

# Nature & Society

The Journal of the Nature and Society Forum

October-November 2012

## Editorial

In his book *The Island of the Colour-blind* (1996) Oliver Sacks recounted his travels to Pingelap, in Micronesia, to study the achromatic people of that island. On the plane he met a large genial American, an importer of canned meats, who enthused over his role in introducing the nutritional benefits of canned meats, especially Spam, to the local inhabitants. Without his work, as he said, the benighted locals would still be eating their traditional diet

of taro, breadfruit, banana and fish. The Spam Baron, as Sacks called him, seemed to be completely unaware that his 'civilised' diet had led to obesity, diabetes and hypertension.

To that list of unpleasant outcomes we could add several other adverse effects of the Spam diet. One would have been a considerable lessening in physical activity, as locals just took a short stroll to the shop to buy their tinned meat. It also started an intractable waste problem replacing biodegradable waste, food for other species, with heaps of cans that would not degrade.

Indeed in many ways it would have meant a greatly impoverished life style. Where people used to have to plan fishing expeditions, using expert knowledge and skills perfected over generations, or walk through the bush to good gathering sites, they now had less use for their mental skills, and a lot more time to feel bored. And that is not even counting the high fossil fuel energy costs of the canning and transporting of the meats.

The Spam Baron is not alone in espousing something that appears to improve people's lives, but that is actually deleterious. In fact it is

a chronic problem and we have not done a good job in sorting out beneficial innovations from bad ones.

Nikola Tesla (1857-1943), the genius who seemed to have an intuitive understanding of alternating-current electricity, has been called *the man who invented the 20<sup>th</sup> century*. Before Tesla, Edison had established and promoted direct current generation, electric light, and the equipment to use DC. Tesla revolutionised the entire electrical industry by developing

dynamos, AC motors, hydroelectric generation and much more. Most of his inventions became widely used and are still in essence with us today. All of us who depend on the electricity grid owe thanks to Tesla. (Although we now know the cost at which that convenience is being bought.)

However he had one plan that would have been unequivocally disastrous if he had brought it to fruition. He wanted to light the whole world, in effect banish night. Fortunately he did not proceed with that one. Just as well, because if you reflect on it from an ecological point of view you

would realise it would have been the end of all

*The confirmation bias (the mind's tendency to pick and choose information to support our preconceptions while ignoring a wealth of evidence to the contrary), is just one of a truckload of flaws in our thinking that psychologists have steadily documented over the past few decades. Indeed, everything from your choice of cell phone to your political agenda is probably clouded by several kinds of fuzzy logic that sway the way you weigh up evidence and come to a decision.*

*Why did we evolve such an apparently flawed instrument? Our irrational nature is very difficult to explain if you maintain that human intelligence evolved to solve complex problems, where clear, logical thought should offer the advantage ....* (cont. box p. 2)

*Dan Jones, The Argumentative Ape, New Scientist, 26 May 2012*

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those species that rely on changing length of day to spur their breeding and growth. Unfortunately, in our quest for ever greater comfort and convenience we have partially achieved the same result, with much of the Earth lit up like a fairground, and climate change definitely disrupting breeding seasons.

Now we have the rush to unconventional gas - shale and coal seam gas obtained by fracking the rock strata. People in the business see an opportunity for quick monetary gains. On the other side farmers see long-term - even permanent - risks: the possible destruction of good food producing land; polluting ground water, including the Great Artesian Basin. What is more important, gas to fuel economic growth, or water for cattle, for growing crops, and for drinking?

Other problems with fracking seem to have escaped attention. It is an essentially leaky process. Leakage during development and processing mean that unknown but significant quantities of methane escape into the air. Based on actual data from the USA it is probable that unconventional gas is just as dirty a fuel as coal. Also if, as many propose, we could continue our relentless consumption of energy as long as we work out how to sequester the resulting carbon gases underground, then fracking will have stymied that option. By cracking all the rocks in which the gas was stored, we will have made them leaky, reducing the potential sites for geosequestration.

The current rush to get out all the gas from coal seam and shale formations seems very short sighted in other ways, too. In the USA so much is being produced that the price of gas has fallen. In an effort to shore up gas prices the USA is now starting to export liquefied natural gas. This seems amazing and illogical for a country that is concerned with improving its energy security. Preserving their underground resources until they need them for their own use would appear to be the logical position.

So is it with many of the bright ideas of humankind in finding ways to take the hard

work out of living. We rarely if ever count the full cost of our beloved inventiveness. The modern search for alternative energy sources to replace our addiction to fossil fuels is replete with examples of proponents overlooking the obvious downsides to their favourite new technology.

Yet, just as burning coal and oil to power our expansion through the last three centuries has turned out to be at an enormous and completely unacceptable cost to the environment, each of the proposed methods of fuelling that continuing expansion also carries an unacceptable cost.

It is time to ensure that economics takes account of reality, to understand that development at the expense of the environment is both dangerous and stupid. It will not profit humans as a species if we make a great deal of money by continuing to destroy the very environments on which we depend for life.

**Jenny Wanless**

*(From box, p 1)  
... [Hugo Mercier and Dan Sperber] believe that human reasoning evolved to help us to argue. An ability to argue convincingly would have been in our ancestors' interest as they evolved more advanced forms of communication, the researchers propose. Since the most persuasive lines of reasoning are not always the most logical, our brains' apparent foibles may result from this need to justify our actions and convince others to see our point of view – whether it is right or wrong.*

*Dan Jones, The Argumentative Ape, New Scientist, 26 May 2012*

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### Moral idiots

All attempts to control the universe, to play God, to become the arbiters of life and death, have been carried out by moral idiots. They will relentlessly push forward, exploiting and pillaging, perfecting their terrible tools of technology and science, until their creation destroys them and us. They make the nuclear bombs. They extract oil from the

tar sands. They turn the Appalachians into a wasteland to extract coal. They serve the evils of globalism and finance. They run the fossil fuel industry. They flood the atmosphere with carbon emissions, doom the seas, melt the polar ice caps, unleash the droughts and floods, the heat waves, the freak storms and hurricanes.

Chris Hedges at TruthDig.com, August 2012  
writing in commemoration of Hiroshima

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### When? Now!

Collapse is a process, and we're already in it, whether we know it or not.

