Nature&Society

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Editorial

Australians were rather shocked recently when they found that our students have fallen behind a number of comparable countries in international tests of English and mathematical skills. This may lead to a reappraisal of our educational system. If so, it is to be hoped that authorities will consider some major changes to the curriculum.

The International Big History Association is proposing such a major change to rectify a more grievous failure of the education system, one not confined to Australia. As proponents of Big History say every culture has its own creation story, but we moderns do not. Actually we do, but it is hidden and fragmented in science and other disciplines. It is certainly not taught in any coherent way.

> *We can't live without life-filled oceans, home to the tiny organisms that generate half the planet's oxygen while comprising the base of the global food chain (contrary to the common belief that Wal-Mart forms the base of the food chain).*
>
> *Guy McPherson, We're Done 20 June 2012*

Big History would consist of bits of nuclear physics and cosmology, geology, palaeontology, biology, telling the history of life on Earth and humankind's place within that. It would also take the future into account, and get people thinking about our effects on that future. Creation stories have been important sources for guiding moral action and lifestyles in many societies. We, on the other hand, seem to treat our creation story as an optional extra, curious and interesting, but irrelevant to our modern life. Nothing could be further from the truth.

Our daily news always contains an account of the most dramatic events, the latest tragedy, the seemingly never ending political brawls, a financial report stressing the need for every financial graph to climb ever higher, lots of sport, and the occasional piece of environmental news. This summer's heat waves and fires have been dramatic and terrifying. Emergency services have been performing to their utmost. But where is the consideration that should be given to the future, the certainty that future heatwaves and tragedies will be bigger, blacker, more deadly than ever, if we do not learn from our mistaken preoccupation with growth.

If there is one mathematical skill that the new curriculum should insist on, it is the ability to multiply by two. Surely, you may say, that is one of the skills children learn in junior school. If it is, then it is strange that no one in politics or business seems to have learnt it. Well, yes they have learnt it, but they have never understood its significance. To be fair, neither did I until a few decades ago. But now I feel that understanding, that significance, should be a corner stone in every person's life. Then, like me, every time they see one of those upward trending, exponential graphs, they will wince, for they are looking at the demise of civilisation rather than its success, as they imagine.

Every economist, every politician, everybody who proclaims that we need growth, should be sat down on the floor with a big chess board, and a truck load of wheat, and made to start work. They should put one grain of wheat on the first square, two on the second, four on the

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third, and keep on, doubling the number of grains in each square. How simple is that!

What they will quickly discover is that they get very tired of counting. But if they are forced to keep going they will find that when they have used up half the truck load, they will have just enough wheat left to go on the next square and not be at all close to finishing the job. Indeed they cannot finish the job, because there simply would not be enough wheat in the world to finish it.

What this chessboard puzzle should teach us is that at every doubling, the last number added is in fact one more than the total of all the previous numbers combined. Clearly in a finite world, growth beyond a certain point is impossible. This knowledge should be used to stem the tide of Economics speak which plagues our modern civilisation.

Of course the politicians, business leaders, and economists will protest, they are not talking of doubling. They only want three per cent growth instead of two, or some other modest increase, but this in turn betrays their lack of numeracy. Growth of just one per cent per year means a doubling in seventy years, growth of two per cent per annum shortens doubling time to 35 years, growth of five per cent means doubling in fourteen years.

Words are extremely powerful. Different vocabularies actually make a difference to the way we see the world, the way we think. So we could hope that Big History, and better mathematical understanding, would make people think in more realistic ways about living on a finite planet. They would think in ecological terms, not economic ones. They would understand about extinctions, they would understand that every species, including humans, evolved to suit particular environments, which is why, when conditions change too radically, life forms become extinct.

Continuing growth in consumption of materials, or waste production, or population in a finite world is impossible. As a species we need to change our goals so that we can fit into the natural world. Instead of thinking that accumulating possessions is a rewarding and worthwhile activity, we need to take joy in the natural world. We should revel in the interlocking intricacies of life in the ocean and on land, and above all in the amazing set of circumstances that have enabled life to evolve on Earth alone among the planets

Only when we think ecologically. when we value the real world, will we truly know what is important. When we know that all the oxygen we breathe comes from plants, then we will know that destroying rainforests and heating up and acidifying the oceans is in our worst interests. This is our challenge, to change our vocabulary and our mindset to take account of the history of life on earth and so to forge a sustainable lifestyle for ourselves and the remaining species which are our fellow passengers on Spaceship Earth.

