

Nature & Society

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October-November 2007

Editorial

Few Australians could be unaware that a new disease has entered the country. Starting with a couple of horses exhibiting a raised temperature, the fear of an equine influenza outbreak dominated the news, movement of horses was banned and the word quarantine attained a new prominence. It was not the suffering of individual horses that made the outbreak newsworthy, but the fear that the spring racing carnivals might not be held, and the thoroughbred breeding industry would be disrupted.

Although racing enthusiasts would not agree, human society would not be harmed in any way if horse racing ceased to exist. Yet the threat of hundreds or thousands of jockeys, strappers, trainers and other staff being out of work, and of flow-on effects on the tourism, hospitality and fashion industries, led to calls for the outbreak to be declared a natural disaster, with federal relief for those affected. Weeks later the impact of this flu has continued spreading, affecting recreational riders, saddlers and others well away from the racing world.

There are lessons for society to be learnt from this episode. One is that quarantine is important and must be maintained and enforced – despite those who call for its weakening to allow more imports. A second lesson is that our lives and the economy are interconnected in many ways and disruption spreads in many directions.

What then can we expect in the near future when people finally wake up to what is happening in the natural world and the effect this will have on our unnatural economy? Two films, Al Gore's *An Inconvenient Truth* and the documentary *A Crude Awakening* have tried to show the public what we are facing with regard to human-induced climate change, and oil depletion, respectively.

Gore's film has certainly made quite an impact. Now a third film *What a Way to Go* has linked these two problems with two others, human overpopulation and loss of biodiversity. Some viewers find this film too confronting. Yet even this film does not cover the range of major problems we can identify. The plight of the oceans, deforestation, falling food supplies and many others are already on the list.

Occasionally environmental organisations put out surveys asking respondents to rank their greatest environmental concerns. Which one would you choose as the most urgent, most serious from all the above? This misses the point. Each one on the list is enmeshed in all the others. There is one problem with many facets and that problem is human destruction of the planet's life support systems.

This destruction is caused by our over consumption of practically everything, and our equally great propensity to make garbage out of everything. Humans are an ingenious bunch and they constantly find new ways to trash the planet.

In nature every species takes whatever it needs from the environment, and its wastes in turn are used by other species, in a never ending cycle. We, in contrast, take what we need, and then what we want, and invent more

We see only what we have names for.

Garret Hardin

The Ostrich Factor, 1999, p.41

A world of facts lies outside and beyond the world of words.

Thomas H. Huxley (1825-1895)

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wants. We often find ways to make the resulting wastes poisonous or indestructible or both. Then we wonder why nature cannot cope. To solve the problem we must address the whole problem, which is, basically, the way we run our lives and our economy.

Until we realise this, most proposed solutions will not prevent environmental destruction. If you think that climate change is the main problem, and that it is caused only by the burning of fossil fuels, then you can imagine that changing to ethanol, or nuclear power, might be the solution.

If you think more deeply, you find that large scale production of ethanol would probably need industrial agriculture, which uses more energy than it produces. It also uses grains that are needed for food.

Indeed this competition is already forcing up the price of many staple foods around the world, and, combined with poor harvests in many places, causing a decline in grain stocks. In addition it is being used as an excuse to destroy native forests to plant crops, resulting in ever greater carbon dioxide emissions.

Nuclear power is far from greenhouse neutral once you consider mining, processing, transport and construction costs. Also it causes intractable waste problems.

Wiser heads have concluded that the worst thing that could happen to the world would be for humans to find an inexhaustible source of energy that enabled us to continue on our blind way to ever more growth, ever more destruction.

Over the last two centuries we have indeed acted as though we have such a source. Coal fuelled the industrial transition. Then oil provided the most energy intensive and versatile fuel source we are ever likely to have. We have acted as though that could continue forever, but now the oil age is coming to an end. Few people realise what that will mean. When the financial markets finally wake up to the ramifications of a decline in oil supplies it

could lead to panic and a financial meltdown. By then it may well be too late to take the measures we will need to weather the storm.

The only sane approach to limiting the damage we are doing to the planet and to our descendants is to cut back on our demands on the earth, starting now. We need to learn to live within the planet's limits, using the daily ration of energy provided by the sun, the amount of food the earth can grow, and restricting our consumption to leave room for other species to live their lives, too.

Rather than being lords of creation, we are actually dependent on all the other species that together provide the ecosystem services that keep the planet habitable. They purify the water, make the soil fertile, keep the air breathable, modify local environments and provide our food.

Unfortunately, as Chris Mooney wrote in his review of Al Gore's new book *The Assault of Reason* (New Scientist 21 July 2007) 'Perhaps the most inconvenient truth of all is that reason itself – and particularly social science research – shows that most citizens will not have a deep understanding of most issues most of the time. They have neither the time nor the

inclination to become fully informed about everything – and who can blame them?'

Maybe we should not blame most ordinary citizens, or even most ordinary politicians, but unless many more of them actually become aware of human dependence on the vast interconnectedness of life and all natural systems, then we cannot have much hope for the future. With an election in the offing, we have to try to get all political parties to increase their understanding of these issues. And we are in urgent need of some extraordinary politicians who can understand our situation much more clearly than most do now.

Jenny Wanless



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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 25 bus route from Woden bus interchange and walk 200m.

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

New Nature and Society Forum Board

At the Annual General Meeting of NSF held on 19 September 2007, a new board was elected. The board now comprises Professor Brendan Mackey (Chair), Catherine Gross (Vice-chair), Jenny Wanless (Secretary), Kylie Vandenberg (Treasurer), Ian Anderson, Valerie Brown, Rory Eames, and Wendy Rainbird.

Andrew Chalklen, after some years contributing as a member of the NSF management committee and, later, the board, did not stand for election at this AGM. We thank Andrew for his consistent support over the years and look forward to his continued contributions to the forum in other capacities in the future.

Forthcoming NSF meetings

For the latest information visit our website www.natsoc.org.au and click on "What's On". There you will also find a link to maps showing the venues.

