of struggle that we do not take a trip, a trip takes us.

John Steinbeck

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happened in the northern hemisphere affected Antarctica and the cure required global cooperation and action.

Now we know that the Antarctic is actually a powerful engine that plays a major role in global climate. Mess with it and the consequences could be devastating. Yet that is what we are doing. We know there are changes in ocean currents in both Arctic and Antarctic waters. These currents run as giant conveyor belts, carrying water from south to north and back again. They distribute heat and carry oxygen and nutrients. Without this flow the deeper ocean will become stagnant, climates will change, all life will suffer.

Antarctic ice cores carry records of past climates and of what we are doing to the atmosphere now. We can go back in time for thousands of years by studying the bubbles of air trapped in the ice and also by analysing the isotopes of hydrogen, oxygen and carbon in the shells of marine animals, especially foraminifera, contained in sediments. It is no good claiming that we are not changing the atmosphere; the record is there and it is clear.

Many people are understandably upset by the insistence of some countries to continue whaling. What they don't understand is that we, all countries that continue to emit greenhouse gases in large quantities, will be guilty of more destruction. There is evidence that the southern ocean is becoming less productive. Cold waters support far more phytoplankton, the tiny floating plants that form the base of the food web, than do warmer waters. The phytoplankton are also susceptible to damage from excess ozone. With this food source reduced krill, and all species that depend on it, are in danger. Already, it seems, some penguin species are starving.

To make matters worse we harvest krill for our own consumption, as a 'crab extender', or even as an agricultural fertiliser. We must

understand that species such as baleen whales and the misnamed crab eater seals have evolved to harvest large quantities of krill in a single mouthful, not to pick up the left overs if we take the dense concentrations.

It is ironic that whales were nearly wiped out to provide the oil to light the lamps in northern cities. They were saved, in part, by the growth of the electricity and petroleum industries. Now they are threatened by the outpourings of those very industries.

Many thousands of scientists will be studying the Antarctic and Arctic especially during the coming Polar Year. They will find some answers and many more questions about what we are doing to those precious areas and what effect this will have on the rest of the world.

People know something is wrong; they just don't know quite what, or why, or what to do about it. And if they complain they are told by the political classes and often by the media, that none of this really matters; their concerns are small, insignificant and local, of no importance in the grand scheme of things. They are admonished to 'enter the real world' and directed to think about something more important: economic growth, perhaps, or the War on Terror. And if they persist, they are called 'nimbys' and pigeonholed as reactionaries or nostalgic idealists and told they should have better things to do.

*Paul Kingsnorth
The Ecologist, January 2006*

The cooperation between scientists from all over the world sets a good example for the rest of us. If we can get the same cooperation between governments and industry to take effective action to address the problems our consumption causes, then much good could come of it.

Antarctica has inspired and fascinated many people. Maybe it can inspire us to save the world.

Jenny Wanless



Editor's note

Thanks to Keith for producing the February/March edition of *Nature and Society*, which has received much favourable comment. I wrote the editorial and then ran away to sea; there are no prizes for guessing where I went. In this journal I have tried to pass on some of what I learned during my time as a tourist and in associated reading.

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Tel: +61 (2) 6288 0760

Fax: +61 (2) 6287 4489

E-mail: office@natsoc.org.au

Website: www.natsoc.org.au

Where we are:

Our rooms are in the South West Wing of Weston Creek Primary School, Minns Place, Weston, ACT.

By car: from Civic, follow the signs to Weston from the Tuggeranong Parkway and continue to Weston by veering left from the traffic lights at the Cotter Road turnoff. This takes you along Streeton Drive for one kilometre, then turn left into Hilder Street (there is a small signpost pointing along Hilder Street). Drive around behind the school into Minns Place and then into the car park. Our rooms are down the slope to the left of the school building – about 40m from where you'll park your car. Follow the sign to 'Sustainability Groups'.

There is space for three or four cars for disabled access close to the entry. There are ramps over the kerb from this small parking space and entry to our building is without steps.

By bus: The 126 bus route from Central Canberra and walk 200m.

By bicycle: the office is adjacent to the western trunk cycle path between Civic and Tuggeranong.

Your participation is invited

On the next page there is a partial list of activities under way in NSF. If you have comments or suggestions about any of these or the articles in *Nature and Society*, please contact Committee members or the NSF office.

Forthcoming NSF meetings

The April and May meetings will both be held at the Fellows Lane Cottage, Emeritus Faculty, Building 3T, ANU campus, beginning 7:30pm

Wednesday 19 April 2006

Talk by Cedric Mims on the subjects covered in his new book *Fouling our Nest*

Cedric writes: My talk will be about the things we discard from our bodies into the environment and the impact, if any, on pollution and climate change. I'll deal mainly with human skin scales, sweat, nails, hair, corpses, placentas, urine, and faeces. It turns out that some of these are of great biological interest but have no harmful effects on the environment, while others (sewage, corpses) can pose problems. I'll mention our insignificant output of CO₂ and methane but other gases, such as the volatile compounds responsible for body smells, are largely of personal and anthropological concern.

About our speaker: (from *Australasian Science*) The pile of recently published books with his name on the cover shows that Cedric Mims has lost none of the acuity that made him a leading medical scientist, teacher and author. Born in England, he spent his formative and productive years as a scientist at the John Curtin School of Medical Research from 1957 to 1972.

After becoming restless with life centred entirely on a laboratory and wanting to undertake work with more clinical relevance, Mims returned to London as professor of microbiology at Guy's Hospital Medical School. There he had major teaching and clinical responsibilities and served on the Medical Research Council. After retiring, Mims returned to Canberra, branching out into a new career as the author of popular books based on medical science. *When We Die* tells about the biological processes of dying and afterwards. Published only two years ago, it won a British prize for best popular science book of the year. Mims' great contributions to human biology are expressed in *The Pathogenesis of Infectious Disease*, which has been lauded by other scientists as a classic book.