Jenny Wanless

The third critical thing in ecological education for children is that they get a grasp of human ecological and environmental history. This is often neglected precisely because "history" as it is taught to younger children tends to focus on showy events, or the lives of other children. The least showy portion of history is the history of soils and agricultural technologies, of woodlands and human practices. This is very tough to teach to kids who have been taught as we've all been taught, to prioritise big shiny events and big personalities in history. And yet it is essential – essential for a host of reasons, most of all because we live in a world that resolutely teaches children that what's at stake in our environmental situation is "nature" and simultaneously reveals that "nature" is something that exists "over there somewhere where things are wild". In a world where very little is actually wild, it is very hard to engage children with the preservation of "nature" – an integrated sense of how humans are part of nature, and more importantly, how humans affect their climate, landscape and environment well and badly is central to the project of helping us save ourselves.

Sharon Astyk, Casaubon's Book
16 September 2010

What a curious species!

"Man sacrifices his health in order to make money. Then he sacrifices money to recuperate his health. And then he is so anxious about the future that he does not enjoy the present; the result being that he does not live in the present or the future; he lives as if he is never going to die, and then dies having never really lived."

The Dalai Lama, when asked what surprised him most about humanity.

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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.

Nature and Society Forum E-Journal

For this edition and the one before NSF is trialling an electronic version of the journal. After the next edition, we will be asking members whether they would be happy to just receive the e-journal, or would prefer to continue to have a printed journal sent to them. This change is being made for environmental reasons (saving paper) but also to save some of the cost of printing and postage and to enable members to pass on items from this journal to others.

Coming NSF meetings

Wednesday 20 February 2013: *Stephen Boyden: Biounderstanding and ecological survival* 7:30-9:00 pm at the ANU's Frank Fenner Building, corner of Daley Road and Linnaeus Way.

The view will be put that the ecological survival of civilisation will require radical changes in the worldviews, assumptions and priorities of the dominant cultures of the world.

There will be open discussion on the pivotal role of concerned individuals, community groups and NGOs in bringing about this cultural transformation. The situation is urgent and we want to get your views on necessary and appropriate action.

Wednesday 20 March, 2013: *Julian Cribb: The Global Food Crisis – and how we can solve it*.7:30-9:00 pm at the ANU's Frank Fenner Building, corner of Daley Road and Linnaeus Way.

Feeding ten billion people through the second half of the twenty-first century presents the greatest challenge humanity has ever faced. While food demand will double by 2060 critical scarcities are emerging of almost all the key resources required to satisfy it. This challenges us to rethink food itself, how we process it, and how to create diets and foods for the future that are safe, healthy, nutritious, use fewer resources and tread less heavily on the planet.

Julian Cribb is an author, journalist, editor and science communicator. He is principal of Julian Cribb & Associates who provide specialist consultancy in the communication of science, agriculture, food, mining, energy and the environment. His career includes appointments as newspaper editor, scientific editor for *The Australian* newspaper, director of national awareness for CSIRO, member of numerous scientific boards and advisory panels, and president of national professional bodies for agricultural journalism and science communication.

His internationally-acclaimed book *The Coming Famine* explores the question of whether we can feed humanity through the mid-century peak in numbers and food demand.

From *Amusing Ourselves to Death* by Neil Postman (1985) When a population becomes distracted by trivia, when a cultural life is redefined as a perpetual round of entertainment, when serious public conversation becomes a form of baby-talk, when, in short, a people become an audience and their public business a vaudeville act, then a nation finds itself at risk; cultural-death is a clear possibility.

NSF news

The Hong Kong Project

Report on November 2012 meeting

The Hong Kong Project, shown at our November meeting, is a documentary film made by the ABC, of the pioneering study of the human ecology of Hong Kong undertaken by Stephen Boyden and his team from the Australian National University in 1972-76, under the auspices of UNESCO. The project included analysis of patterns of flow of energy, nutrients and water in the urban ecosystem. It was considered that the system is not ecologically sustainable in the long term.