Wednesday 17 October 2007, 7:30pm - Climate refugees - a panel will look forward into the future, when rising sea levels begin to flood the heavily populated deltas of Asia and low-lying nearby islands, when some monsoons are diminished and others cause massive floods, when the rivers that sustain hundreds of millions of people in south and south-east Asia lose their dry-season flows from receding Himalayan glaciers and when China diverts their waters north. Australia's responsibilities as a neighbour, as a contributor to climate change, as possessor of a well-watered north with low human population densities will be debated in the context of Australia's own limited human carrying capacity and the implications of peak oil.

The panel will comprise Bryan Furnass (NSF), Andrew Teem (Kiribati) and Kerrie Tucker (ACT Greens).

Venue: the ANU Emeritus Faculty. A map showing the venue can be found on the ANU website. The building is called the Fellows Lane Cottage and is building 3T on this map. Fellows Lane runs off Fellows Road. The cottage is to the immediate north of the Law Faculty buildings and east of the South Oval.

Wednesday 21 November 2007, 7:30pm - A community forum on the need for more sustainable housing developments and the respective roles of government regulators, urban planners, architects and designers (and their educators) and developers, estate agents and house buyers in achieving more self-reliant housing that is also affordable. Nature and Society Forum began in August 2007 a project to enable the community to become more aware of the issues and empowered to respond effectively to the challenges (More information overleaf).

Venue: the ANU Emeritus Faculty.

Reports from NSF

Urban planning and design

This committee was formed initially to promote the booklet written by Derek Wrigley "*Climate change needs housing change*" to expose the very substandard design of planning and housing in the ACT in relation to global warming and climate changes.

Housing in its lifetime is responsible for about half of our greenhouse emissions and significant reductions are quite feasible if we take a critical look at how houses are designed. Naturally available resources such as sunlight, buoyancy, water, soil, microbes and organic growth plus blocks of land with good orientation can supply an adequate degree of comfort and convenience.

An analysis has shown that only 12 per cent of blocks in recent estates were so oriented and proportioned as to allow the houses to make effective use of the sun. This is clearly anti-social at a time when fossil fuels are damaging our atmosphere and becoming so potentially expensive as to be unaffordable.

In addition, not only do current roofs never have photovoltaics or solar water heaters incorporated, but they are so badly oriented and broken up as to make the future installation of these useful devices almost impossible.

The booklet exposes most of these inadequacies and offers solutions which have the potential to provide much healthier accommodation, sunlight in every room (including southern rooms) with a much higher degree of self-reliance, providing most, if not all of the electrical needs of a family (free), requiring no heating or air conditioning and having the future potential to create and fuel the family car with hydrogen (when the technology arrives).

When natural gas becomes too expensive to use for cooking and heating what are the occupants to do? We cannot continue designing houses in such an unthinking way. We have no option but to consider new ways of living

The technology and know how to build these houses is already known and the committee is hopeful that the booklet - now available from NSF at \$15 post free - will stir the consciences of those in power to the point of at least building a demonstration house so that we can all see how it works and realise that it is all possible and can contribute substantially to "*healthy people on a healthy planet*".

Report of meeting

Healthy places - healthy people

It was a pleasure to welcome Tony Capon, a Sydney member of NSF, as our speaker at the August meeting. His topic was Healthy Places: an essential linkage between healthy people and a healthy planet?

As a medical professor and a former Medical Officer of Health in NSW, Tony is well aware of the essential links between the health of people and places. These links can be at many levels. The places can be as small as one's own home, or office, and as large as the country or planet. Tony chose to concentrate on cities, as this is a scale that most people find meaningful. They can relate to their city, and they can take action at that level.

From the start of the public health movement in the 19th Century the emphasis was on the prevention of communicable diseases, largely through the provision of clean water, sanitation, quarantine where necessary, and later, food safety.

By the time of the NSW Public Health Act 1991, concerns had extended to environmental health and a list of chronic diseases, including cardiovascular disease, diabetes, respiratory disease and cancers.

One way of improving people's health in the 19th Century had been to separate people's homes from their work, as so many workplaces produced toxic garbage and effluent. In modern times this is being seen as a contributor to ill health, as urban sprawl means people drive long distances. Indeed it has contributed to the engineering of physical activity out of our daily lives, along with the centralisation of food retailing.

If jobs and infrastructure are provided in new areas, and food supply localised, with a short distance from paddock to plate, there will be benefits for people in the opportunities for incidental physical activity. This will enhance the physical and social health of people, as it provides more time for families and neighbourhood activity.

As well as these changes to provide for more physical activity and local food supply, there are other concerns. They include air quality and asthma; water quality and re-use; safety and the built environment and mental health.

Creativity and innovation are measured not by what is done, but by what could have been done ... but wasn't.

*Charles Willock
Charles Sturt University*

Tony showed a grid for relating our urban ecological footprint to human health and well being. Factors influencing the footprint are as follows: the economy and work; transport and urban form; housing and building; nature and landscape; media and communication; culture and spirituality. It is important that the links between these and factors governing human health and well being are acknowledged and acted on. Human health depends on the quality of air and water, levels of noise, infection and chemical exposure, but there are other factors including: the local climate; access to food; physical activity; safety; family relationships; and social capital.

Rather than seeing all these as separate issues, urban planners and managers need to consider the health determinants, and health workers need input into urban planning. There is no ideal model. Some cities can be very large, and healthy, but big cities are not necessarily good and smaller cities can often be preferable.

Tony Capon is a member of the Oxford Health Alliance (OxHA), in which the University of Oxford, Novo Nordisk A/S and the World Health Organisation are key partners. The Alliance is focussing on the global epidemic of chronic disease, especially concentrating on innovative action with various stakeholders about the three risk factors; physical inactivity, unhealthy food choices and tobacco use.

Linkages in this work include researchers, policy makers, corporations, NGOs, public health professionals and civil society.

There will be an OxHA summit in Sydney in February 2008, with the theme Building a Healthy Future, dealing with chronic disease and our environment. Mental health, which has been absent from the list, is likely to be included at this conference. Tony would like NSF involved, as he thinks we can contribute to this work.

Tony ended with a new formula for the Nature and Society Forum: Healthy people in healthy places on a healthy planet (HP) cubed.

Topics dealt with in the ensuing discussion ranged over a wide field of interest. One was the trend in new developments for small blocks, which could be the slums of the future, with insufficient sunlight, no backyards for children (or for drying washing, for growing vegetables or poultry runs).

Different stages of life have different housing needs. Also there are many small country towns waiting for new inhabitants, and these could be much healthier than Macburbia.