May talk: Wednesday 17 May 2006

Derek Wrigley will talk to us about solar electricity in the domestic setting.

What's been happening

Wendy Rainbird reports on progress with the Australian National Sustainability Complex.

- A contract has been signed with Business ACT to hire a consultant to scope the business plan for the ANSI complex.
- Janis Birkeland and David Hood gave a presentation with ACTPLA to twelve ACTPLA-relevant staff, and received a very good response
 - this will support the presentation of the ANSI project to ACT ministers shortly.
- After another presentation, the Institute of Engineers has endorsed the project.
- Val Brown, John Harris and Wendy met with Allan Fox who has agreed to develop an Interpretative Education Resource Plan for the ANSI site and area. An application was submitted in NSF's name for a Healthpact Grant to provide some of the funds for Allan Fox's work. This will be an important resource for ANSI and will feed into the Business Plan, along with other work done on the educational aspects of the project.

The Sustainability and Health project

Wendy Rainbird also reports on the progress of projects nurtured under this project:

Four projects have submitted Healthpact grant applications.

- The Allan Fox ANSI site Interpretative Education Resource Plan (see above).
- Wendy worked with Marilyn Higgins (formerly ACT Dept Education), and Cris Kennedy (CSIRO Science Communication) to develop Scinema (the Student Science Film Festival) into Sustainability and Health Film-making Workshops. The project has

potential for reaching a wide audience, as the best films are shown in cities and regional towns around Australia during National Science Week.

- Wendy has let them know that NSF has members and resources to support workshops for the science behind the themes or topics chosen by students
- Cris has contacts to provide expertise in film-making workshops for students.
- A multi-year funding proposal was submitted.
- The "Art of Moving" project promotes greater use of public transport, cycling and walking. Their application was submitted under the name of the Environment Centre with the ANU as partners.

•The Indigenous Wellness Centres was developed by Percy Knight with assistance from Geoff Pryor.

These projects are still in development and may be submitted in the next funding round:

•The Youth Leadership for Sustainability has taken off with a range of youth-connected organisations arranging to meet to develop their networks and structure.

•The Concerned Residents of West Kambah (CROWK) Learning Precinct project, being developed with Urambi school.

All government – indeed, every human benefit and enjoyment, every virtue and every prudent act – is founded on compromise and barter.

Edmund Burke 1729 - 1797

We have made this appalling mess of the planet and mostly with rampant liberal good intentions. Even now, when the bell has started tolling to mark our ending, we still talk of sustainable development and renewable energy as if these feeble offerings would be ... an appropriate and affordable sacrifice. We are like a careless and thoughtless family member whose presence is destructive and who seems to think that an apology is enough. ...until we stop acting as if human welfare was all that mattered, and was an excuse for our bad behaviour, all talk of further development of any kind is unacceptable.(p.148)

James Lovelock

The Revenge of Gaia

Showing that, while Burke can bargain with other humans, we cannot bargain with nature; nature does not compromise one iota



Book review

Half Gone – Oil, Gas, Hot Air and the Global Energy Crisis

by Jeremy Leggett
Portobello Books, London, 2005

Jeremy Leggett is a geologist who once consulted for oil corporations so is well-placed to comment on the coming oil crisis. He also knows something about climate change having worked for Greenpeace as their climate campaigner. Indeed, his first book *The Carbon War* was a page-turner on the negotiations leading up to the Kyoto Protocol. This later book *Half Gone* is about the conflation of the two emerging crises: the imminence of peak global oil production, and climate change.

As its name suggests, *Half Gone* makes the point that we are at the point of peak global oil production – we have used up about a trillion barrels and there are another trillion to go. But as we slide down the right hand side of Hubbert's Peak, oil will become increasingly expensive.

Leggett predicts that as prices rise, recession will follow, if not outright economic chaos.

Leggett believes the peak is imminent. 'There will be nowhere near enough oil coming on-stream to meet the combined forces of depletion and demand between 2008 and 2012,' he writes. 'If there were such oil available, it would be from projects we would know about today...there is now no way to plug that gap.'

Meanwhile, human-induced greenhouse warming is a reality and could cause as much economic disruption as oil depletion will. He quotes recent visitor to Canberra John Schellnhuber from the Tyndall Centre who says: "If we go beyond two degrees we will raise hell." Leggett's top concerns include the mining of ice-like methane hydrates and destabilising them, releasing greenhouse-potent methane to the atmosphere; warming soils releasing more carbon dioxide resulting in land becoming a net source rather than a sink for the gas; Western Europe becoming significantly colder as the Gulf Stream shuts off; the melting of the Greenland ice-sheet that would raise sea-levels by seven metres, inundating coastal cities and plains; and the West Antarctic ice-sheet sliding into the sea that would raise sea-levels five metres.

Many books are now being written on Peak Oil such as Kenneth Deffeyes' excellent *Beyond Oil* in which he explores the various alternatives to oil. So does *Half Gone*, but its value lies in quantifying just how much more carbon we can actually put into the atmosphere before crossing that two-degree warming threshold. The danger, of course, is that as oil declines, government will turn to more plentiful coal for electricity production and will liquefy it for transport fuel. The environmental consequences could well be disastrous.

So how much carbon from fossil fuels *can* we afford to burn? Answer: 400 billion tonnes. Sounds a lot, but consider there could be 700 billion tonnes of carbon in remaining conventional as well as unconventional sources of oil, 500 b tonnes in gas (excluding methane

hydrates) and 3,500 b tonnes in coal. What are the implications? Leggett says we cannot burn all the oil, much of the gas must remain below the ground and the great majority of coal shouldn't even be considered.