The project also examined the environments, living conditions and health of the human population. Even then Hong Kong was a very crowded city, and growing quickly as it drew in residents from the surrounding countryside. Very large blocks of flats were being built to house the expanding population, and to rehouse the many people who were building and living in crowded conditions in hastily built structures made of flimsy material – anything they could lay their hands on. You would have to be impressed by the enterprise these new arrivals displayed, in managing to make a life for themselves in their new habitat.

In the course of the study it became obvious that the Chinese were able to make the most of very little, that unlike Westerners, they were content with very small personal spaces – maybe a bed was their only personal space. It was also found that they actually preferred their rickety slums, where they had a greater sense of community and mutual help, than in the modern blocks of flats, which did not engender such cooperation.

In all it was a very interesting study. After the showing Stephen was happy to respond to questions and discussion. We were also fortunate to have several other members of the original team present on the night.

After several thousand years of so-called civilization, most people still have to toil day and night for the rest of their lives. In the tenth chapter of The Story of My Heart, *(1883) Richard Jefferies says, "The most extraordinary spectacle, as it seems to me, is the vast expenditure of labour and time wasted in obtaining mere subsistence." If Jefferies is right, then what was the point in creating "civilization" in the first place? Whatever wisdom may be, in part it must be something beyond what is called civilization. To look for happiness in the material wealth of civilization is a waste of time. All the gadgets that are meant to give comfort to the body will bring little comfort to the soul. It is a mistake to think that technology will ever cure the ills of the spirit. It is foolish to love machinery while despising the world that was here before those machines.*

Peter Goodchild, Essays, 2012

Health on a heating planet

The scientific evidence for human-induced global warming is now well established. In the last century, Australia's average temperature rose by 0.9 degree centigrade over the preindustrial average, the number of record hot days having doubled since 1960, most of them over the past decade. Much of the Australian bush is now in flames, many properties destroyed or threatened. The Bureau of Meteorology has extended its temperature colour charts to 54C, and local councils have changed their highest warning on roadside pie charts from extreme to catastrophic. From September to December 2012 the average maximum temperature (40.33C) was the highest since 1910, when reliable records were first kept. The first seven days of 2013 were amongst the top-20 hottest days on record with, for the first time, six consecutive days over 39C.

As might be expected, at the personal level, excessive environmental temperatures cause the greatest mortality and morbidity rates amongst the elderly, the very young, and in those with chronic physical and mental illness who are on medication or high alcohol intake. Normally, body temperature is kept constant at around 37C through a combination of metabolic heat production (increased by exercise) and radiative and evaporative cooling through sweating. Sweating becomes ineffectual when environmental temperature reaches 38C (lower if humidity is high) and may be manifest as irritating prickly heat, particularly in children.

Prolonged exposures to temperatures above 35C, and particularly above 40C can lead to heat exhaustion, heat stroke and death, particularly if (non-alcoholic) fluid intake has been inadequate. Extreme heat has taken more lives than any other in white Australia's 200 year history. During the 2009 Victorian bushfires, 173 people perished as a direct result of the bushfires and another 374 lost their lives to extreme heat during the same week. More than 2000 people were treated for heat-related illness in the fire's aftermath.

According to the Climate Institute, severe weather events have an adverse effect on mental health, as many as one in five suffering from the debilitating effects of extreme stress, emotional injury and despair. An increasingly hostile climate will spell a substantial rise in post-traumatic stress, anxiety and depression, which can linger for months, even years. Incidence of lack of sleep, tiredness, loss of productivity, domestic disputes, anti-social behavior, accidents, violence, self-harm and suicide increase during heat waves. Global warming will impose severe organisational and economic stresses on emergency and medical services and on the nation's economy as a whole.

Adaptive measures to local heating

Household adaptations can do much to minimise the effects of heat waves and fires. Air conditioners or evaporative coolers are the mainstay of keeping cool in affluent households, but become ineffective if power supplies fail, as they often do during heat waves. Curtains or blinds should be drawn and windows closed during hot days, and windows opened during night time. Fluid intake from tap water should be increased to several litres per day until urine becomes pale yellow. If heat inside the house becomes excessive, wet towels, fans and tepid showers can be helpful. Exercise should be restricted to cooler times of the day.