Why has society been so slow to take up renewable energy, when the need for it was noted over thirty years ago? Why do Asian countries ignore air quality and the all enveloping brown haze, in the pursuit of private car economies?

We need to worry about unholy alliances between some big business and government. For example

Australian laboratories used to test various new compounds, but now governments make their assessment on safety using information provided by the companies involved. This type of self-regulation is not working with regard to GM crops and some pollutants.

Sometimes simple actions can do quite a lot to improve health, for example making ordinary drinkable tap water available where children play, so they have options other than buying bottled drinks.

Thanks to Tony for another stimulating evening, and some NSF members are looking forward to working with OxHA.

Jenny Wanless

"Journalists, editors and producers will always prefer to tackle material they know runs down dependable furrows of sentiment and can be communicated through conventional forms". The is due to many factors – he writes at length about the commercial imperative, the concentration of media and the sheer laziness which formulaic journalism can induce, especially when second-hand news and commentary is available in truckloads at the click of a mouse.

"We are all incapable of objectivity". It is most refreshing to see a prominent working journalist tackling that most fragile construct of the Age of Enlightenment, the subjective-objective distinction.

*Richard Begbie,
Canberra Times, 16 September 2007
Reviewing and quoting from
David Salter's
The Media We Deserve*

Positive views, please!

Nature and Society would like to hear from you if you are one of those people who can see positive outcomes for people, as society adapts to the changing world we live in.

We invite you to share these views of the future with the rest of us, for publication in our Christmas/New Year edition. Contributions up to 700 words please, by 20 November.

NSF Chair's Report 2006/2007

Brendan Mackey

Achievements

The last 12 months has seen major changes and developments in our organisation.

1. Governance

- We have a new governance structure, comprising a board and a more systematic approach to managing the major projects we are legally responsible for: (I) ANSI; (II) the PAN Social Change Project; (III) ACT Biosphere Reserve Project; (IV) SEE-Change; (V) Urban Planning and Housing and (VI) Sustainability and Health
- We have produced a new strategic plan, with a revised Vision, Mission, Guiding Principles, and Objectives.

NSF's guiding principles include a commitment that we will conduct ourselves in ways consistent with the values and principles of the Earth Charter.

In this respect, it was pleasing to note the recently released report by the House of Representatives Standing Committee on Environment and Heritage on their inquiry into a sustainability charter for Australia 'Sustainability for survival: creating a climate for change'. And, amongst other things, strong support for the Earth Charter as a reference Charter for the drafting of an Australian sustainability charter; [read quote on 4.7!]

Also, as part of our new governance, we have been working hard to improve our financial management and reporting, with the wonderful assistance of our new Treasurer.

2. We moved to a bi-monthly seminar series focussed on key issues, with every alternative month being a member's workshop. Seminar topics have included:

- Sustainable housing and communities for Canberrans
- The biology of global warming and its profitable mitigation, and
- Applying justice frameworks to environmental decision-making

- Origins of the nuclear/greenhouse impasse: a view from the Earth and anthropological sciences
- Bushfires in Australia
- Recycled water: issues for Canberra

Next month we are holding a public meeting on the topic of *climate refugees*.

3. Our journal continues to be regularly published to a high standard thanks to the tireless efforts of our very worthy editor

4. And, we continue to develop new activities that compliment our major projects, such as the production and promotion of the housing industry booklet by Derek Wrigley.

So, NSF remains a creative and active player in environment and sustainability.

Indeed, I believe we have witnessed a 'phase shift' in the public, private sector, and political concern for these issues. The *Australian Financial Review* is producing a series of major reports on the new carbon economy, and even the *Sunday Telegraph* is imploring us to 'Save Planet Earth'. The

environment is now the economic and political issue. All of this was unimaginable even twelve months ago, and represents an extraordinary opportunity for NSF. We have never been more relevant and more important.

Challenges

However, amidst our efforts and these new opportunities we face many challenges:

- Although our membership base is loyal and much loved, it remains in my view at a sub-critical level, and is age-biased with too few young people
- The lack of a diverse mix of funds remains a major impediment to NSF achieving its potential, as is the overall level of our funding; we simply do not have the financial resources our major projects need to be fully realised. More worryingly, we do not have a secure, ongoing source of funding to cover our core operational and administrative costs, including the overheads associated with employing our wonder office manager, Keith – without whom our operations would collapse!

Technology has a peculiar fascination; it casts a spell on people which makes them believe it to be progressive if they put into practice everything that is technically possible. To me this seems not progressive but childish.

Carl Friedrich von Weizsäcker

- Our ongoing existence up to this point in time continues to be dependent on extremely generous donations from a handful of members; we are all extremely grateful for their generosity!
- Unfortunately, there are no easy solutions. Down every possible funding road, difficulties appear. For example, the board has been discussing the possibility of seeking grants from ACT sporting and other clubs. However, some of you may have heard that the South Sydney rugby league club is considering eliminating pokie machines from its premises on the basis the money is immorally gained!
- In general terms, I believe we must look for income streams based upon our core business and organisation strength, namely, education – education that is in the broad sense that NSF thinks about it. In each of our major projects we need to consider where the opportunities lie and develop appropriate sources of income to cover our core organisations costs.
- Another potential source we need to explore in earnest are grants from major philanthropic organisations; education is after all a major theme and priority for many funders.
- Finally, we need to seriously consider the membership issue and make a decision about an ideal membership size, and set targets and a timetable for achieving this increase in membership. We need a strategy for how we will increase our membership, which must include consideration of young people and people in other cities around Australia. It may be time to consider more closely how we can make better use of the internet.

A challenge. Try, if you can, to spend at least five minutes without the company of plastic sometime today. I'm warning you, it won't be easy. We sit on it, wash in it, eat from it, drink from it, play with it and pay with it. It is more than likely there is some residing inside you. Plastics are literally everywhere.

Daisy Dumas, in The Ecologist, 2007

Looking ahead...

Of course, the other big news is that we are moving NSF HQ from Weston Creek to a lovely office in the old part of ANU's JCSMR. This is actually something of a home coming, as it has been Frank Fenner's office and Steven Boyden's originally residence in JCSMR – so the wheel has turned full cycle. Many thanks to Frank for organising this, which means, amongst other benefits, that we will have certain of our operational overhead costs covered for us by the school.