Even if we were to exploit gas reserves and unconventional

oil sources such as oil shales, the lead times are such that if peak oil occurs this decade, we cannot avoid economic trauma. As energy investment banker Matthew Simmons says: 'The only alternative right now is to shrink our economies.' In fact, nothing will fill the gap – neither renewables nor nuclear. Leggett is not a fan of nuclear and spells out its inadequacies: long lead times; lack of investment; opportunity for terrorism; lack of satisfactory waste disposal; and a bad track record of cracks in reactors, illegal discharges etc.

What role can renewables play? Leggett argues that combined with energy efficiency, they hold the key to a viable future if we can just get past the economic chaos that awaits us shortly. Perhaps the only fault in the book is his starry-eyed approach to hydrogen, but for the rest, he does seem to know what he is talking about.

This is a highly readable book. George Monbiot rightly says on the cover that it 'demands to be read'. *Highly recommended.*

Jenny Goldie



Book review

Nature and Society: Patterns in Space and Time

David Tranter, Seaview Press, 2006

(Last year the author approached NSF to let us know about this book and has now offered us a copy for review.)

Nature and Society's "inter-linked cameo descriptions of patterns we can recognise in our daily lives" provide insights into the natural world and human society, emphasising their interdependencies and, at root, their oneness as climate change and other perils begin to bite.

The cameos give the book a filmic quality and provide some of the book's gems – crystal clear descriptions of natural phenomena, many of which are drawn from the author's own marine research career: the origin of petroleum, coral bleaching, pearl formation, the Adele penguin and positive feedback. In one of his cameos the author draws an analogy between cooperation between cells and cooperation between people.

Tranter progresses in the book through a number of ways at looking at nature and society, taking an ecological process or phenomenon and then applying the lessons to human society and, thence, to current problems such as the conflict in Iraq and globalisation.

For example, he wonders at the many applications of Newtonian physics to "astronomy, oceanography, meteorology, tectonics and space exploration. However, complex as it is, the complexity of the physical [non-living] world pales into insignificance compared with the complexity of life". After describing the infinite complexity of life, Tranter condemns the theoretical models of much economics as simplistic applications of physics to social phenomena and the way it takes for granted the perpetual resilience of the living planet. He

deplores the way the Newtonian basis of economics cannot comprehend the flow and the dynamic nature of the living world, with its positive and negative feedback loops.

Early on the author introduces the concept of entropy and contrasts the disorder accompanying it with the order of complexity. He explains how entropy on Earth has been held at bay by the input of energy from the sun. He likens the processes of increasing complexity to increasing information, but the meaning of this important metaphor eluded this reader. The book challenges the reader to think carefully; although it is easy to read, it inspires a flood of thoughts, new connections, new possibilities. Although it would be easy to read it at a single sitting, to do so would be to miss the opportunities the author's generosity gives us.

One of the threads weaving through *Nature and Society* is the story of human evolution and what we can learn from our evolution to help us deal with our pressing problems. He describes how the adoption of agriculture led to cultural growth in practices and skills favoured by a settled life and the artefacts that could be accumulated readily if people were not nomadic. Among those were written records and these led to the rapid

spread of knowledge and our species' cultural evolution far out-pacing our biological evolution. We can see the results of this apparently unfortunate disjuncture continuing today as the gap between our culture and our nature continues to widen.

In the ways described, the author returns many times to caution us, firmly but gently, each time from a new perspective, about our threatened biosphere.

The book is available from the author for \$25 (cheque or credit card) sent to him at PO Box 208 Robertson NSW 2577. The book is also available free on the internet at www.natureandsociety.net.au.

Our current difficulties are twofold: firstly, there is a mismatch between the rapid pace of our technology and our tardy response to impending danger; secondly, our genome is incapable of anticipating the future because it is anchored in the past. We are genetically adapted to a hunter-gatherer existence, some of our cultural quirks, such as religious and economic fundamentalism and consumerism, having little survival value; they are not genetic adaptations at all but cultural maladaptations.

Nature and society p. 146

... today's decision-makers are urged to observe the precautionary principle – if the consequences of an initiative are not known with any certainty then it makes sense to wait before leaping into the unknown, the more so since it is often difficult to distinguish lags from trends.

Nature and Society p. 101

Report of members' meeting

Design for Resource Recovery: recovering resources from wastes and eliminating landfill

On 15 March Walter Jehne spoke about how a local shire could eliminate its costly landfill and generate jobs and social responsibility by recovering resources presently lost by trucking domestic waste to Canberra's landfill.

Our challenge

After 200 years of 'enlightenment' we have:

- a society where consumerism dominates our identity, aspirations and security
- shopping malls as our social and community focus
- retail 'therapy' to deliver us health, happiness and well-being.

The dark side of this picture is that most of our economy comprises linear process flows based on:

- exploitation and then the degradation of our natural soil capital
- over 90% of industrial output and retail sales being in a waste stream within six months
- over 50% of our service economy devoted to driving consumerism via marketing, debt finance, two income dependency and mis-education to restrict our vision.

Gore Vidal wrote 'we are living in a bubble economy pumped up by laughing gas' that is:

- totally unsustainable in its exploitation and waste of limited natural resources
- massively dependent on unsustainable oil-based transport and process inputs
- overburdened by wastes that are degrading environmental and human health.

We know we must change. Yet we are offered only ineffective waste management that:

- greatly increases statutory waste management costs and overheads
- recycles only the 20% of those materials that are profitable for our existing industrial model
- sweeps under the landfill carpet some 80% of our discarded materials
- creates and exacerbates significant long-term health, cost and environmental consequences.

Worst of all our existing landfill strategies preclude the minimisation and/or reprocessing of waste. Consequently we urgently need to design viable resource recovery strategies that:

- reduce our production of waste
- help us re-define what is waste and reassess how it is created
- facilitate the safe recovery and reprocessing of as much material as possible

- create and capture maximum value opportunities for local communities from our management of waste.