Outside the house, flammable materials such as dry vegetation should be removed to re-cycling dumps, and grass kept short. Since most house fires are started by embers, gutters should be cleared of leaves and hoses and wet brooms made easily available for dowsing spot fires. If a catastrophic fire looms, early evacuation is essential.

Time and again, we see the decline of public services accompanied by the rise of private workarounds for the wealthy. Is crime a problem? Well, rather than pay for prevention and better policing, move to a gated community with private security guards!

Are public schools failing? Well, superb private schools have spaces for a mere $40,000 per child per year.

Public libraries closing branches and cutting hours? Well, buy your own books and magazines!

Are public parks — even our awesome national parks, dubbed "America's best idea" and the quintessential "public good" — suffering from budget cuts? Don't whine. Just buy a weekend home on a country estate!

Public playgrounds and tennis courts decrepit? Never mind — just join a private tennis club!

I'm used to seeing this mind-set in developing countries like Chad or Pakistan, where the feudal rich make do behind high walls topped with shards of glass; increasingly, I see it in our country. The disregard for public goods was epitomized by Mitt Romney's call to end financing of public broadcasting.

Nicholas Kristof, New York Times
21 November 2012

Global warning

At the global level, the most dangerous impact of the present unprecedented rate of warming is disruption of the Earth's climate control mechanisms, leading to massive species extinction, threats to water and food security and extreme weather events, including severe storms, floods, droughts, heat waves and fires, which have occurred throughout the world over the past two decades, more frequently and intensively than previously experienced weather patterns.

Without concerted action by all countries, including Australia, the world is on a path to exceeding 4 degrees increase in temperature by the 2060s, which would have a catastrophic effect on the environment and human health. Unfortunately, most world governments are not aware of the urgency of the situation, being pre-occupied with avoidance of falling over the fiscal cliff and neglecting the immeasurably more catastrophic and irreversible consequences of falling over the climate disruption cliff. As the world's greatest per capita greenhouse gas emitter, it is incumbent on the Australian government and community to follow best practice, politically, economically and socially to mitigate the impending disaster which faces our planet.

Bryan Furnass

Bryan is a retired physician, a member of the Strategic Council of the Climate Institute, Doctors for the Environment, Australia, and Nature and Society Forum, from whose reports much of this information is derived.

Planning to destroy the Great Barrier Reef

While climate change is not the major driver of coral loss at present, it can be expected to dominate if we continue on our current course. No one likes to say it out loud, but we should publicly recognise that we are planning to destroy the Great Barrier Reef by setting targets for climate change that we know are inadequate to protect the reef.

Dr Chris McGrath
writing in *Crikey,* 5 October 2012

Wind Farms – To be or not to be

The October issue of Australasian Science carried an article on Wind Turbine Syndrome in which the author, Simon Chapman, Professor in Public Health at Sydney University, claimed that this is a classic case of a "communicated" disease. Many wind farms have operated in European countries, many have operated in North America and Australasia, without apparently causing any concern to residents or their animals. Yet in some areas all manner of ills have been blamed on these elegant generators.

Elegance indeed was my first impression of a wind farm seen on a distant ridge in New Zealand years ago. I still enjoy the view of them across Lake George on the approach to Canberra. On closer acquaintance a wind turbine is massive, rather than elegant, and it is noisy. But then our whole society is obtrusive on the natural world in various ways, often noisy and often dirty, think of coal mines, or any power station, railways, aerodromes, and major highways. The fact is that our society is huge, noisy and dirty and to keep it going we have to have huge means of generating power.

We know that many of the parts of this huge society of ours have indeed been very bad for the health of those who work in them or live close by; asbestos works, lead smelters, coal mines spring to mind. Wind farms look very benign in comparison: so indeed they are in many cases. According to Chapman, who also spoke about the problem on Radio National's Science Show (20 October), wind farm syndrome is confined to the Anglophone world, and seems to be spread by word of mouth.

I don't make any judgement on that. I am only too well aware that different people have very different reactions to noise. Some people love listening to loud music. Some of those love loud classical music, some love loud modern music – and neither can stand the others' choice. It is obvious from the number of people who walk around with ear buds in their ears that they enjoy continuous sound, whereas others of us would be driven crazy by it. Many people love the roar of racing cars, or roaring crowds, or other noisy pursuits. Some of us would actually enjoy silence rather than any of these. Some of us would rather listen to the birds, or the wind in the trees.