Thoughts on biodiversity, past, present and future

Extinction. that is a heavy charge to make. it proclaims that Sapiens had become a species so technologically powerful, so effectively deadly—and so psychologically fixed on its superiority to the rest of life—that it could eliminate one whole other species from its habitat. Not necessarily by intention—in fact probably by intention, not taking the time and care to figure out the long-term effects of its actions, though surely as hunters intimate with the ways of their prey they knew that mammoths took a long time to gestate and a long time to grow to reproductive age, and had arrogance not overpowered humility they might have realized their effect on the dwindling herds and switched to other animals.

Kirkpatrick Sale

After Eden, 2006, p86
on our attitude to natural resources

[20,000 years ago our ancestors must have thought] there had always been mammoths, why would there not always be mammoths? Besides, if one tribe refrained from killing them, even if it

realized that the mammoth numbers were dwindling, how would it know if another nearby tribe would make the same decision? And if the meat supply from other species was scarce, there may have been no good alternative to killing mammoths, who were, after all, a very economical source of meat.

Kirkpatrick Sale

After Eden, 2006, p86

The essential wisdom of biocentrism, a way of coming to regard the human, as the ecotheologian Thomas Berry has put it, “at the species level”, as one more creature on the earth in essence no grander and greater than the rest, and at heart ultimately dependent upon them and their continuing healthy interactions for our very lives. We are so cocooned in our human centredness in most of our existence that this sort of humility seems well-nigh degrading, or juvenile, but it is of course the crucial element of a worldview that knows domination to be wrong and integration to be right.

Kirkpatrick Sale

After Eden, 2006, p.130

The oceans' plight

In an article entitled *Landfill-on-sea* in the *Ecologist*, Daisy Dumas highlighted the appalling problem of plastic rubbish in the ocean. Of course it was man-made rubbish in the ocean that propelled Ian Kiernan into starting the Clean-Up Australia campaign, but all the efforts by thousands of concerned citizens in this and other countries have hardly slowed the increasing garbage dump in the ocean.

Once upon a time the flotsam and jetsam from sailing ships, wrecked or otherwise, provided stories of adventure and romance, castaway sailors, hopes dashed and, in some places, a livelihood for the tough and often callous people inhabiting rocky coastlines. Now the flotsam and jetsam has assumed even greater tragic dimensions, and affects all the oceans, all the time.

The Great Pacific Garbage Patch (GPGP) describes an area of the northern Pacific Ocean twice the size of France, in which the rotation of currents in a large subtropical gyre traps a mass of plastic that is estimated to be the largest body of pollution in the world.

Plastic is virtually indestructible, and it is deadly. Greenpeace estimates that one million birds and 100,000 marine mammals die in the GPGP each year. They can be strangled, drowned, starved with stomachs full of plastic, or poisoned by the man-made toxins that collect in, and leach out, of plastic.

Biodegradable plastics are not the answer. They are decomposed by high temperatures and light, at specific pH levels, and these conditions are not common in the ocean. Also the small pieces they break down into can be mistaken for food, and still kill.

The GPGP is not the only floating garbage patch. Indeed as the aboriginal custodians of the Gulf of Carpentaria know only too well, that semi-enclosed body of water traps lots of rubbish, and after every storm the coastal people have to clear their beaches of plastic and cast away nets, and the bodies of creatures killed in their meshes.

There is a stream of bad news coming from many parts of the ocean. Australia has learned of the problem of toxic shellfish and heavy metal pollution

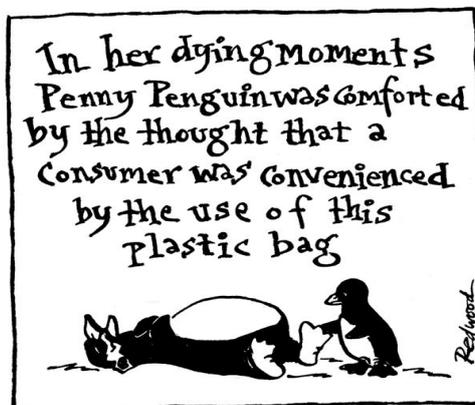
of seaweed in Sydney Harbour. Moreton Bay is experiencing the encroachment of fields of fireweed, the slime from which, brought up on fishing nets, causes painful blistering to any human skin it touches.

Overdoses of basic nutrients, washed off agricultural land or from sewerage outfalls, have severe effects on many marine ecosystems. Overfishing has altered the balance of life in many areas of the sea. In some fisheries now the main haul is jellyfish.

Rising carbon dioxide levels in the atmosphere are acidifying the ocean, and can affect the ability of sea life to form shells or coral. Global warming itself will certainly damage coral reefs, and affect whole ecosystems. There are commentators who think that human actions have gone so far that they may wipe out 500 million years of evolution, taking us back to oceans dominated by bacteria and jellyfish.

If anyone still doubts the ability of humans to change the climate, they should look at the way humans are changing the great marine areas of the planet that could well have been named Ocean, rather than Earth.

Jenny Wanless



The tragedy of the ocean commons

If boats of all countries respect the rules, tuna will not be finished. If only a few countries respect the rules, and others don't respect the rules, the fisherman who respects the rules is finished.

Alfonso Consiglio
Spanish purse seine trawler owner
National Geographic magazine
April 2007, p.51

Oceans crash

We haven't yet learned how to factor the health of the environment into our economic paradigm. We need to get to work on this calculus quickly, because a stock market crash will pale in comparison to an ecological crash on an oceanic scale.

Charles Moore of the Algalita Marine Research Foundation, 2007

Good News in New England

In the 1980s the New England area of NSW suffered devastating dieback of its trees. Dieback had been gathering pace since the 1950s, but no one knew why it was happening. Was it disease, attacks by insects, or a change in farming practices to improved pastures and the accompanying use of fertilisers?

Some wool growing families decided to change the way they managed their properties. They began planting trees along fence lines, in clumps, along contours or in corridors. They soon found that the trees repaid them handsomely, providing shelter for new born lambs and newly shorn sheep during cold snaps. The loss of stock dropped. The weight of fleeces actually increased; sheep that were busy shivering had less energy for growing wool.