Tim Murray, commenting on Chris Clugston's *Scarcity: Humanity's Final Chapter?*, 2012

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# Nature and Society

Editor: Jenny Wanless

Publisher: Nature and Society Forum

ISSN: 1038-5665

**Nature and Society**© is the journal of the Nature and Society Forum, GPO Box 11, Canberra ACT 2601, and is published six times a year.

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## Where we are

The Forestry Building of the Fenner School of Environment and Society at the ANU.

From the building's entrance, turn left past the School's office and our office can be found on the right at the end of that corridor. But ring before coming as the office is occupied irregularly.

**By car:** There is very limited meter parking 200 metres to the north, near Union Court.

**By bus:** The route 3 bus from Civic drops you in Daley Road. Walk 100m south-east to the Forestry Building.

**By bicycle:** Abundant bicycle parking just outside our office.

## Are we brave enough to leave this appetite unsated?

If we are concerned about our great appetite for materials, it is plausible to increase the supply, to decrease waste, to make better use of the stocks that are available, and to develop substitutes. But what of the appetite itself? Surely this is the ultimate source of the problem. If it continues its geometric course, will it not one day have to be restrained? Yet in the literature of the resource problem this is the forbidden question. Over it hangs a nearly total silence. It is as though, in the discussion of the chance for avoiding automobile accidents, we agree not to make any mention of speed!

John K. Galbraith, *How much should a country consume?* in Henry Jarrett, *Perspectives on Conservation*. 1958.

## Coming NSF meetings

**Wednesday 17 October: Corporate governance reform for planetary well-being and human health. Peter Tait, 7:30-9:00 pm** at the ANU's Frank Fenner Building, corner of Daley Road and Linneaus Way.

Peter Tait is a recently arrived Canberra GP. He completed a Masters of Climate change at ANU in 2010. 30 years working at Alice Springs in Aboriginal Health and involvement in peace and environmental issues stirred a combined interest in public health and human ecology. Both topics intersect in that human wellbeing is founded on an equitable society and underpinned by a healthy ecology. Global environmental change and worsening rates of ill-health, the outcome of the maladaptive human politico-economic system, require a systemic response. Peter hypothesises that governance failure to regulate corporate behaviour in the context of a rampant neo-liberal worldview underlies the maladaptive system. He proposes that governance reform is the key to rectifying this situation. This talk will discuss options for governance reform and social transformation to put the corporate genie back in its bottle.

**Wednesday 21 November: The Hong Kong project: A documentary film of a pioneering study of the human ecology of that city, led by Stephen Boyden on behalf of UNESCO. 7:30-9:00 pm** at the ANU's Frank Fenner Building, corner of Daley Road and Linneaus Way.

**Wednesday 5 December: Christmas gathering, 5:30-7:30 pm.** Venue and special event to be advised. Refreshments provided

## A passing legacy

Medical school teaches us to believe we are living longer now, and so today's diet must beat the diets of the past, hands down. This argument had me so convinced that I never considered questioning the dietary dogma I'd absorbed throughout my schooling. But I realize that today's eighty-year-olds grew up on an entirely different, more natural diet. They were also the first generation to benefit from antibiotics, and many have been kept alive thanks only to technology. Today's generation have yet to prove its longevity, but given that many forty-year-olds already have joint and cardiovascular problems that their parents didn't get until much later in life, I don't think we can assume that they have the same life expectancy.

Cate Shanahan, *Deep Nutrition*, 2009, p 11

# NSF meeting report

## An Economy for a Resilient World – Dr Robert Howell, 15 August 2012

Dr Robert Howell's life story and experience is extensive and impressive.

His first discipline was philosophy, in which he gained an MA. He has used a philosophical approach to life in his many and varied roles as a university teacher, business manager, consultant and author. He has also worked in the health sector and as City Manager of the Napier City Council in New Zealand. These many varied occupations led to further studies and awards – Robert also has a PhD in community health planning and management.

Quaker beliefs and philosophy interested Robert for many years, and eventually he became a Quaker, with a strong interest in peace making. This led to a 12-year project in Indonesia, working with the Centre for Peace and Security Studies at Gadjah University in Yogyakarta, where he trained Indonesian police in non-violent conflict resolution.

In the 1990s Robert and his wife moved to Auckland, New Zealand where he worked as a consultant to NGOs and local government and business, advising and teaching in policy setting, organisational design and business. Working with large organisations gave him an awareness of the problems in choosing suitable investments; and this led to an interest in ethical investments; and eventually to the setting up of the Council for Socially Responsible Investment (CSRI) in 2003. He has also worked, written and taught in the areas of climate change, environmental degradation and sustainability.

Robert blended his extensive philosophical, spiritual, policy and management knowledge and skills in his contribution to the book – *Right Relationship: Building a Whole Earth Economy* - published in 2009. The authors point out that the economy is about relationships, as is ecology; and the

relationship that humans have with both is wrong – our economic activities are destroying the life support systems that sustain us.

NSF is fortunate that Robert, who now lives in Canberra, agreed to be our August speaker. He is currently working with the Australian Quaker Peace and Earthcare Committees; and chose to use his extensive and varied knowledge to discuss Human-Earth relationships and how an economy should work. He chose for his topic the thinking philosophers have developed throughout the ages to deal with Human-Earth relationships; and the insights scientists have provided as to how an economy should work and be structured so it is able to care for and sustain the world that we need to sustain healthy human life. Unfortunately mainstream economists have not yet made the necessary changes that would enable our financial

system to care both for the planet and its people.

Robert's talk was structured around a framework of ethical, economic and scientific traditions/streams starting with Aristotle, who lived 350 BC and had talked about the qualities and virtues that allow a person to live a good life. He led us through 4 main streams of thought – Aristotelian, Social Contract, Utilitarian and the work of the scientists. He discussed how philosophers had expanded human-human relationships and ethics to human-earth relationships and ethics. Indeed, we now have a stream of ecological economics.

Unfortunately the thought that drives the economics of our global financial structures has not travelled this path and has not taken heed of the logic and the

warning that scientists and some economists have given – that there is an obvious limit to growth in a finite world. This was first given wide publicity by the Club of Rome's publication *Limits to Growth*, in 1972. The conclusion is that modern economics is not based on scientific rationale, facts and knowledge. It fails to put a price on the consequences of its actions.