So if we can be driven crazy by other people's choice of music, or feel physically ill when bombarded by loud music, it is conceivable that the noise from wind turbines is disturbing. However it is equally sure that many of us would be completely unaffected.

There are, however, other serious concerns about wind turbines. There is danger to birds and bats from the whirling blades. This can be quantified and scientifically evaluated one way or the other. No one has seriously suggested that we should stop building skyscrapers, although they are guilty of killing birds. People also spring to the defence of their cats (or their right to own cats) although these animals are more efficient bird killers than wind turbines could ever be.

Some people think wind farms should only be permitted in the ocean, but what about possible effects on sea creatures? Vibrations from the superstructure of a wind turbine could be transmitted through the frame to the water, and sound travels much further and faster through water than it does through air. Whales use sound to communicate over long distances; they already suffer from the underwater cacophony we have created with shipping, depth charges and seismic prospecting. There is proof that whales suffer from the disturbance in busy shipping lanes; it is at least possible they would suffer from oceanic wind farms.

Humans' all-pervading noisy big enterprises, without which we would not know how to function, all make huge demands on the Earth and place an unacceptable burden on all the other species which share the planet with us.

One of those unacceptable burdens is the continued emission of carbon dioxide from our use

> *It is a simple truth that all forms of energy production and carbon capture and storage require water – and usually a lot of it. Yet few government and industry policies on climate change and energy have considered the relationship with water, and consequently many climate change responses risk running Australia dry.*
> *…In our responses to climate change, Australian institutions are creating new silos that overlook essential interrelationships, and the result is the adoption of policies that exacerbate key problems.*
> *Water, energy and climate change are inextricably linked and it is time Australian businesses and governments integrated management of these sectors.*
>
> *Jamie Pittock and Karen Hussey,*
> The Canberra Times
> *2 December 2010*

of fossil fuels. Climate change could well drive many species to extinction – and it won't do us any good either. So our choice is to wreck the Earth by continuing on the way we are going, or to change to alternative sources of energy, including wind power, while reducing our demand.

We could build energy neutral houses that require no heating or cooling. We could become much less mobile and stop racing around and wasting fuel. We could consume less of everything, and live on locally grown produce. We could do many things, but at least in the short term we won't do them. So we need to use many alternatives to fossil fuels, and accept solar power, wind turbines, wave power and the rest. In Australia we have an abundance of sunshine, the southern coast provides good potential sources of wave power, we have hot rocks suitable for geothermal energy generation.

As a society we must realise that there are drawbacks to almost all alternative energy sources, from hydroelectric on. The drawbacks to coal seam gas mean that it is almost as polluting as coal. Nuclear, with the high energy cost of mining and refining, as well as having the problem of storage of dangerous waste, would be a really bad option. Tidal barrages destroy important habitats for many species. Almost the only alternative energy source which is truly benign is geothermal power from naturally occurring geothermal provinces such as Yellowstone, Rotorua and Iceland.

> *We have lived our lives by the assumption that what was good for us would be good for the world. We have been wrong. We must change our lives so that it will be possible to live by the contrary assumption, that what is good for the world will be good for us. And that requires that we make the effort to know the world and learn what is good for it.*
>
> *Wendell Berry, The Long Legged House, 1969*

While we summon up the will to concentrate on energy efficiency, and in lowering our expectation of continuously increasing energy supplies, learning to use less and expect less, we will need to make the most of varied, relatively benign alternative energy sources, and wean society off fossil fuels for good.

Jenny Wanless

Six degrees

Complex societies have sometimes survived the rise and fall of empires, plagues, wars and famines. They won't survive six degrees of climate change, sustained for a millennium. In return for 150 years of explosive consumption, much of which does nothing to advance human welfare, we are atomising the natural world and the human systems that depend on it. *George Monbiot, December 2012*

Thinking like a mountain

Since [shooting that wolf] I have lived to see state after state extirpate its wolves. I have watched the face of many a newly wolfless mountain, and seen the south-facing slopes wrinkle with a maze of new deer trails. I have seen every edible bush and seedling browsed, first to anaemic desuetude, and then to death. I have seen every edible tree defoliated to the height of a saddle-horn. Such a mountain looks as if someone had given God new pruning shears, and forbidden Him all other exercise. In the end the starved bones of the hoped-for deer herd, dead of its own too-much, bleach with the bones of the dead sage, or molder under the head-lined junipers.