We need to move forward from the existing paradigm in which everything that is excess to our individual and immediate needs becomes waste because they have been contaminated or mixed and so have no further market value. With clever design these wastes can be separated, cleaned and concentrated to become valuable resources, particularly at a community or regional/industrial level.

Waste is a mental construct and we need to deal with this mental impediment to clear the way for re-design so that we can better bio-mimic nature. Nature does not have wastes but rather is based on the evolution of highly productive and efficient cyclic systems, where the by-products of every process or organism is substrate for other organisms resulting in the evolution of highly bio-diverse and sustainable eco-systems that, over 3.8 billion years, have created and sustained our climate, soils and biosphere.

*I'm Changing the Climate! Ask Me How!
Bumper sticker designed to be
pasted—illicitly—on SUVs*

We need to re-design resource recovery strategies on nature's model to turn wastes into value by enabling the recovery, re-processing and re-use of materials from wastes through

local value-capture businesses, and negate the demand for continuing landfills and waste management costs, while enhancing human and environmental health values.

How we can get there

To bio-mimic nature we need first to analyse and understand our current and projected waste flows and then use this data to design more effective resource recovery processes and cycles. Such analyses should define current and projected:

- populations and growth scenarios
- per capita or household waste production
- types and composition of these waste streams
- location of these wastes
- community attitudes and impediments to resource recovery options.

We can then use these data to re-design existing waste systems and transform our current mixed and dispersed waste streams into defined clean resources and value-capture opportunities.

Behavioural changes

To help reinforce and drive this change in approach we need behavioural changes that aid:

- the source separation of wastes by households, particularly of toxic contaminants
- community education programs to reduce waste volumes and aid separation
- the re-design of waste logistics to optimise collection, separation and recovery
- the support of local ownership and management of their resource recovery facility
- establishment of local eco-businesses to capture value from former waste streams

- restructuring fees and charges to provide incentives for desired behaviours.

Innovation and improvement

Based on the systems analyses and subsequent re-designs it is also possible to innovate and improve aspects of our waste management in three main ways.

1. The provision of resource recovery transfer stations

Resource recovery transfer stations should be designed to assist local communities in their separation and collection of materials to avoid the need for the costly collection and centralized landfill disposal of mixed contaminated wastes. The re-design of such logistics can often enable significant value capture through:

- savings from reducing waste volumes through community education activities
- savings in direct landfill costs which are currently some \$70-150 a tonne and rising rapidly
- savings in collection and transport which are increasing as fuel prices rise
- savings from better synchronising collection/drop off options with community needs
- increased value creation through the potential to sell defined separated resources
- value creation through new local eco-businesses re-processing recovered resources
- increased value capture by the local community from associated multiplier benefits.

A global market requires a global identity; not just goods, but landscapes themselves must be branded and made safe for the universal act of consumption. A global market requires global tastes – we have to want the same things, like or dislike the same things. Only that way can markets cross cultural boundaries. At the same time, an advanced industrial economy requires economies of scale – which means mass production, the smoothing-out of edges, uniform and characterless development; the standardised manufacture of entire landscapes.

*Paul Kingsnorth
The Ecologist, January 2006*

2. Innovative process improvements

Process improvements may totally eliminate the need for landfill disposal. For example on average:

- each person currently sends some 1000 kg of wastes to landfills every year
- 200 kg of this is separated and recycled as clean paper and containers
- a further 200 kg is green garden wastes able to be composted eg City to Soil.

However, through innovative new bio-conversion technologies options may exist for most of the residual 600 kg to be converted into compost and cleaned packaging materials with source separated toxic contaminants (1-2% of total) being returned to their manufacturers under pending end-of-life product responsibility obligations.

In fact the waste management industry recognizes that such bio-conversion options are the critical challenge and next step in reducing landfill volumes and long term impacts.

The Sustainability Science Team and Zero Waste Australia have been leading the development of such bio-conversion technologies for the processing of such residual wastes – increasingly important with the rise in apartment dwellings.

Proof of concept studies have been designed to further:

- demonstrate the effectiveness of these processes in treating this residual waste fraction
- verify the safety of the resultant products and their compliance with environmental regulations
- evaluate and confirm the economic benefits from these processes
- design suitable scale facilities for communities with 2-50,000 households
- publicise the viability of such bio-conversion facilities as alternative to landfills.

3. Product and Market Innovation

In addition to demonstrating the viability of the proposed resource recovery technology, an effective resource recovery strategy also needs to create:

- a commercial market and demand drivers for the products to be produced
- a range of commercially viable products designed to satisfy this market demand
- regional commercial suppliers able to run the viable waste-to-value eco-businesses.

Many attempts to use composted wastes failed due to simplistic understanding of the complex composting processes and poor product and market strategies. However the market opportunities from

sophisticated composting can be significant. For example, Australia has over 100m hectares of degraded farmland in which soil organic matter levels have been degraded ten-fold in the past 200 years. This degradation has resulted in the serious loss of natural soil capital to erosion (Australia loses 50 tonnes of soil for every tonne of wheat exported), reduced infiltration, retention and efficiency of water use, resulting in the increased vulnerability of farmed land to drought stress and declining productivity.

Restoration of soil organic matter provides a critical, almost unlimited and potentially highly profitable market for organic soil amendments from processed green wastes. However, to be commercially viable critical success factors need to be considered such as:

- their local production to minimize transport costs
- their effectiveness at relatively low application rates of 1-5 tonnes per hectare
- the affordability of such restoration treatments at less than \$200 a hectare

- their full compliance with quality criteria and environmental regulations
- their capacity to generate a return on investment of some 100% in annual productivity gains plus 100% on annual improvements in the health and capital value of the land.

Soil amendment products and processes have been designed to meet these criteria. The design of such products and markets need to be a key part of any viable resource recovery strategy. Without such market drivers, it is unlikely that innovative waste technologies or community or environmental benefits will be adequate to make resource recovery strategies viable.