*The central "truth" of [the social sciences] is that nature, especially that of humankind, is nice and that people are designed to do things that, all in all, favor the survival of their species. Hence people could never be equipped by nature with instincts to kill other people. This idea comes from the Bambi school of biology, a Disneyesque vision of nature as a collection of moralistic and altruistic creatures. It admires nature for its harmony and beauty of form and for its apparent "balance" or even cooperativeness. It admires the deer for its beauty and fleetness, and it grudgingly admires the lion for its power and nobility of form. If anything is really wrong with us, it explains, it is a sociocultural problem that we can fix by resocializing people. It is not a biological problem.*

*Michael P. Ghiglieri, 1999  
The Dark Side of Man: Tracing the Origins of Male Violence*

The various philosophers that have followed Aristotle have established principles for social order based on life, liberty, health, property and the protection of human rights. However it can be argued that climate change created by human activity takes away human rights.

Numerous researchers and leaders in science, philosophy, ethics, ecology, culture, religion and economics have now recognised that the human-earth relationship in the world's dominant cultures is not in equilibrium. For example, Albert Schweitzer reminded us that mainstream ethics dealt only with man-to-man relationships and ignored the human-earth relationship. Rachael Carson's book – *The Silent Spring* – raised the world's awareness of the environmental consequences of human actions, when it was published in 1962. It is widely credited with helping to launch the environmental movement.

Then in 2009 Elinor Ostrom was awarded the Nobel Prize for Economic Science. Her research showed that people are capable of creating rules and institutions that allow for sustainable and equitable management of shared resources.

Religions are also changing their teaching. Although the Old Testament regarded man as the controller of nature, and all other life forms available for use by man to his advantage, modern religious interpretations of scripture (the Methodist Church website) is more about stewardship of nature, rather than domination.

And the *Earth Charter*, an international declaration of fundamental values and principles for building a just, sustainable and peaceful global society in the twenty-first century, reminds us that life in all its diversity is to be respected and cared for with understanding and compassion.

Robert Howell reminded us that although there is now a recognition among many of the world's leading thinkers and workers in philosophy, science, ethics, economy, religion; and in the world's international agreements and charters, that the relationship between man and nature is paramount and must be respected and understood and cared

for if we hope to survive, the dominant global strategies used today to drive the world's economics and investments ignores this understanding. He examined the current investment patterns and the behaviour of our banks and financial institutions in the light of the modern philosophers who had developed human-earth ethics. He showed that the United Nations Principles of Responsible Investment (UNPRI) have major ethical inadequacies and are in part responsible for the fact that less than 2% of Australian investment cares for the planet. The consequence is that the human life support systems provided by our ecosystems are in bad shape. Our economy is not in accord with the rationale and principles of science, in that it assumes limitless growth and resources. It is also based on a utilitarian ethic that is primarily a human-human one. We need a human-Earth ethic that does not

see the planet as simply there for human utility. We have also ignored the cost of the consequences of the present economic system to human health. The British Medical Journal has estimated this cost. It is enormous, and makes the carbon price look very small.

In summary, we need to keep working to extend the understanding of human-earth ethics that does exist, and to change everything we do. We need to stress in our public presentations that the dominant global economic system is not based on the principles and rationale of modern science. The economy should be based on the principle of a closed system (except for energy from

the sun) rather than an open linear system. If we are to reverse the threat of ecological degradation, humankind needs to change our economy, and if we are to change our economy we need to change our ethics.

As a Quaker, Robert believes we also need to see the human-earth relationship in spiritual terms, as well as in scientific, economic and ethical perspectives.

We thank Robert for a very important and thought-provoking talk, and for presenting a guide to our personal and public actions.

**Gerda Mark**

*As a campaigner for the removal of shark nets around Sydney, I am alarmed that we still do not get the point: sharks live in the ocean. If we choose to swim, entering the shark's environment, then here are consequences of that decision. Global warming is going to have more impacts on the human race only one of which is becoming shark dinners. If I drink too much and drive, I may die. Others may die too. The moral is don't drink and drive. Being eaten by a shark sounds nasty but every day there is some animal or insect or bird threatened with extinction by our actions, so just accept that life is risky and make your decision.*

*Liz Thornton  
Letter to Crikey, 3 April 2012*

## The End of Growth: Peak oil and the economy of the future

Richard Heinberg addressed a large Canberra audience in September on the topic of *The End of Growth*, the title of his most recent book. He pointed out that, although in the public mind the resources boom has been making Australians wealthy, in fact eighty three per cent of the profits actually go off shore making others overseas wealthier, not us. The problem is the way we measure economic growth, the defective GDP or Gross Domestic Product.

It is often said that estimated GDP has been growing through the preceding centuries, but indeed it has only been in the last hundred years that growth has really taken off. Especially since the Second World War growth has become the mantra of the whole world. In this very unusual time energy consumption has gone off the charts, and everything economists like to measure has followed the same course, population, industrialisation, food production.

Other things the economists don't tend to mention, like pollution, have followed the same curve.

Heinberg himself was most inspired by the book *Limits to Growth* when it was published decades ago. Studying the trends in energy, debt and climate change, amongst others, there is no doubt the authors of *Limits to Growth* got it right – we are on track for collapse. Remember energy underpins everything. The fossil fuel revolution of the industrial revolution changed everything. Remember peak oil: take away that energy and GDP collapses.

A single litre of oil provides the equivalent of six weeks of hard human labour – it has enabled us to mechanise almost everything. Without it we will have to go back to that hard labour – or do without. The USA, the first country to exploit its oil fields, grew rich on exporting oil. But by the 1970s their oil production started tapering off. Other countries have followed suit. Most have now become oil importers. Extracting unconventional sources only delays that day, but does not mean the end is not in sight. High oil prices trigger economic recession.

What most people do not know is that ever since our money supply was decoupled from precious metals, by going off the gold standard, governments have

basically lost control of the money supply. Money is now created by banks simply making loans – every time someone 'borrows' money from a bank, the bank has just created that amount of money by a few stokes on a keyboard. It reminds me of one of those fairytale castles, with improbable turrets and towers defying gravity. It is essentially a figment of the imagination or a house of cards that can fall down with any puff of wind. What a basis for an economy, for running a country!

With globalisation wages stagnate, as workers in one country compete with workers in other countries, so that everyone loses out to the cheapest. More loans mean people take on more debt and debt is growing at three times the rate of GDP. In 2008 the financial system collapsed and it will keep on collapsing. It is a perilous system: consumer debt and government debt weaken the

whole economy. So much for our vaunted economic management, more correctly mismanagement.