I now suspect that just as a deer herd lives in mortal fear of its wolves, so does a mountain live in mortal fear of its deer. And with better cause, for while a buck pulled down by wolves can be replaced in two to three years, a range pulled down by too many deer may fail of replacement in as many decades.

So also with cows. The cowman who cleans his range of wolves does not realize that he is taking over the wolf's job of trimming the herd to fit the range. He has not learned to think like a mountain. Hence we have dustbowls, and rivers washing the future into the sea.

We all strive for safety, prosperity, comfort, long life, and dullness. The deer strives with his supple legs, the cowman with trap and poison, the statesman with pen, the most of us with machines, votes, and dollars, but it all comes to the same thing: peace in our time. A measure of success in this is all well enough, and perhaps it is a requisite to objective thinking, but too much safety seems to yield only danger in the long run. Perhaps this is behind Thoreau's dictum: In wildness is the salvation of the world. Perhaps this is the hidden meaning in the howl of the wolf, long known among mountains, but seldom perceived among men.

Aldo Leopold, *A Sand County Almanac*, 1949

Modern civilisation

Modern science-based civilisation is but a thin veneer over fundamental medieval notions divorced from empirical evidence. *Andrew Glikson*

Taking the roof off housing

Derek Wrigley presented the following paper at a conference of the same name organised by Rehabilitation International, Australia, on 27 November, 2012

My theme will take the title of this conference somewhat literally because the roof of the single storey detached house of today is becoming a critical interface between us and the sun. There are several ways in which such houses can be improved for the benefit of residents, especially those with a disability.

There is a severe mismatch today between domestic roof forms and the application of photovoltaic panels and solar water heaters. We should now be preparing for the next significant step – installing the **combined distributed energy roof** – making one technique do double duty.

We are, unfortunately, passing through a development phase where hot water absorber and photovoltaic panels have developed rapidly but are applied haphazardly onto roofs that were not designed for them. This phase must come to an end if we are to benefit effectively from solar energy technology.

If we are to achieve anything like sustainable lifestyles there are three essential requirements which must be met in the housing industry.

1. Urban planners need to understand passive solar house design better in order to subdivide suburban land so that solar houses are practicable.

2. House designers need to plan the roofs at the same time as they plan the ground floor – *not at the end* of the design process. The fundamental *purpose* of a roof is changing rapidly because of climate change and our urgent need to reduce pollution.

3. Renewable energy from the sun is now technically and economically feasible and vital to our survival, but optimal effectiveness will not be achieved unless house designers understand that basic science and nature, in collaboration, can provide comfortable conditions at much lower running costs and significantly reduced atmospheric pollution.

Regulators, developers, architects, mortgagors, estate agents and the buying public, must also understand (or at least not undermine) the *science* which underlies the design of effective, liveable houses. We have lost sight of our real objectives, seduced by the easy accessibility of cheap oil over the last century.

We need to remind ourselves that *the real purpose of building houses* is to provide effective personal spaces which are a joy to live in, and which promote good health. However, in the last half-century they have become more like trophy filing cabinets for runaway consumption. These factors are critical, especially for people with disabilities.

The ease of constructing roads and underground services still dominates our design thinking to the active detriment of the lifetime real function of houses, and house blocks are divided ineffectively from what land is left over – current planning in Canberra is testament to this practice. Orientation and the shape of house blocks must be closely related if we are to create effective liveable houses. The sun won't change its path across our sky – it is we who have to change our practices if we are to be healthy and happy in our houses.

> *... all our environmental problems can be boiled down to Limits to Growth phenomena. A frontier mentality was OK when early European settlers spread out across the New World; today it is not. When you live alone in a wilderness, it is safe to use a passing river as a source of water, a washroom, and a toilet; but when you live in a Mumbai slum it is not. Over-population is not a magic number; it is a function of our environment. One person per sq.km probably makes a desert over-populated.*
>
> *Martin Lack, 4 December 2012, on Gail Tverberg's blog*

One Canberra suburb I reviewed recently had 84 per cent of its residential blocks of such sizes, density and orientation as to make it difficult or impossible to design effective solar houses on them despite regulations designed for good solar access.