However where commercially viable strategies can be designed, they can generate significant direct, indirect and multiplier benefits to the local and national economy via:

- decreased community and environmental costs and risks from landfills
- the improved health, productivity and stability of critical national soil resources
- improved water use efficiencies, drought resilience and eco-system services
- local economic multiplier benefits from new waste-to-value eco-businesses.

Implementing change

As resource recovery strategies need to be designed to be commercially viable, they also need to be designed to address all factors likely to affect their potential success.

Impediments to change

This includes potential major impediments inherent in the status quo to change, new approaches and innovation. Our current waste management status quo is protected by many interests including

- governments and their advisers and administrators seeking minimal risk and the protection of overheads, regulations and the comfort of continuing as before
- local government with revenue and overheads but also risks and costs from waste options
- the waste industry which aims to
- maximize profits from service fees at minimum risk
- standardize services to cut overheads
- research bodies promoting high-tech monitoring and ongoing research projects
- the commercial industry which aims to maximize sales of new products and materials while transferring all costs and consequences to the society, the environment and the future.

Catalysing change through the primary stakeholder

Catalysing change in the context of such a status quo protection can only be addressed through the primary stakeholder and beneficiary of such improvements and needs to be based on:

- community awareness activities to raise the often hidden, direct and indirect costs, risks and consequences of current waste management practices
- community commitment-building activities reinforcing the relatively simple, beneficial options for overall waste reductions and source separation particularly of toxic risks
- community ownership strategies whereby the community contributes to and shares in the benefits from savings, improved environmental outcomes flow-on benefits from new local eco-businesses that they have facilitated via their resource recovery strategies.

Innovative solutions through innovative tools

Innovative solutions are also needed to move beyond status quo impediments. Although needing to be

tailored for each situation, the design of resource recovery strategies can benefit from:

- The use of systems analyses to re-design optimal logistics for resource recovery strategies
- The application of innovative process technologies such as the proposed bio-conversion of mixed kitchen/food wastes

- The development of innovative market and product applications to maximize value creation for the user and local community
- The incubation of new innovative eco-businesses to implement the local waste-to-value resource recovery opportunities
- Community commitment to all stages of the design, management and outcomes from such tailored regional resource recovery strategies.

Dealing with impediments

In addition to harnessing community commitment, the design of resource recovery strategies also needs to deal with those impediments that have previously prevented such beneficial changes. Three types of impediments stand out.

1. The internalization of current externalities

The internalization of current externality costs and subsidies such as:

- the real cost of resources eg public timber, degradation, consequences
- the real cost of landfill operation, risks, impacts, opportunity costs
- adding the real cost of disposable products into their price, eg, disposable nappies

If greed were not the master of modern man, how could it be that the frenzy of economic activity does not abate as higher standards of living are attained, and that it is precisely the richest societies which pursue their economic advantage with the greatest ruthlessness?

*E.F. Schumacher
Small is Beautiful*

- the real cost of natural capital lost and its restoration.

2. The community capture of savings

The community capture of savings from the strategy, via for example:

- passing on landfill savings of some \$100 a tonne to eco-operators
- providing incentives and rebates to ratepayers for waste reduction and recycling
- bonds and fines for products, services and actions reflecting their real costs, that is, including their externalities
- protection of revenues and overheads protects the status quo.

3. The community itself needs to drive the change

Encouraging strategic community leaders to drive the needed changes as:

- **governments cannot** and do not drive strategic change but merely talk the talk, protect revenue and overheads, minimise their risk and responsibility
- **industry does not** drive strategic change but rather seeks to maximise their income and profits, minimise their costs, and minimise their risk and responsibility
- **researchers do not** drive change but rather maximise tenure, grant funding, and perpetuate need for more research
- **the market cannot** drive needed changes as collective self-interest delivers maximum cost for minimum performance, not improvement of a fundamental, strategic or structural kind
- **individuals cannot** drive needed change as they do not have the mandate, critical mass, nor legal status to take effective action.

The reality is that only the community can represent and drive action its own interests. Because it is paying (even reluctantly), it can not escape its responsible for leading and the outcomes. However to do this communities need:

- accurate data on all options and their full costs, tangible and intangible
- designs to provide viable commercial change options
- blueprints for profitable local commercial operations.

This information is actually or potentially available by way of demonstrator case studies.

By using such information the community can effect the needed and desired changes to move beyond the totally ineffective, but very expensive, obsolete and protected status quo.

Conclusion

Australia's economy annually may be:

- wasting some \$200 bn of its potential resources and service outputs, while
- degrading over \$100 bn of natural soil, mineral and environmental capital, yet
- paying some \$4 bn annually in direct waste management charges for this 'privilege'.

Even though economists recorded the above as positive GDP, it is totally unaffordable, unsustainable and inequitable to current and future generations.

Eco-technologies and eco-designs are available and have been demonstrated to enable interested communities to profitably implement appropriate resource recovery strategies.

However effecting the desired change will require not just technologies and systems re-designs but that interested communities also overcome impediments favouring the status quo.

Although governments, industry and the market will continue to talk the talk, and charge the community accordingly, only strategic community commitment

can effect the needed changes.

Consequently committed communities are critical to design appropriate local resource recovery initiatives that bio-mimic nature and can effect the needed changes so as to:

- maximise the creation and capture of local value from its current 'wastes'
- restore natural soil, bio-diversity and environmental capital

- help secure a more sustainable and equitable social and ecological future.

Faced with the choice between changing one's mind and proving that there is no need to do so, almost everybody gets busy on the proof.

John Kenneth Galbraith

Don't under-estimate the power of distraction to keep our minds off the truth of our situation.