Turning to the climate Heinberg pointed out that we are now in the midst of the biggest scientific experiment humans have ever conducted. We are changing the parameters of our climate, we are altering the way

our planet works as a system, and waiting to see what will happen. Will we raise the global temperature by one, two, six degrees or more? We are watching the Arctic ice cap melt. We are triggering dangerous feed-back mechanisms. We are seeing methane plumes being released in Arctic regions. There is enough methane stored in hydrate crystals in the Arctic to raise global temperatures by as much as ten to twenty degrees, and once you have started a cycle of positive feedbacks, they feed on each other.

Climate change could undoubtedly imperil food supplies, and much more. We are at a time when we need to make choices. Australia could choose to just become China's quarry. But understand that the resources boom is almost over, and that economic growth could be choked off in just a few years. Also remember that whatever our economic future, with a growing population there is actually less per capita – that has been the case, despite the hype about our healthy economy.

So banking on economic growth is not a good idea. Heinberg also considers that it is too late to fiddle

*It is difficult for people living now, who have become accustomed to the steady exponential growth in the consumption of energy from the fossil fuels, to realize how transitory the fossil fuel epoch will eventually prove to be when it is viewed over a longer span of human history.*

*M. King Hubbert, Scientific American, 1971*

with greenhouse gas emissions. Instead he thinks we should concentrate on developing resilience, to enable society to weather the climatic and economic crises. Resilience would come from small scale local self-sufficiency.

We need to wean our society off the expectation of growth – we need alternative ways of measuring our society's success, something much more reasonable than GDP. This most unsatisfactory measure counts all the 'bads' such as pollution, storm damage, ill health, as adding positively to GDP, because they add to monetary flows. Several other measures have been suggested, such as the Genuine Progress Indicator. The American state of Maryland is adopting the GPI. We certainly need a scale that only values positive outcomes, such as well-being for people and the environment.

We also need an alternative financial system that works for people and society, and not for financial mismanagement. We need population stabilisation, and an end to growth. We could for instance move to worker ownership of businesses, where making or doing enough for the available market is what is required, with no demand to keep production growing.

In matters of energy and climate strategies resilience means learning to use less. In future we must become less mobile: build buildings that do not need air conditioning or heating: improve agriculture to feed the local population while improving the soil.

All energy should come from renewable sources. All renewable resources for whatever use (food, fibre, energy or anything else) must be harvested at less than their rate of growth.

Non-renewable resources must be completely recycled.

Reform economics and understand that the economy is a subset of the environment, not the other way round.

We need to be ready for crises, and use each one as an opportunity to learn and do better. It is hard for economists to understand that we have reached the end of their system, although some economists

such as Hermann Daly have recognised this, and are developing ecological economics.

We can make these necessary reforms. We can show our best side in a crisis, but we need more and more people to be aware of the reality of the problems we face.

Richard Heinberg turned out to be a most lucid and interesting speaker – and his talk was received enthusiastically by the large audience.

**Jenny Wanless**

See also: Jenny Goldie's book review of *The End of Growth* in *Nature & Society*, Dec 2011-Jan 2012

For information on storing carbon in soils, which would actually draw carbon down from the atmosphere and help prevent climate change see (1) Restoring Australia's Landscapes, *Nature & Society*, Aug-Sept 2011. (2) Planet Under Pressure Report, *Nature & Society*, June-July 2012

*Humanity's transition to a sustainable lifestyle paradigm, a pre-industrial lifestyle paradigm within which a drastically reduced human population will experience subsistence level material living standards derived exclusively from renewable natural resources (RNRs)—water, soil (farmland), forests, and other naturally occurring biota—is therefore inevitable. Our choice is not whether we "wish to be sustainable"; our choice involves the process by which we "will become sustainable".*

*Chris Clugston*

Scarcity: Humanity's Final Chapter, 2011, p3

## **Richard Heinberg: The end of growth; Adapting to our new economic reality**

Through the support of NSF and others the Canberra community was fortunate to be able to hear from Richard Heinberg on his analysis in his recent book, *The*

*End of Growth*. While confirming the key projections from *The Limits to Growth*, 40 years previously, it reinforced how cheap fossil energy and debt had driven growth over the twentieth century but why its limits and climate consequences now dictated that further major economic growth revivals were very unlikely and unnecessary.

Effectively 'economic growth was toast' within years not decades. Similarly we were 3 to 4 decades too late to think that fiddling with CO2 emissions or alternative energy sources could prevent the intensification of dangerous climate extremes. As often previously discussed by the NSF we have locked in dangerous climate changes that due to feedbacks such as via increased methane emissions now risk mean global temperatures rising

over 6°C, within decades well ahead of IPCC projections.

Given that we have known about these risks for forty years and not acted on them, questions were asked as to: what gives Richard hope that the imminent crisis will be seen as, and provide, an opportunity for change? What evidence is there that we can create the 'lifeboats' and fashion the safety nets to secure our soft landing once we are in crisis and economic and social freefall? Given that biological systems generally collapse in crises once they have exceeded their breaking point, are the models projecting smooth declines and soft landings dangerously naive and misleading?

Richard agreed that the crunch will come through fundamentals such as local shortages in food and water with just seven missed meals being the difference between stability and social collapse. As such school and community gardens and permaculture with livestock were recognized as critical bases of social resilience. By contrast vulnerable dependent globalised supply chains may be major risks. Hence, as the responses to the question in the wise Chinese saying tell us; When is it the best time to establish a garden? Twenty years ago. When is the second best time? Today.

**Walter Jehne**

*It is high time that we stopped calling for an "End to Growth". Stopping growth is meaningless. Or promoting "degrowth" or a scaled down form of industrialism. Degrowth and de-industrialism is inevitable. I don't know of a weather forecaster that advocates or promotes a coming storm. It's coming - and in fact has begun whether we like it or not or choose to ignore the signs.*

*Tim Murray, commenting on Chris Clugston's Scarcity: Humanity's Final Chapter?, 2012*

We were fortunate that Johannes was able to share some of his experiences with us at the Forum before he returned to finish his studies in Vienna. When he finishes he will be qualified both to teach at vocational, middle and high school levels, and also to advise organisations on practical ESD matters.

Environmental education has a very long history, going back at least to Jean-Jacques Rousseau (1712-1778) in his famous work *Emile on Education (Émile ou De l'éducation, 1776)*. It also reminds me of Louis Agassiz (1807-1873) dictum a century later: "Study nature, not books!" which is exactly what the young Charles Darwin did.