The Land, Water and Wool Project studied these ten properties and has found that they provide convincing evidence that helping the environment has improved farming. The paddocks are only lightly grazed, so there is plenty of feed, and the sheep do not eat tree seedlings, boosting revegetation. There are lots of insects in the grass, but plenty of birds to keep them in check. Rare birds have returned, so have koalas and other native animals.

For some of the men who spent their boyhood helping their fathers to ring bark trees, it is ironic but wonderful to see that farming and the environment can both benefit from the simple act of growing trees, and not overgrazing paddocks.

Land Line, ABC TV, 23 Sept 07

We removed ourselves from the fundamental position in nature that we had heretofore shared with absolutely all other species since life began; we abruptly stepped out of the local ecosystem. We told Mother Nature we didn't need her anymore; that we could take care of ourselves

What does it mean to live outside ecosystems? It means that our interests no longer dovetail with those of the natural world around us ... Inventing agriculture in a very real sense was tantamount to declaring war on local ecosystems.

Niles Eldridge, *Dominion*, 1995

Environmental and climate change refugees

Likely impacts of climate change on Oceania

The latest United Nations report of the Intergovernmental Panel on Climate Change (IPCC) paints an alarming picture of the emerging global impact of climate change. Predictions include rising sea levels, increased frequency and intensity of cyclones, droughts, floods and extreme weather events, loss of species diversity, threats to food and water security and the spread of vector-borne infectious diseases to wider latitudes and higher altitudes.

The number of people killed in the Oceania region by weather-related disasters rose 21% over the last three decades of the 20th century, including those effected by events such as cyclones, floods, landslides, droughts and extremes of temperature. Worldwide, around 188 million people were adversely affected by natural disasters in the 1990s, six times more than the 31 million directly or indirectly affected by war. These events will affect Australia indirectly, including pressures for migration from potential environmental refugees amongst our neighbours in the Pacific Islands and coastal areas of South and Southeast Asia.

Impacts of climate change in the Pacific Basin

Natural disasters linked to climate change may prove a great security challenge for developing nations, displacing affected populations, feeding into existing or inter-communal conflicts. In extreme cases, the survival of the nation itself may be in question. For example, in the absence of effective mitigation strategies, a one metre rise in sea level would flood about 17.5% of Bangladesh and much of the Ganges river delta, which is the country's food basket. Strangely, the UN does not officially recognise the category of environmental refugees.

Sea-level rises may also have dire consequences for low-lying atoll countries in the Pacific, such as Kiribati (population 78,000), the Marshall Islands (population 58,000), Tokelau (population 2000) and Tuvalu (population 9000). One estimate is that by

In truth, though, it's not about who's saying it. That's why all the attacks on Prince Charles' and Al Gore's lifestyles are misplaced. So what if those who aspire to a better world don't always attain the reach of their words? Do you? Do I? Does anyone? Are only the saintly allowed to suggest that humanity needs new – higher – standards? Are only those goals that seem immediately achievable the ones that should be given consideration? Surely the important thing is to keep trying.

*Jeremy Smith
The Ecologist, May 2007*

2080 the flood risk for people living on small islands will be on average 200 times larger than if there had been no global warming, and the risk would be even higher if the melting of polar ice continues at present rates. Larger, more mountainous populous islands such as Fiji and New Caledonia will also be seriously affected. In a worst case scenario of sea level rise, much of Fiji's productive land and urban areas would be flooded. Unsurprisingly, climate change has risen to the top of the political agenda in the Pacific, the leaders of all Pacific nations expressing their deep concern about the impact of climate variability and sea-level rise at the 2002 Pacific Island Forum.

Rising sea levels pose far wider challenges to regional security than the survival of small island states in the Western Pacific. Most of Asia's densest aggregation of people and productive lands are on, or near, the coast, including the cities of Shanghai, Tianjin, Guanzhou, Hong Kong, Tokyo, Jakarta, Manila, Bangkok, Singapore, Mumbai and Dhaka. The areas under greatest threat are the Yellow and Yangtze river deltas in China, Manila Bay in the Philippines, the low lying coastal fringes of Sumatra, Kalimantan and Java in Indonesia, and the Mekong, Chao Phraya and Irrawaddy deltas in Vietnam, Thailand and Myanmar respectively. Many of these locations have not previously been susceptible to climate induced risks and their vulnerability has increased due to extensive urbanisation and human settlement in coastal and riverine environments, exacerbated by extensive land use clearance. Moreover, several large Asian cities are susceptible to cyclones driven by warm expanses of water that form in the west equatorial Pacific Ocean during summer. These cyclones produce strong tidal surges, especially in La Nina years, which can greatly increase the severity of coastal flooding and the consequent threat to lives, infrastructure, agriculture and fresh water.

Potential refugee migrations

The United Nations High Commission for Refugees (UNHCR) estimates that there were 2.4 million refugees globally in 1975, rising tenfold over the following two decades, peaking at 27.4 million in 1995, thereafter declining to 19.2 million in 2005.

In addition to political refugees, some contend that environmental refugees now constitute the fastest growing proportion of refugees globally. Oxford academic Norman Myers predicts that by 2050 up to 150 million people may be displaced by the impact of

global warming and sea level rise - up to 26 million people from coastal regions in Bangladesh, 73 million people in China and 20 million in India. By 2050, refugees from environmental causes could exceed all others by a factor of six, although it is difficult to disentangle environmental from many other causal variables.

Sea-level rise, more frequent storm surges and other climatic factors with the potential to stimulate migration may increase gradually over the course of many decades, allowing affected countries to make adjustments and to ameliorate the effects. Climate induced migration is set to play out in three distinct ways. First, people will move out in response to a deteriorating environment, creating new or repetitive patterns of migration, especially in developing states. Secondly, there will be increasing short-term population dislocations due to particular climate

stimuli such as severe cyclones or major flooding. Thirdly, large scale population movements are possible that build up more slowly but gain momentum as adverse shifts in climate interact with other migration drivers such

as political disturbances, military conflict, ecological stress and socio-economic change.

What can Australia do? Some speculative ideas

Unfortunately there has been no comprehensive analysis of the number of people likely to be displaced as a result of climatic factors, particularly sea-level rises of the order predicted by the IPCC. Most displaced persons will probably seek refuge within the boundaries of their native countries or in neighbouring states with similar ethnic and cultural backgrounds. Experience of the tsunami which devastated the Indonesian province of Aceh in early 2005 suggests that survivors may not have the physical resources or mental resolve to move very far away from their homes.