Woody Allen

Evolutionary psychology

Why are we so slow, especially in the United States, so see the great peril that faces us and civilisation? What stops us from realising that the fever of global heating is real and deadly and might already have moved outside our and the Earth's control? I think that we reject the evidence that our world is changing because we are still ... tribal carnivores. We are programmed by our inheritance to see other living things as mainly something to eat, and we care more about our national tribe than anything else. We will even give our lives for it and are quite ready to kill other humans in the cruellest of ways for the good of our tribe. We still find alien the concept that we and the rest of life, from bacteria to whales, are parts of the much larger and diverse entity, the living Earth. (p.4)

Because we are tribal animals, the tribe does not act in unison until a real and present danger is perceived. (p.10)

James Lovelock
The Revenge of Gaia (2006)

Campbell Island

Rockhoppers Crash

During the Second World War coastwatchers on New Zealand's sub-Antarctic Campbell Island took photos of the Rockhopper Penguin rookeries there. In the late 1980s Department of Conservation (DOC) staff took photos at the same places. They were shocked by what they saw; penguin numbers had dropped by over ninety per cent.

DOC scientists thought this crash could be caused by the slight warming of sea water that had been recorded around the island. They argued that phytoplankton, tiny floating plants, thrive in cold seas. Even a slight rise in temperature, part of a degree, could reduce this fertility and thus reduce the zooplankton and all species that depend on it for food.

Ecologist David Thompson looked for ways to test the DOC scientists' hypothesis. Knowing that there were many penguin skins in museum collections he decided to test them and compare stable isotope ratios in them with modern penguin material. The ratio of carbon 13 to carbon 12 is a proxy measure of marine productivity. It shows how quickly phytoplankton are growing: the faster the growth, the higher the productivity.

The results of this study support the starvation hypothesis. Unfortunately they also show that marine productivity is lower now than at any time in the last century. Different studies have shown that the Rockhoppers are working harder than ever to find their food, but they cannot find enough to raise their chicks.

The International Union for the Conservation of Nature now considers Rockhoppers vulnerable to extinction.

Flightless Teal

New Zealand's Department of Conservation is a world leader in eradicating pest species from smallish islands. They have recently been

successful in ridding Campbell Island of rats, after a carefully planned and executed 'saturation bombing' of the island with rat poison.

Now DOC staff can reintroduce several flightless birds that were surviving on a few islets around the main island. The flightless Campbell Island Teal is one such species. DOC staff, helped by their specially trained and muzzled bird dogs, are delighted to find that the teal have settled in and are breeding.

Home of the Blizzard

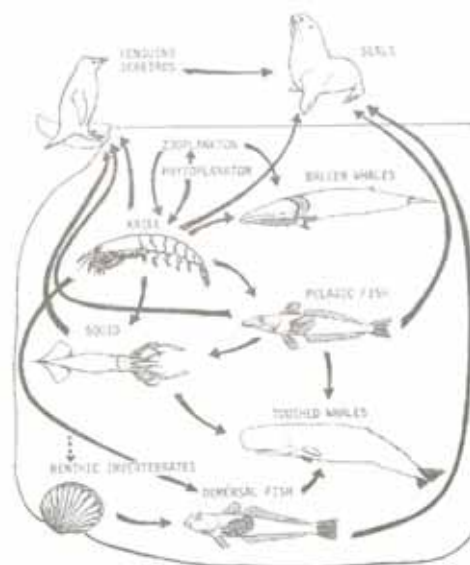
Sir Douglas Mawson gave this name to the base where he and his expedition wintered for two years in Antarctica. Now Mawson Station is using wind power to reduce its use of diesel fuel. Two wind turbines go a long way to

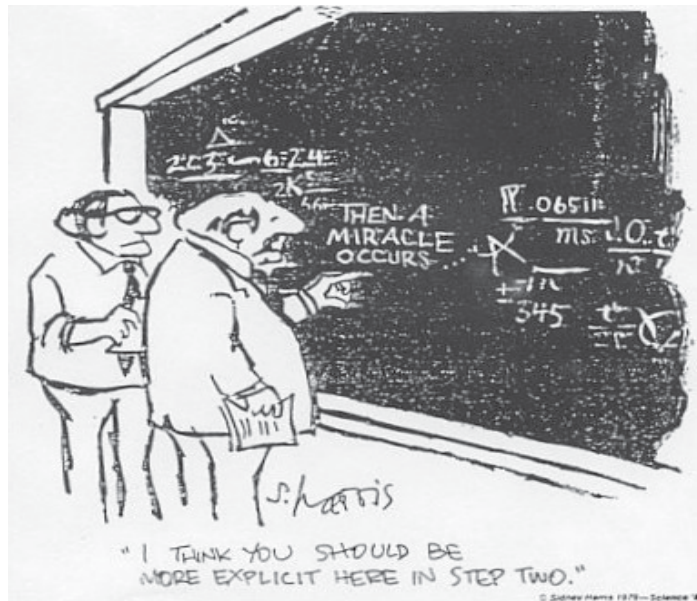
providing all the electricity the station needs. In addition the Australian Greenhouse Office provided a grant in 2005 to try storing wind power in hydrogen fuel cells. The test ones were to be used in a heater and a vehicle. If successful, this will cut fossil fuel use even further, by obviating the need for diesel at comparatively windless times.

The ultimate aim is to run the station and all field camps without the use of any fossil fuels

John Howard's greatest achievement in his ten years as prime minister was the sense of apathy he had induced in the Australian population. To demonstrate his government's openness, he has fostered debate on small, divisive issues like boat people, gay rights and uncontroversial bonding issues like Anzac Day, our sporting prowess, 'supporting our fine soldiers' and what is un-Australian. But he has squashed debate on the big issues like sustainability and our involvement in Iraq.