When I was a boy, *Nature Study* was a formal part of the curriculum. While at primary school we never missed Crosby Morrison's wonderful weekly radio programs. They were also broadcast during the evening and were very popular, running for 20

years, eventually in all States of Australia, New Zealand and South Africa. Nowadays, I suppose, nature programs on television cater for the same demographic, but there is a huge difference. Morrison's programs were about our local, everyday environment and, being radio, he told us about what was going on out there. He stimulated us to go outside and see for ourselves. He encouraged us to look and listen, hands on if need be, and to ask the question Julius Sumner Miller later made

famous: "why is it so?"

Televised nature programs are about the exotic and unusual and while they encourage the more affluent to go on Safari in Africa or mix it with penguins in the Antarctic, such experiences are definitely hands off. They are great experiences, to be sure, but have little to do with how we live our lives which is what Morrison aimed at.

Nowadays the challenge that environmental education faces is to achieve in a classroom situation, most often an urban classroom, the depth of understanding that comes from being there and doing it. It is similar to NSF's problem. Discussing and debating issues in a Forum setting is great, but no substitute for direct participation in nature's great work.

Johannes is articulate and passionate about his chosen profession and spoke to us about the PEEC

## NSF meeting report

### Johannes Brossman: Environmental education

**19 September 2012**

Johannes Brossman is studying Environmental Education in Vienna. He came to Australia to broaden his experience by undertaking a two-month internship at the *Pullenvale Environmental Education Centre* (PEEC) Brisbane. PEEC is part of the Queensland Govt Education system: a specialist centre where schools can bring their students to gain hands on experience in understanding environmental and sustainability issues. It is similar to the *Birigai* environmental education centre at Tidbinbilla which is supported by the ACT education system.

program and a Swiss approach to education for sustainability, both of which try to structure learning experiences in such a way that they become relevant, fun and hands on. They aim especially at developing an emotional attachment.

The PEEC program uses the idea of a *storythread* to connect people with nature. Its aim is to build an emotional connection (sometimes a reconnection) with nature. Intellect, including both knowledge and understanding, is not enough. It is love, respect, wonder and amazement that is needed. In the storythread program students observe, inquire, investigate, predict, influence, and subsequently reflect upon their own lives and experiences in order to shape future knowledge, attitudes, values and actions.

Storythread involves 4 distinct “chapters”: Chapter 1 precedes the excursion to the Pullenvale site. It introduces the characters (real and fictional) that live either in harmony or in conflict with their environment. Chapter 2 is the excursion itself where the students become part of the story and relate to the characters and places. Chapter 3 is back in the classroom where the students reflect on their experiences, while chapter 4 applies what they have learnt to their home place through a series of culminating activities aimed to make life better.

From time immemorial human culture has been transmitted through stories. Language is merely the vehicle. It is through stories that knowledge, values, issues and practices are passed on from one generation to the next. They model the human experience and serve neither to idealise nor trivialise the richness of the experience of being human and taking part in their community, which nowadays is nothing less than the whole of this special planet. This is not easy especially in the context of competing stories about looking great (being in fashion) and the benefits of shopping therapy. Virtual reality is all about having fun and this means keeping nature in its place and under control.

The second approach to environmental education that Johannes introduced us to is based on a Swiss research project undertaken by Barbara Gugerli-Dolder and Ursula Frischknecht-Tobler. This work was conducted between 2002 and 2011 and is

based on Joanna Macy’s work on deep ecology. Forum members will recall that we undertook a series of workshops on Joanna’s ideas some years ago. Here is a quotation from her:

*“The most remarkable feature of this historical moment on Earth is not that we are on the way to destroying the world — we’ve actually been on the way for quite a while. It is that we are beginning to wake up, as from a millennia-long sleep, to a whole new relationship to our world, to ourselves and each other.”*

The technique developed by Gugerli-Dolder and Frischknecht-Tobler integrates pleasant and unpleasant emotional experiences of nature in a systemic, action oriented framework focused on values and knowledge about the future. It promotes attentiveness to these interconnections and incorporate these in daily routine activities.

There was not a lot of time to look at some concrete examples of the application of this Swiss approach. I Googled both researchers but unfortunately my German was not up to the task of providing more information. I for one would like to know more about *the new relationship to our world* being promoted by these researchers. What I do know is that despite a great deal of good will on the part of a large section of the community (possibly the majority) and an enormous effort by environmental educators, the recognition that

*Industrialized civilization is totally and inescapably dependent upon non-renewable resources. Joblessness and low economic growth are ecological problems caused by non-renewable resource scarcity; these problems can never be solved by economists or politicians. Instead, nature will resolve our problems for us and humanity will shrink until it can once again be sustained by consumption of annual bounty from earth’s renewable resources.*

*John Bermingham, commenting on Chris Clugston’s Scarcity: Humanity’s Final Chapter?, 2012*

humans are an integral part of the natural system is increasingly mythologised, marginalised, and muddled.

Fortunately enthusiastic would be environmental educators, like Johannes are working hard to address this alarming trend. It is a huge challenge.

**John Schooneveldt**

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### Anthropocentrism

I’d rather be against nature and have more people better fed. I’d rather be serious about the world’s needs.

Roger Cohen, New York Times, 6 September 2012

(Illustrating the anthropocentric barriers we face to ecological understanding)

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## Biodiversity supporting Homo sapiens

Do we need to protect so many species? Or can we rely on ecosystems with a depleted number of parts? Recent results from a study of grassland ecosystems shed important new light on these questions. Seventeen grasslands with different numbers of species were created and then studied over many years. The analysis, published in Nature last fall, showed that more than 80 percent of the plant species contributed to the effective functioning of the ecosystems, causing, for instance, a greater buildup of nutrients in soils.

Another study, published in Science in January, showed that more species allow for better functioning in arid ecosystems, which support nearly 40 percent of the world's human population. The bottom line is that many species are needed to maintain healthy ecosystems, and this is especially the case in a rapidly changing world, because species take on new roles as conditions change.

Benefits provided by ecosystems are vastly undervalued. Take pollination of crops as an example: according to a major United Nations report on the Economics of Ecosystems and Biodiversity, the total economic value of pollination by insects worldwide was in the ballpark of \$200 billion in 2005. More generally, efforts to tally the global monetary worth of the many different benefits provided by ecosystems come up with astronomically high numbers, measured in tens of trillions of dollars.