Australia and New Zealand surely have a moral responsibility to accept refugees from Pacific Islands inundated by rising sea levels. Their combined population is relatively small - in the region of 150,000, and some of them - from Tokelaua and Tuvalu already have negotiated rights to enter New Zealand, and Marshallese can settle in the United States. Only the inhabitants of Kiribati (population 78,000) have no real migration options, and may seek entry into Australia or New Zealand.

A worst case scenario would occur from abrupt climate change, if greenhouse gas emissions exceeded IPCC predictions through massive escape

Theories of progress are not scientific hypotheses. They are myths, which answer the human need for meaning.
John Gray
Black Mass, 2007 (p 2)

of CO2 and methane from Arctic tundra, if oceans and forests became CO2 emitters rather than CO2 sinks, and if the West Antarctic ice shelf were to dissolve into the ocean, resulting in sudden rise in sea levels. In that event it is probable that there will be massive mortality around the Pacific Basin, either directly or indirectly via food deprivation, infectious diseases or human conflict. Increased mortality rates may lead to population stabilisation or decline, which would reduce global pressures for resources. But there might then be tremendous pressure for boat migration to Northern Australia from the many millions of inhabitants along the Pacific rim, posing a security, resource and public health nightmare for adaptation, particularly since Australia's own food supplies may be compromised by drought in the southern states.

A positive spin on catastrophe

As a nation of migrants, Australia has an interesting history of successful cultural adaptations over the past two centuries, starting with involuntary and later voluntary intake of British migrants from the late 18th century and the shameful neglect of indigenous Aboriginal culture. During the Victorian Gold Rush at Ballarat in the mid-nineteenth century, co-operative working arrangements were achieved between the local Aboriginal community, white settlers and the large intake of Chinese migrant miners.

The prospect of arrival of many boatloads of environmental refugees in the Northern Territory would present formidable ethical, resource, housing, public health, security and social challenges which might at first sight seem unsurmountable. On the other hand, given the social and political will, a combination of local Aboriginal knowledge of the land, Asian expertise in horticulture and Western application of renewable energy and water technologies might enable Northern areas of Australia to provide a sustainable environment for new migrants and food production for other parts of our country.

Acknowledgement - I am grateful to Alan Dupont, Graeme Pearman and the Lowy Institute for permission to quote substantially from their book *Heating up the planet*.

The pursuit of a condition of harmony defines utopian thought and discloses its basic unreality. conflict is a universal feature of human life. it seems to be natural for human beings to want incompatible things – excitement and a quiet life, freedom and security, truth and a picture of the world that satisfies their sense of self-importance. A conflict-free existence is impossible for humans, and wherever it is attempted the result is intolerable to them. If human dreams were achieved, the result would be worse than any aborted Utopia. Luckily, visions of an ideal world are never realized.

*John Gray
Black Mass, 2007, p 17*

Welcome to an entirely new “waterworld” – variety australis!

Peter Fisher looks at the conundrum of economic expansion, urban water supply and climate transition.

“I think it cascades down the spectrum”: Rather than talking about tax thresholds Kevin Rudd might well have been referring to the stepping down of water solutions as the country, far north aside, dries even further: To wit, new dams, “super pipelines”, water grids, direct potable (drinking) water reuse and desalination plants. Exotic concepts like the Salt Greenhouse are not yet on government shopping lists but hang about.

On a continent sliding towards a South Seas variant of what climatologist James Hansen calls an “entirely new planet”, authorities are scrambling to ensure sufficient supplies to meet business-as-usual growth projections.

In so doing, they're turning to the sea for what is now the most favoured solution and the ultimate engineering fix – desalination plants: There is a certain irony in the fact that a retreating primeval sea left a visiting card of salt – a salt which is now producing unacceptable salinity levels in drought diminished streams. But now household water saving

and to a lesser extent, restrictions, are lessening flows in sewers across the nation (down to 40 per cent on average in Brisbane) leading to ever higher salt concentrations that are even threatening to make basic treatment processes even for wetting down roads and irrigating ovals, etc., non-viable, let alone for adding to potable water supplies.

More exacting standards of treatment usually feature reverse osmosis (RO) in combination with membrane filtration either of the ultra- or nano-forms. These are high carbon processes (i.e. they use lots of energy with consequences for CO₂ emissions from coal fired power stations) and without a plethora of wind turbines could undermine GHG targets compounding the very problem of climate change. A modest 10 ML per day RO-NF

Bryan Furnass

plant for instance could use in the vicinity of 15,000 kWh adding 12 metric tons of CO₂ into the atmosphere if the electricity comes from a black coal fired power station and half as much again in the case of brown coal.

At the heart of our water problem is the new climatic backdrop: Localised, wild deluges following a long dry as witnessed in East Gippsland and on the Sunshine Coast this year, but overall less water in the dams. Is this the new pattern we can expect as small temperature increases interact with those cantankerous Pacific Ocean twins, El Nino-La Nina? Or will larger increases dominate? A rising incidence of what meteorologists call "convective rainfall" – violent cloudburst like thunderstorms as opposed to gentler rain associated with the passage of fronts – may be on the cards.

Meantime up in the catchments, accelerating dryness will increase the likelihood of contagion fires posing a serious threat to water supplies by lodging contaminants (as well as affecting medium term yield as a result of tree re-growth). For example, the 2003 Canberra maelstrom coming on the back of the 2001-2003 drought, burnt 47,000 ha of forest denuding 98 per cent of the city's Cotter River drinking water catchment. If this wasn't bad enough the run-off from a subsequent deluge deposited 21,200 metric tons of debris into the Bendora Dam leaving 800 tonnes of sediment - 17 times the annual average sediment load. There were huge rises in turbidity, iron and manganese, organic carbon, phosphorous and nitrogen along with the presence of harmful polyaromatic hydrocarbons released from burnt plant matter albeit at low concentrations. The water still wasn't suitable for human consumption a year on.