*Caller to ABC Radio National's
'Australia Talks Back'
27 February 2006*





One subtle way scientists can be muzzled in Australia today

An NSF member, a retired senior scientist, wrote to the NSF office on 27 February saying, in part (with identifying details deleted):

"I've just had a bit of a disappointment. [Name deleted] rang from [a State capital], inviting me there in April (at Government expense) to an International ... Scientific Committee workshop (I used to be a member), to talk on the model I used years ago for humpback whale stock assessment and how we might improve the model. I pointed out to him that while the model could have done with some tidying up, the model is no longer applicable, as a basic pre-requisite is no longer fulfilled – that the environment (food supply conditions), while variable, remains generally constant. When I went on to explain how climate change was starting to affect the feeding grounds, [name deleted] said that was really outside his terms of reference and would only irritate his political masters. In response to a direct question from me, [name deleted] said that it was a 'business as usual' workshop. Not wishing to offend a friend and respected researcher any further, I agreed to withdraw from the workshop. So much for the Government's recent insistence that there is no muzzling of scientists!"



A model with many applications

One of the delightful things about passing on information to NSF members about information in their area of special interest and action is the feedback from those members.

Recently I passed on a press release from a WA farm lobby group urging wholesale use of GM crops, saying there were many markets that would accept Australian GM exports. This is the response I received:

"I suggest that rather than parading the fact that so many countries accept GM crops, we look behind those acceptances to see if they were achieved by industry lobbying, approvals from stacked committees and GM releases by default. Before we agree to any requests from farmers or GM companies to grow GM crops they confirm they have full uncapped commercial insurance cover for all possible claims and liabilities, including effects on consumers generations hence. Consistent with the free market principles so often promoted, let the commercial insurance and cross-insurance industry assess if they want to take these risks and at what premiums. At least then affected groups such as the Philippines maize farmers and all concerned have an option to substantiate their claims rather than pushing more spin and misinformation."

I found this comment especially useful as it has application beyond the GM context as a way of enforcing the precautionary principle.

Keith Thomas

Educational Tourism

Antarctica is big, it is very cold and only intrepid explorers used to go there. Now tourists go in large numbers. Most go to the Antarctic Peninsula by ship from Ushuaia in Argentina; many fewer go to Greater Antarctica. Wherever they go they have to abide by strict environmental guidelines.

The Environmental Protocol of the Antarctic Treaty aims to protect wildlife, to respect specially protected areas (such as historic huts), to avoid interference with scientific research, to keep Antarctica pristine and to ensure visitors' safety. The International Association of Antarctic Tour Operators (IAATO) has adopted a code of conduct to achieve these ends. This code has been adopted by the Antarctic Treaty parties for all visitors, including scientists and officials.

Under the treaty, no waste may be discharged from ships south of 60 degrees. IAATO rules to prevent, for example cross infection between penguin colonies, stipulate that boots must be cleaned and disinfected

both before and after any landings. No seeds or other vegetable matter should be introduced or transferred - Velcro should be cleaned! If anything is picked up incidentally, such as pebbles in boot tread, it should be off-loaded in the area where it was picked up, not even in the next bay.

At Macquarie Island a couple of rangers came on board and stayed with us to accompany us on any landings we made there. They said where we could go and what we could do. The tour staff were also fully briefed and ensured our compliance. The rest of our voyage was either in New Zealand waters or in the Ross Dependency so a New Zealand ranger travelled on our ship and checked that we behaved ourselves. He would have to report any breaches he observed and these would be marked against the tour company.

New Zealand is doing an excellent job in the Ross Dependency. It is maintaining the historic huts in the area, Borchgrevink's hut (1899-

1900) at Cape Adare, and Scott's and Shackleton's huts (1901-17) on Ross Island. Access to the huts is strictly controlled. Conservation and restoration of the huts is carried out by a private charitable organisation, the Antarctic Heritage Trust, based in Christchurch. Tour ships help to support this trust by running auctions of Antarctic memorabilia on board after tourists have visited the huts.

Conservation of wildlife also benefits from tourist ships. Birdlife International and Birds Australia have produced a video and accompanying lecture for their Save the Albatross campaign. These are presented on board ships with a request for donations. Funds go to research on the effects of long line fishing and the education of fishermen to use less harmful methods.

Education of tourists continues throughout the voyage. We had three lecturers on our staff: two naturalists – Prof Pat Quilty, earth scientist, and Roger Kirkwood who has done research on penguins and albatross – and Antarctic veteran and history buff, Syd Kirkby. In

"Why didn't [the Easter Islanders] look around, realize what they were doing, and stop before it was too late? What were they thinking when they cut down the last palm tree?" — Jared Diamond.

What were the Easter Islanders thinking when they cut down that last palm tree? What are you thinking right now?

*Question found on the internet
23 March 2006*

addition we took nine scientists to Macquarie Island, where they were to spend the next couple of months. They gave us brief presentations on their projects. We all had the opportunity to broaden our knowledge of Antarctica, its global significance, its geological and human history and to gain understanding of current research in this amazing place. We also learned to take to heart our tour organiser's warnings; these are our plans, but this is Antarctica and nothing is guaranteed. We will do what we can, as conditions allow.

A third of humanity doesn't want to ride bikes anymore; that has profound geopolitical implications.

—Anne Korin, the co-director of the Institute for the Analysis of Global Security (1 May 2005)

TADAust Connect - Technical Aid to the Disabled

Technical Aid to the Disabled (TADAust) originated in Sydney some 29 years ago to provide low cost aids to people with disabilities using volunteer tradesmen and engineers.

Today there are six fully operational TADs all with the same philosophy and objectives. Essentially, each TAD provides its service by designing and making aids to provide a degree of independence and an increase in the quality of life for people with disabilities and the frail aged.

(TADAust) is the national body that represents each of the State TADs.