These ecosystem services are commonly considered "public goods" — available to everyone for free. But this is a fundamental failure of economics because neither the fragility nor the finiteness of natural systems is recognized. We need markets that put a realistic value on nature, and we need effective environmental legislation that protects entire ecosystems.

Richard Pearson, *New York Times*, 1 June 2012

## Mood lighting

Natural daylight varies throughout the day. Morning and evening light has a greater proportion of the reds and yellows of the spectrum, while light at midday contains more of the blue end of the spectrum. When the sun is comparatively low in the sky its light has to take a long path through the atmosphere. As the wave length of blue light is much the same size as the particles and molecules in the atmosphere this light is dispersed, leaving proportionately more of the red end of the spectrum to reach our eyes.

Our bodies have evolved to make use of this light to regulate our circadian cycle. Light-sensitive melanopsin receptors in our eyes respond to blue light by suppressing production of the sleep-inducing hormone melatonin, and that makes us more alert. As daylight fades to the redder tinges of evening, the suppression of melatonin ceases, reducing our alertness and allowing us to feel sleepy.

Artificial lighting disrupts this system and the consequences can be severe. This is especially shown by night-shift workers. Epidemiological studies show that women working night shifts have a fifty per cent increase in breast cancer. There is a possibility that this is due to the suppression of melatonin, which plays a role in suppressing tumours.

In any case, with the provision of artificial light long after sunset, many people are chronically sleep deprived. The result is increased risk of cardiovascular disease, obesity, cancer and gastrointestinal disorders.

Both fixed white LEDs and fluorescent lighting are bad in this respect. But now there are suggestions that LEDs could let us design lights that eliminate the problems with artificial light, by using different combinations of red, green and blue, for different purposes.

*This idea of freedom as the right of belonging inspires many virtues. One of them is the virtue of civic engagement... In the operation of that principle, it also invites us to do so in a way that respects the civic role of others.*

*In yet another dimension of our being, the idea of freedom as a right of belonging to a community of other free people applies not only within our own time but across many generations. It asks us to remember that we are not the first or last generation to walk upon this earth. When understood in those terms, the idea of freedom is a right of belonging to a community that exists through time, and even beyond our time. This entails the virtue of stewardship. The responsibilities of mutual belonging make us stewards of the land, and of our society, for others who will come after us, and they in turn for their posterity.*

*David Hackett Fischer* Fairness and Freedom: a history of two open societies - New Zealand and the United States. OUP, 2011

On the Space Station, astronauts experience the Sun rising and setting every ninety minutes; their sleep is seriously affected. In an effort to counter the problem NASA is testing colour-tuned LEDs to find out what blends and schedules are best for restoring better sleep patterns.

For astronauts a red-rich mode should help them do personal chores and start relaxing to prepare for sleep. Yellow-tinged morning light would help them wake up. Blue-tinged light would boost alertness during work periods. Airlines could also use lights with a warm-reddish tint to enable passengers to arrive refreshed and cheerful from long-haul flights.

Jeff Hecht, *New Scientist*, 30 June 2012

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### The delicate dance of disequilibrium

Environmentalism is still widely viewed, especially in the United States, as a special-interest lobby. Its proponents, in this blinkered view, flutter their hands over pollution and threatened species, exaggerate their case, and press for industrial restraint and the protection of wild places, even at the cost of economic development and jobs.

*A rational world, a world that will protect the ecosystem and build economies that learn to distribute wealth rather than allow a rapacious elite to hoard it, will never be handed to us by the scientists and technicians. Nearly all of them work for the enemy.*

*Chris Hedges at TruthDig.com  
In remembrance of Hiroshima, 2012*

Environmentalism is something more central and vastly more important. Its essence has been defined by science in the following way. Earth, unlike the other solar planets, is not in physical equilibrium. It depends on its living shell to create the special conditions on which life is sustainable. The soil, water, and atmosphere of its surface have evolved over hundreds of millions of years to their present condition by the activity of the biosphere, a stupendously complex layer of living creatures whose activities are locked together in precise but tenuous global cycles of energy and transformed organic matter. The biosphere creates our special world anew every day, every minute, and holds it in a unique disequilibrium. On that disequilibrium the human species is in total thrall. When we alter the biosphere in any direction, we move the environment away from the delicate dance of biology. When we destroy ecosystems and extinguish species, we degrade the greatest heritage this planet has to offer, and therefore threaten our own existence.

Edward O. Wilson, *The Future of Life*, Abacus Books, 2002

## Gold standard buildings

Radio National's *Science Show* (7 April 2012) visited one of the greenest buildings in the world, at the University of Vancouver, British Columbia.

Being Canada, the building could incorporate a great deal of timber, to sequester lots of carbon. But to go one better they used timber from trees killed by the pine beetle, the pest that is devastating BC's forests. Floors and ceilings made of timber are aesthetically pleasing and so help to lift the spirits of those working in the building and improve productivity. So too does natural daylight, and every part of this remarkable building gets day light.

Photovoltaic cells on the roof provide electricity. Rainwater, captured and treated on site makes the building self-sufficient in water. All run-off and used

water goes into the aquifer, or the irrigation system. Even sewage is treated on site, ending up in a wetlands area. Regulations mean the waste water gets chlorinated, but testing shows that the system is so successful that the chlorine is not actually needed.

People working in the building are regarded as inhabitants, rather than occupants. They

are provided with social spaces, and helped to become a community working together. They have a say in how things are going – for example they vote on the temperature. Their direct feedback influences the operation of the building.

The food service in the café is based on local, sustainable, and largely vegetable foods. The only water available is tap water. Cutlery and plates are compostable.

A green roof provides habitat, and a large vegetated wall acts as a heat shield in summer. Internal walls are movable so can be reconfigured when necessary. In fact the building has a long list of unusual attributes, one of which is that it is so successful that it has actually reduced the University's energy consumption. It has also improved the inhabitants' mental and physical health. It is an ongoing research and teaching exercise in sustainability.

Universities around the world can share their experience and make a real difference. There are several similar buildings in progress, including one in Brisbane.

## Renewable energy from native forests?

On March 20 2012, the Australian House of Representatives voted on a disallowance motion relating to the Minerals Resource Rent Tax. It was defeated only by the casting vote of the Speaker.

Though the mainstream media scarcely mentioned it, this motion caused consternation among environmentalists across the country.

Independent Member for Lyne, Rob Oakeshott, had proposed to classify as renewable the energy generated by burning native forest timber. This, he claimed, would improve employment prospects in rural areas. Those expressing concern argued that it would also trigger a renewed assault on Australia's native forests.