The *up-front* economics of block subdivisions determined in ignorance of solar geometry, but with excessive road construction specifications, proliferating underground services, poor understanding of the thermal capacities of housing materials, and the need to make a profit all predominate over the *lifetime* human considerations of happy housing.

Subdivisions of this kind too frequently minimise the penetration of daylight and sunlight in winter and paradoxically can only increase reliance on expensive, polluting fossil fuel energies. This is

illogical thinking and unsustainable practice, contrary to the direction we must be taking if our grandchildren are to have any semblance of a happy future.

However, it is not fair to blame only the planners and house designers. The buying public need to change their expectations and their mindsets to accept that large is not always better; that keeping up with the Jones's is an inflationary and unsustainable practice.

Unfortunately, the over-indulgences of the twentieth century seem to have twisted our sense of values, contributing to several tendencies in housing design which are proving contrary to good health.

Medical statistics are showing that depression, rickets and tuberculosis are on the rise. Vitamin D levels in our blood have declined partly due to increased indoor living and to the housing industry's ignorance of effective solar house design, and partly to an ill-considered English hangover about excessive sunlight inside buildings – faded carpets and upholsteries etc. (still prevalent).

Florence Nightingale, during her work in the Crimean War in the 1850s, showed that bright natural light and sunlight are vital for good health.

In the competition for 'affordable' housing, better house design based on science has been ignored and meaningless aesthetic novelty, bordering on opulence, has prevailed. When climate change really hits us, house owners will find, when it is too late, that they did not get good value for their money and our regulators are condoning this in their approvals of house designs.

Examples of this failure include the following.

An unbelievably high percentage of black tiled roofs has appeared in our new suburbs, despite the fact that they can raise internal temperatures in summer by up to 7^{o} - and even more ridiculous, black tiled roofs with air conditioners – at a time when we should be reducing our consumption of fossil fuelled electricity, not increasing it.

Because of an inadequate balance of mass and insulation in twentieth century houses, air conditioners have been retrofitted, but are now becoming the norm in new houses. This is contagious ignorance because nature can cool our houses more effectively with buoyancy convection, which is cheaper to install, has zero running costs, is completely silent and causes no pollution. This simple technique has been known for over two millennia. Why do we never learn?

Brick veneer external walls have become the norm, despite the fact that reversed brick veneer produces better comfort conditions in this climate and requires lower energy input. Builders find it more convenient to build the conventional brick veneer.

Many house blocks are now elongated narrow rectangles with the small end facing the street and to the north as a token gesture, giving a reduced exposure to the beneficial sun and with the long sides unattractively and ineffectively close to their neighbour. This planning is reverting to the slums of nineteenth century Industrial Revolution housing in the UK.

> *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*

Such houses have only a thirteen per cent ability to warm themselves by solar exposure during the cooler months and their pitched roofs have only a twenty per cent ability to generate useful electricity. And the real estate agents proclaim they have northern frontages! This is deceptive advertising at its worst.

At the same time we are seeing pretentious porticos, unnecessarily large living areas, excessive down lighting, expensive kitchens and bathrooms (designed partly to be paraded to visitors as one-upmanship on the Joneses), home theatre rooms – all of which require heating and cooling by power hungry air conditioners which pollute the environment and heat the local suburb.

Let me summarise what is possible if we are to achieve a sustainable future.

In Australia we have always assumed that rooms on the south side of a house cannot receive warming sunlight through their windows in the cooler months. Southern habitable rooms can be warmed by the sun by using simple external reflectors - temperature rises of up to twelve degrees above normal have been recorded in winter in the eight houses in Canberra that have installed them. Calculated efficiencies of forty seven per cent are achievable – more than double the efficiency of photovoltaics *and*

there are no running costs. We could benefit by challenging our long held beliefs.

By accepting a solar discipline in our urban planning, every new house, if sensitively designed, could be faced within twenty degrees of north. This is possible on square blocks of 378 square metres, with three bedroom terraced houses of 135 square metres, and giving a nine star rating, with the sun entering every habitable room, providing psychologically cheering warmth at no running cost.