Back on the coast it's not going to get any easier: Most of the heavy wastewater infrastructure around the country is situated quite close to the sea (often experiencing seawater infiltration) making it vulnerable to sea level rise or SLR (not a camera lens) – climatologists are now reporting that the melting of the Greenland ice sheet is 30 years ahead of the modelling so a SLR of a metre or so within the next few decades is not as far fetched as once thought. Supplies of recycled water deriving from advanced wastewater treatment systems situated at or near such infrastructure are thus vulnerable.

If many wastewater treatment plants are at risk of inundation then desalination plants too, tucked in the back of the dunes, will certainly be in for a difficult

time. It does not appear that SLR has been factored into prospective locations and design criteria. An early establishment of buffer zones should aim to reconcile their siting with incursion models.

The emergence of wave power technologies – see for example, last month's announcement of a 3 megawatt plant, the world's largest, off the Orkney Islands – at least provides an alternate, less intrusive, energy source to wind apropos of the Kwinanas in WA. And, at the supply augmentation level, there are promising developments in floating desalination units.

So where does this leave us?

First, we desperately need an integration of water and energy into a consolidated greenhouse gas abatement and climate change adaptation strategy.

Second, there is scope to research and develop low carbon advanced water treatment technologies for applications detailed below – electrolysis based systems may suffice in the interim. If

this summer is anything like what Greece – our climate zone counterpart - has just gone through whence 65 people died as fires torched 180,000 hectares of land – we're staring at the prospect of runaway energy consumption off the back of water supply limits on power generation. It's time to do the energy arithmetic for water security, too.

Third, the water debate has in large part downplayed the quality issue. There are serious questions about the hidden contamination of H₂O and difficult management issues in using recycled water for direct potable reuse. But ahead of the development of new generation treatment systems urgent measures are needed to prevent emergent pollutants reaching sewers in the first place and thence into sludge and effluent, by pre-treating discharges at hotspots. Insofar as pharmaceuticals, hormones, and other organic wastewater contaminants are concerned, a good starting point would be requiring hospitals and clinics to implement best practice regimes (no more squirting drug residuals in syringes down sinks) while installing treatments such as activated carbon prior to discharge to sewer*. In other words, a shift is needed from end-of-pipe

The first principle is that you must not fool yourself - and you are the easiest person to fool.

Richard Feynman

* Fisher PMJ and Borland R. Gauging the pharmaceutical burden on Sydney's environment: a preventative response, *Journal of Cleaner Production* 2003; 11: 315-320.

thinking towards prevention and/or treatment closer to origin points.

It's breathtaking to discover that between 60,000 and 80,000 synthetic chemicals are in current commercial use worldwide and 1800 new ones are released every year. An unknown portion of these would be residing in sediments either "in-solution" or attached to particles in surface and groundwater, either in their parent or degraded form. Yet more could be bound up in mixtures in these mediums. New research has suggested that mixtures of compounds may have synergistic relationships leading to potentially damaging effects: A Californian study on frogs, for example, has found that while one chemical alone may do no harm in low doses, in conjunction with others, even in doses that are individually safe, it can do serious harm. The US Geological Service is similarly cautious - "the potential effects of contaminant mixtures on people, aquatic life and fish-eating wildlife are still poorly understood" as are researchers at Britain's Brunel University - "mixtures of chemicals can pose a significant threat to population-level processes, even when the components are present at low and individually ineffective concentrations."

Whether ensnared in activated carbon (AC) filters which have proved reasonably effective for first pass stripping, or in the "reject concentrate solution" of Reverse Osmosis (RO) Nano Filtration (NF) treatment systems, this witches' brew is in all likelihood, biologically hazardous. The AC filters, "reject concentrate" and "back flush" solutions (used to periodically unclog membranes), should be carefully disposed of preferably in secure landfill. The remaining water that makes it through RO-NF/UF treatment trains will have elements of this brew, however tiny, which will one way or another end up in the wider environment. Declared "safe" for human consumption - which is by no means clear cut due to concerns about chemical mixtures - an RO-NF filtrate may not necessarily be without effect on smaller aquatic organisms in the light of their chronic, 24-7 exposure. We simply don't know.

In short, the science is still evolving and the technology for detection and stripping, while making progress, has some way to go.

The industry needs to get across the rapidly developing field of ecotoxicology to sharpen

understanding of prospective health hazards and environmental impacts from wastewater *discharges*. It should similarly be making use of the increasingly sophisticated policy tools for dealing with scientific uncertainty that have recently been developed in the UK and elsewhere.

Meantime, we may have one or two major direct potable reuse projects in cities unwilling or unable to use desalination. In the circumstances where a very water-stressed population is committed to using water from a questionable source, it's hard to imagine a situation where (any) new research casting doubt upon its wisdom would result in a shutdown pending upgraded filtration processes, if there are any. The issue may just become muddled and confused like that surrounding Hormone Replacement Therapy or mobile phone usage.

In the Netherlands, Italy, Germany, Austria, Belgium and Slovenia, patients with depression are prescribed agricultural work. Holland has 600 care farms that are part of the health service compared with 43 in the UK, none of which are aimed at mental health.
BBC News 14 May 2007

In any event, we aren't forced to go down this path in order to supplement supply. There are major opportunities for industrial water recycling (integrated with improvements in energy and materials) in areas such as food, textiles, refineries, laundries, and even sale yards in provincial cities,

using advanced wastewater treatment systems. Preventative measures are also possible in the case of power stations by resort to air cooling and more promisingly, new technologies that will enable any source of low grade heat to be used obviating the need to burn coal and use water for cooling. In the interim, seawater cooling has yet to be harnessed in industrial plants located on the coast and there are as yet, unexploited opportunities to recruit waste heat for thermal desalination of seawater for process and cooling water.

Last but by no means least; it's bizarre that our population growth aspirations persist in the wake of Australia IPCC2. Might a new WWF report by respected climate scientist Barrie Pittock pointing to a possible threefold increase in heat-related deaths, the collapse of crop yields and a serious decline in river flows, lead to a serious scrutiny of how many more people we can accommodate in this ancient land without completely running out of water? Don't hold your breath for an outbreak of sobriety!

Dr Peter Fisher is an environment industry specialist who teaches water management at Central Queensland University, Gladstone.

Farrago

Drought-resistant wheat

The higher temperatures and lower rainfall expected as a result of climate change will reduce the yield from the varieties of wheat commonly grown in Australia at present. To counter this the Molecular Plant Breeding Cooperative Research Centre has been developing up to thirty strains of wheat, each using one of six genes for drought tolerance, derived from maize, thale cress, moss or yeast.