### The bigger picture

That Mr Oakeshott's proposal came within a whisker of becoming law is significant not only because of its potential impacts on native forests and the rural economy, but also because it casts light on a bigger picture. It illustrates just how much more remains to be done to convince Australian parliamentarians, and the wider public, of fundamentals that govern our continued presence here on Earth.

The crux of the matter rests on four propositions:

- Humans are completely dependent on the natural life-support systems of the biosphere. [1] This planet is our home, and our only home for the foreseeable future.
- The rapid growth of the human population, and our increasing consumption of non-renewable resources and production of dangerous by-products, now threaten the integrity of these natural life-support systems. [2] Human impact is now so great as to rival forces of nature.
- We need to "tread more lightly on the earth," to use fewer non-renewable resources and to produce fewer dangerous by-products. This includes replacing fossil fuels with renewable sources of energy as quickly as possible.
- Success will depend both on international co-operation and on the efforts of individuals, groups, communities and corporations. [3]

*When I look out on such a night as this, I feel as if there could be neither wickedness nor sorrow in the world; and there certainly would be less of both if the sublimity of Nature were more attended to, and people were carried more out of themselves by contemplating such a scene.*

*Jane Austen's Fanny Price in Mansfield Park*

### Pulling our weight

Pessimists, including the eminent scientist, James Lovelock, [4] judge that it may already be too late, that we have already set in motion changes in the dynamic balance of the biosphere that we can't reverse. Optimists hope that technological ingenuity and market forces, guided by strong government action, will provide our salvation. [5] A sober reading of the science, however, means that we should be both alert (to the risks and dangers of our present course) and alarmed (by our inaction).

The onus to act is first on those countries and peoples that have benefited most from exploiting natural resources and that have the capacities to make a difference. In this vital endeavour, Australia should and can punch above its weight.

Instead, we lag behind others. Many European and

East-Asian countries have developed more energy-efficient, advanced economies. These countries now produce only half as much greenhouse gas per capita, or per dollar of GDP, as do Australia, Canada and USA.

Our Federal Parliament continues to quibble about a price on carbon (Tony Abbott

pledges to repeal the legislation) while state governments compete to facilitate an exponential growth in fossil fuel extraction. This action by state governments is scandalously irresponsible, since burning Australian coal overseas will increase CO<sub>2</sub> in the atmosphere far more quickly than our carbon tax will reduce it.

### What energy is renewable?

So how does Rob Oakeshott's narrowly-defeated, House of Representatives motion relate to the bigger picture? Should we classify energy produced by burning wood as "renewable"?

Classifying energy as renewable means that it can be replenished within a reasonable time by natural processes. It also requires that if harmful products are produced, such as greenhouse gases, these are removed in the replenishment process.

Time is critical. Fossil fuels could be regarded as renewable, except that their formation from partly-decayed vegetable matter took many millions of years. They will not be replenished on any timescale relevant to humans.

Ethanol obtained from annual crops, such as maize or sugarcane, can be replenished by growing similar crops the following year. The next year's crop, as it grows, removes an equivalent amount of greenhouse gases from the atmosphere.

Burning wood from forests, plantations and farm lots is an intermediate case. When wood is burnt, greenhouse gases are released. To replace wood burnt as fuel by new growth, and to reabsorb the equivalent amount of greenhouse gases, takes from a few decades (in the case of fast-growing tree species in plantations) to several centuries (in natural forest ecosystems, which typically store much more carbon per hectare).

### Time to re-think

We already risk triggering runaway climate change. So our overriding priority must be quickly to reduce the concentration of greenhouse gases in the atmosphere, from the present 393 ppm of CO<sub>2</sub> to something like 280 - 300 ppm (the pre-industrial level). Since zero-emission sources of energy, including photovoltaics, solar-thermal, wind, wave and geothermal, are already available, [6] why increase the risk of triggering dangerous climate change by needless wood burning?

Just as in recent decades we have developed new attitudes to asbestos and tobacco, so we should now adopt new ways of thinking about sources of energy that produce greenhouse gases. Much fossil fuel will be best left in the ground. Not only because the specific location of the resource may mean that extracting it will damage or pollute an aquifer, but also because burning coal, oil or gas risks unacceptable consequences for the world's climate.

Native forests that are healthy are best left undisturbed. Not only because they have therapeutic or recreational benefits for humans, but also because felling them risks unacceptable consequences for the climate. Living forests, as well as being wonders of nature, provide vital environmental services.

But native forests that have been altered by logging do need attention. Researchers at the Australian National University claim that by re-growing these

forests, fully one quarter of Australia's annual greenhouse gas emissions could be cancelled out each year. [7]

We need to manage these forest ecosystems to maximise the uptake of greenhouse gases and to optimise the safe storage of carbon in plants and soil. Climate change means that the risks of fire, windthrow and other hazards may increase, and the species composition of re-growth may need to be altered. Such scientific ecosystem management requires the expansion of a skilled and dedicated workforce. The work will be for public benefit, and will require public funding and support.

History will judge restoring the biosphere to health as the major task of our era. In this we have, in Australia, the scientific, technological, financial and logistical capacity to punch above our weight. But what's still sadly lacking is the political consensus to get on with the job.

**David Teather**

*In 'Endgame' I explained that a culture that requires the importation of resources cannot be sustainable. In order to be sustainable, a culture must help the landbase, but if your culture requires the importation of resources from another landbase, it means you've denuded the local landbase of that particular resource. In other words you have harmed your landbase, and are using that harm as a reason to harm another one. This is by definition unsustainable.*

*As cities – which require the importation of resources – grow, they will plunder ever larger areas.*

*Lierre Keith  
Deep Green Resistance  
2011, p 59*

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## Farrago

### Light pollution

Tom Davies is a community ecologist at the University of Exeter, UK. He is working on the Ecolight project to assess the effects of night-time light pollution on plants and animals. Changes in night time light could affect the circadian rhythm of animals, when they hibernate, when they mate, when they hunt.

Plants could also be affected. Such things as flowering time, seed production, senescence in the autumn, leaf fall could potentially be altered.

The team is predicting a figure of a six per cent increase in artificial lighting per year, globally, with most growth in developing countries.