TADAust Connect is the Internet Service

Provider that was developed by TADAust to give access to the Internet for people with disabilities, Aged Pensioners and Veterans who hold pension cards. Simply stated, TADAust Connect was created as a result of an awareness that people on a pension found it difficult to pay for commercial ISP services, and were therefore being denied access to the Internet.

TADAust Connect is a service for all of Australia run by a staff of three in the ACT with volunteers providing assistance with enquiries and administration.

If you are a Canberra resident and would like to volunteer to help TADACT run the TADAust Connect site, you can talk to the administrator on 0404 446 734 or write to TADAust Connect at PO Box 3827 Weston Creek ACT 2611.

If you are thinking of a good present to give to people who are eligible, why not give a TADAust Connect Gift Voucher? You can purchase a Gift Voucher for any of our current Dial Up Plans and after presentation, we will forward an Application form for them to complete. E-mail TADAust to receive your voucher: signup@tadaustconnect.org.au

Further gems from David Tranter's *Nature and Society*

The stock market is a greed-driven system, vulnerable to runaway panic.

p.119

Over the past few hundred years, humanity has become a monoculture by degrading the biodiversity of its environment. Diversity is a library of information accumulated over time about the world in which we live, its pressures, constraints and opportunities. Diversity is a source of strength in both nature and society – in government, trade, business, culture, education – whatever. The opposite of diversity is not unity but monotony, monopoly and

monoculture, signposts on a long continuous slide into oblivion.

p.67

Weight for weight, the most abundant animal species on earth are Antarctic krill and human beings and there the similarity ends! One underpins a food chain, the other pins it down; one draws on renewable resources, the other draws on fossil fuels; one

sustains a multitude of species, the other wipes them out.

p.62

The main contemporary debate is about greenhouse warming and its consequences. it is sometimes argued that this may be part of a natural cycle and, by implication, there is no cause for concern. However the period of the cycle may be millions of years which dwarfs our allotted life span. To argue that there is no need to do anything about an undesirable trend because it may have a cyclical component is mere sophistry if there is something we can do to reverse it.

p.104

My son, who was on sub duty in the Navy, said the Arctic ice averaged over 20' thick circa 1960.

The subs can surface through about 12' of ice and used to have to search for places to come up in the Arctic. Now it averages only about 6', so they don't even bother to check any more, they just come up wherever they feel like it.

Joe Anderson

*Quoted by Folke Gunther
www.holon.se*

Farrago

Ice Cap Collapse

Jim Hansen, Director of NASA's Goddard Institute for Space Studies, said that the Greenland ice cap could collapse with explosive rapidity. This would cause a sea level rise of a couple of metres this century and several more next century.

Scientists have seen meltwater pouring down crevasses to the bottom of the ice sheet, where the lubrication it provides will speed the ice's movement into the ocean.

New Scientist 4 Feb 2006

Velcro vector

Ubiquitous Velcro may be an environmental hazard. Scientists and support staff arriving at Macquarie Island were subjected to a vacuum cleaner and forceps inspection by botanists. Out of sixty-four staff only twenty were clean. Between them the other forty-four carried 981 seeds and fruit belonging to ninety species. Seeds were plucked from pockets, cuffs, seams, socks and boots, but the great majority were attached to the Velcro fasteners of clothing and gear.

Some of the ninety species are known to be highly invasive and would pose a serious threat to the island. The spread of alien species into other lands is second only to habitat loss as a cause for declining biodiversity.

New Scientist, 11 March 2006

The grand show is eternal. There is always a sunrise somewhere. The dew is never dried at once. A shower is forever falling. Vapour is ever rising. Eternal sunrise, eternal sunset. Eternal dawn and glowing, on sea and continents and islands, each in its turn as the earth rolls. And for this I am forever grateful to be alive.

*John Muir, 1838-1914
The Wilderness World of John Muir,
edited by Edwin Way Teale, 1954*

Oil for Fish

The global fishing industry is using ever more oil, ranging further afield to catch diminishing stocks of fish. In 2000 fisheries burned thirteen billion gallons of fuel to catch eighty million tonnes of fish.

These figures show that fisheries are vulnerable to increasing fuel costs. European experts thought that thirty per cent of Europe's fishing fleet might stay in port this winter as fuel prices rose.

Fisheries use over twelve times as much energy to catch fish as the fish provide to those who eat them.

New York Times 20 Dec 2005

Permafrost Meltdown

Nearly ninety per cent of the Arctic permafrost could melt down to a depth of at least three metres this century. This will buckle highways, topple buildings and break pipelines. In some places it will create huge lakes and bogs, some of which are already forming in western Siberia.

It will swell northward flowing rivers in Siberia and Canada, pouring fresh

water into the Arctic Ocean, weakening the vertical movement of ocean water that drives currents, such as the Gulf Stream.

The thaw would release much of the estimated 400 billion tonnes of methane trapped in the frozen soil, driving a positive feedback loop for climate warming.

New Scientist 4 Feb 2006



The idea that humanity is separate from nature – that we are masters of the earth – is an illusion borne of our religious preoccupation with ourselves – we the jury and the judge! The air we breathe is the handiwork of plants, most of the cells in our body contain organelles that once were independent organisms, and we depend upon bacteria to digest our food and keep our skin in good shape. so we have always interacted with nature and we always will, for we share a common home.

*David Tranter
Nature and Society p.34*



Contributions for the next edition of *Nature and Society* are invited now from all members. They should be sent to the editor, Jenny Wanless, 22B Jensen St, Hughes ACT 2605, ph 02 6281 3892, by 15 May 2006.

Contributions may be sent electronically - no formatting, plain text only. This journal was prepared using Office XP and PageMaker 7.0.2 (Windows). Contributions may also be sent on paper.

Items in *Nature and Society* do not necessarily reflect the opinions of the majority of the Forum members, but are published in the hope of stimulating thought and discussion.

This issue was prepared by Jenny Wanless, Gosta Lynga and Keith Thomas.

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