The new strains will be compared with non-GM wheat in two field trials that have been approved. They will take place in a drought affected area of western Victoria.

Australasian Science, August 2007

Ecosystem services

Humans underestimate their need for the ecosystem services provided almost unnoticed by other species of life. We depend on them for many things, including sequestering carbon dioxide and purifying water.

Researchers at the University of Zurich, Switzerland, analysed the ecosystem

services provided by grass species. They found that the more ecosystem services we need grass to perform, the greater the number of species of grass there must be in the system.

To support us we need whole ecosystems, not just a few species to perform particular services.

New Scientist, 14 July 2007

We assume that because Americans speak English, their world is just as comprehensible to us as their own. But as George Bernard Shaw observed, Britain and the US are two countries divided by a common language. The same surely applies to Australia and the US.

*Jenny Stewart, Canberra Times
30 April 2007*

(Thus, in some ways it helps to understand Americans' ways better if we imagine them as speaking a language other than English)

inhibits a range of fungal pathogens that affect grain and fruit crops. It is also active against *Trichophyton tonsurans*, which causes human tinea. In addition, gluconic acid is a key agent in dissolving phosphate in soils, thus making it available to plants.

In 2002 GGA and the Grain Research and Development Corporation provided funds to fully develop the research and

Cure for wheat fungus

In 1988 there were big losses in the Australian wheat crop caused by *take-all*, a fungal infection of the roots. The Grain Growers Association (GGA) gave a small grant to Dr Murali Nayuda, at the ANU, for research into biological control of the fungus.

Years of research by Nayuda and his team found a native soil-dwelling bacterium, a strain of *Psuedomonas*, which attacked the take-all fungus. With continuing GGF support, the team isolated the gene in *Psuedomonas* that produces the active compound, and they have created new strains of the bacterium by adding more copies of the gene, enabling better control of take-all.

To their surprise the team found that the active substance is a simple sugar, gluconic acid. It

prove its commercial viability. The eventual product will involve coating wheat seeds with a film of the bacteria in suspended animation, ready to become active when grain is planted. Field trials are already underway in North America.

Unfortunately, Dr Nayuda has found that because of the need to protect patents, he has been unable to publish, so the work has not lead to scientific recognition.

Australasian Science, June 2007

New Rail

Western Australia is the first state to have acted on the realisation that healthy public transport provides at least part of the solution to two 21st Century challenges: climate change and urban congestion. Later this year WA will open its showpiece one billion dollar Southern Suburbs Railway linking Perth with Mandorah, serving a population of 400,000 in growing dormitory suburbs.

The 2006/7 state budget surplus of over a billion dollars has been used to pay for the rail link, ensuring it is debt-free from the start. The service will provide trains at ten minute intervals in peak hours, with trains operating at speeds up to 130km/hr. Local buses will connect with the trains, providing an integrated network.

The Weekend Australian, 18-19 August 2007

HIV hinders conservation

Biodiversity in Africa is intertwined with the effects of the HIV/AIDS epidemic. The economic havoc caused by the epidemic forces people to turn to bush meat, it leads to increasing use and over harvesting of native medicinal plants as affordable treatment for the effects of AIDS, and the demand for coffins leads to deforestation.

The actual conservation of endangered species in national parks and reserves suffers as trained staff die from AIDS or have to leave work to care for their families. Training new staff takes time and money, both of which are in short supply in the affected countries.

The only chance to break the cycle of disease and environmental degradation is for health, conservation and agriculture projects to work together to find solutions.

New Scientist, 14 July 2007

Mangroves

In the reporting of the effects of Cyclone Larry, which occurred in March last year, there was no mention of the fact that many yachties saved their yachts and themselves, by upping anchor and moving to one of the mangrove creeks in the region.

Coastal development in many areas has seen the clearance of mangroves, but in northern Queensland good science and sensible planning has retained many mangrove lined creeks as fish habitat, and as safe havens during cyclones.

Mangroves are now protected and cannot be destroyed without a permit.

Perspectives, ABC Radio National, 13 July 2007

They don't get it!

A celebrity gardener who loves outdoors living in all seasons. He says that gardening helps to reduce his carbon footprint, because every tree he plants takes up one tonne of carbon emissions. But he adds that in winter he uses outdoor heaters and open fires.

The editor of a motoring magazine who wonders if he should change to a new, green car now. (It has to be powerful enough to tow his boat.) Or should he wait for the new greener cars of the future which will save the planet when they are adopted by all drivers.

Readers are invited to contribute more examples to this occasional series.

Shading to save water

An Israeli technique for shading broad-acre vegetable crops has been tested near Griffith, in southern NSW. The large screen houses have shade cloth roofs, with side panels to reduce wind speed. Melon growers found that crops grown in these shade houses needed thirty per cent less water than in the open.

Interestingly, reducing evaporation by wind is a bigger contributor to water savings than is the reduced exposure to sunlight. However some pests flourish under the cloth, with too much water encouraging diseases such as Pythium and Phytophthora.

Israeli research suggests the cloth will only pay for itself where the cost of water and the value of the crop are both high.

Australasian Science, June 2007

Peak oil, the environment and modern time-frames

Morgan Stanley energy analyst Stuart Baker is blunt: "I don't think about peak oil because my clients don't think about peak oil. To the extent that they think about it, it is something for the future, but hedge funds want to make money in six months."

Australian Financial Review
4 August 2007

Comment: this quote exemplifies the short-term thinking mindset which imperils the environment and human societies whose timeframe extend beyond six months.

With climate change, it is looking ever more likely that we will be gradually overwhelmed by repeated disasters and shocks such as bush fires, floods and storm surges and eventually a systems collapse. Perhaps this is why there are no space traveling aliens - maybe technocrats never value and consequently always destroy their environment.
June Lewis
posting to the Greenleap discussion list on 4 September 2007



Nature and Society Forum

Contributions for the bumper holiday reading 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 November 2007.

Contributions may be sent on paper or electronically. This journal was prepared using Microsoft Word and PageMaker 7.0.2.

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.

Jenny Wanless and Keith Thomas prepared this edition together with the named contributors; Jenny and Keith also contributed the unattributed items and provided the quotations.

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