*New Scientist*, 2 June 2012

### Lights lure animals off-course

Joe Ritter, an astronomer working on Hawaii, was worried that the new white LEDs that were replacing the old, orange sodium street lights would obscure his view of the stars – ‘devastate astronomy’ in one of the world’s most important research sites. When he started investigating he discovered something more alarming: the lights were killing the local wildlife.

When fledgling sea birds take their first flight they are supposed to head for the bright reflection of light on water. Instead, with the street lights shining brightly, the young birds fly towards the lamps, and circle them until they drop with exhaustion, or collide with buildings

Baby sea turtles have the same problem. They hatch on the beach, and instead of heading for the sea, they turn inland and get killed crossing roads, or fall easy prey to predators.

The lights are affecting other species in different ways. Studies have shown that populations of woodlice, harvestmen, ants and beetles increase, a development probably not popular with human inhabitants.

Ritter decided something had to be done. He developed a light with a unique spectral mix, drastically reducing the blue light component. The lights have been in production for six years and by installing them in Hawaii, Ritter is contributing to saving the turtles and birds, as well as astronomy.

*New Scientist*, 30 June 2012

### Bird brains

Not all dinosaurs died out at the end of the Cretaceous. Some feathered ones survived that cataclysm: we know them as birds. *New Scientist’s* issue of 2 June 2012 carried an article on the probability that birds achieved their remarkable abilities by maintaining the form of juvenile dinosaurs – just as humans are like juvenile apes.

In both dinosaurs and apes, the young have comparatively flattened faces with big brain cases. In both groups that bigger brain case in their modern descendants houses a bigger brain and therefore produces a smarter animal.

And just how smart can birds be? In the same issue of *New Scientist* there is a review of a book called *Gifts of the Crow*, by John Marzluff and Tony Angell. They explore the surprising abilities of the

corvid group in language, insight, play, emotion and awareness. Many of us know that crows have been studied for abilities such as tool

making, inquisitiveness and learning, but we would not necessarily have thought of them as having the range of abilities documented in this book.

The corvids include some of the most intelligent birds ever studied. They show self-awareness when seeing their reflection, display advanced planning abilities and abstract thought. They mourn, they give gifts, they tease.

The collective nouns applied to the group show a certain amount of animosity, a disparagement, from humans who have recognised some of their own less attractive traits in these birds – a scold of jays, a conspiracy of ravens, a murder of crows. Maybe they are just all too human. Or are we jealous because we can’t fly.

There is more to this book than just fascinating examples of the cleverness of crows. The authors pair the observations with cutting-edge knowledge of physiology and brain function. They link crow behaviours with changes in cerebral neurochemistry.

Oh! And did you know that there are crows who windsurf, and not just in the way that many birds ride updrafts. Some crows windsurf holding bits of curved bark in both feet, and extending their wings to ride cliff-hitting updrafts. Seems like a brilliant bit of fun to me.

Jenny Wanless

*Action is the antidote to despair.*

*Edward Abbey, American writer*

## Marine reserves work

Researchers at the ARC Centre of Excellence for Coral Reef Studies in Queensland now have genetic proof that marine reserves really do provide more fish for fishermen. The team caught 1620 coral trout and stripey snapper from a series of reserves on the Great Barrier Reef. They took DNA samples from their tails before releasing the fish. They later sampled juvenile fish from 19 other locations to check whether they were offspring from the protected areas.

The reserves make up just 28 per cent of the area studied, but the researchers calculated that about half of all the juvenile fish in the area were spawned in the reserves, proving that they provide a significant boost to the total number of fish available.

*New Scientist*, 2 June 2012

## Tick for old houses

The Bishop's Lodge, designed by architect John Sulman and built in Hay in 1888, is an excellent example of building for comfort in a trying

environment. It has corrugated iron walls stuffed with sawdust, deep, shaded verandahs, small windows to reduce heat gain, but lots of ventilation and is built up off the ground.

An article in *Insites*, the magazine of the Historic Houses Trust of NSW, for Winter 2012, points out that simple modification to old homes is more energy efficient than knocking them down and replacing them with new five or six star buildings. There is a great deal of embodied energy in most buildings, and knocking them down wastes that energy.

The Scottish Government agency Historic Scotland took a modest terrace house in poor condition, and studied the amount of carbon emitted in leaving it as it was, retrofitting the building, or knocking it down and replacing it with a new energy efficient building. The worst result was to do nothing. Demolishing and rebuilding would result in 80 MJ of emissions, against only 8 MJ used in retrofitting.

When we look at the green rating of new buildings we do not consider the environmental costs of their production. The new cement, glass and steel have been manufactured at the cost of considerable GHG emissions. Heritage Victoria has estimated the embodied energy, for instance, in a heritage listed school building – around 4000 tonnes of CO<sub>2</sub>. So in many cases retrofitting is a much better option than building a new, state of the art green building.

## Pure water

The Catskill Mountains had provided clean, pure water for the residents of New York for many generations. The water was so good that at one time it was bottled and sold throughout the region. But gradually, as the population of the Catskills grew, with more housing, farms and resorts, the water deteriorated until it no longer met Environmental Protection Agency standards. New York officials faced a choice. They could build a filtration plant, for a cost of about \$6-8 billion, and with annual running costs of \$300 million. Or they could spend about one billion dollars on restoring the watershed's ability to provide clean water.

So in 1997 the city raised an environmental bond issue and used the money to purchase forested land, and to upgrade septic tanks in the Catskills.

As a bonus the policy of natural water management in the Catskill Forest region provides flood control at very little expense.

E. O. Wilson, *The Future of Life*, 2002

*The environment is not separate from ourselves. We are inside it, and it is inside us. We make it and it makes us.*

*Saying of the Yanomami tribe in Brazil  
Reported by Survival International*

## Windfarms and birds

An important study into the effect of wind farms on ten of the key species of upland birds in Britain has shown that operating wind turbines are not the bird killers they are reputed to be. However the construction phase can actually lead to bigger reductions in bird populations.

The worst findings were for the curlew, Britain's largest wader. Curlew numbers dropped by forty per cent in a radius of up to 800 metres from the construction site at the eighteen windfarms in northern England and Scotland included in the study. Curlew numbers remained significantly lower after the turbines began operating, as did snipe. However Red Grouse numbers, which fell during construction, recovered.

The results depend very much on the birds' preferred habitats. Species which prefer open, broken and short vegetation, actually increased in numbers with the construction of the wind farms. Birds of prey, on the other hand, avoid wind farms thus reducing their available food supplies and habitat.

*The Canberra Times*, 14 April 2012



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

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