By accepting that '*small can be beautiful*' the capital cost of such smaller, very liveable houses with good orientation could be reduced; more clean electricity could be generated than consumed, reducing the consumption of fossil fuelled electricity.

We could fit more houses onto a given subdivision, even including a central playing field and a local general store.

We could reduce the area and cost of internal access roads by about forty per cent, by water sensitive design and adequate single car parking.

The combination of passive solar heating and suitable internal mass and insulation could keep the whole interior at a comfortable temperature with minimal top-up heating.

A natural buoyancy system of convective ventilation, coupled with a natural external cool air reservoir provided by refractive solar shades (which admit light but keep the heat out) and deciduous vines would produce free, silent air and structural cooling, making air conditioning unnecessary.

Water self-sufficiency could be obtained by collection and storage of rainwater, supplemented by sub-soil irrigation with grey water.

If built in groups to obtain quantity benefit, and taking a holistic 'cradle to cradle' view over twenty years, such a house could be much cheaper to build and live in, and reduce its greenhouse emissions by about ninety per cent. It would be a much healthier and happier home for all buyers, especially for those with a disability.

The housing industry, especially in the light of global warming, is culpable in ignoring the design of better housing embodying proven science and by not conducting relevant research. Our regulatory bodies are also complicit in not recognising or enforcing such knowledge and by so doing they are all cheating the public by not responding to the ominous signs of climate change.

We have all been spoilt by the last century, and it is unfortunate that those who are at a physical disadvantage will continue to be handicapped unless more enlightened housing design is demonstrated.

Derek Wrigley

People say that I am hard core about some of this stuff but I know because I have been to Davos, and I've sat with Bill Clinton and I've sat with Bill Gates and I've sat with Tony Blair and I've sat with Nancy Pelosi. I've sat with all these people who we think are in charge, and they don't know what to do. Take that in: they don't know what to do! You think you're scared? You think you're terrified? They have the Pentagon's intelligence, they have every major corporation's input; Shell Oil that has done this survey and study around the peak oil problem. You think we've got to get on the Internet and say, "Peak oil!" because the system doesn't know about it? They know, and they don't know what to do. And they are terrified that if they do anything they'll loose their positions. So they keep juggling chickens and chainsaws and hope it works out just like most of us everyday at work. That's real, that's real.

Van Jones
American environmental activist
August 2007

The industrialised worldview

The industrialised worldview perceives Nature as something to be harnessed through industrial processes and infrastructure, in order to enhance the human condition. It is an exploitive worldview that seeks to use natural resources and habitats as the means to continuously improve human societal wellbeing—that is, to provide continuously improving material living standards for ever-increasing numbers of ever-expanding human populations.

Chris Clugston, *Scarcity: Humanity's Final Chapter*, 2012

No steady state

Industrial civilization, being over 90% dependent on natural non-renewable resources, cannot be sustained. There can be no "steady state" industrial existence. We cannot make a deal with Nature and negotiate an 'America-lite' economy, or live like the Waltons or Ben Franklin and say "Stop". Only a society that is exclusively reliant on renewables could hope to be "steady".

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

There once was a culture that swallowed a lie

Sung to the tune of:
There was an old lady who swallowed a fly

There once was a culture that swallowed a lie
I don't know why they swallowed the lie
Perhaps they'll die

There once was a culture that damaged the land
Their quest to expand made them damage the land
They damaged the land, they swallowed the lie
But I don't know why they swallowed the lie
Perhaps they'll die

There once was a culture that ruined the ocean
Oh what a notion!
To ruin the ocean
They ruined the ocean and damaged the land
Their quest to expand made them damage the land
They damaged the land, they swallowed the lie
But I don't know why they swallowed the lie
Perhaps they'll die

There once was a culture that poisoned the air
They did not care that they poisoned the air
They poisoned the air and ruined the ocean
They ruined the ocean and damaged the land
Their quest to expand made them damage the land
They damaged the land, they swallowed the lie
But I don't know why they swallowed the lie
Perhaps they'll die

There once was a culture that brought life to the brink
Things go extinct when life's at the brink
They brought life to the brink and poisoned the air
They poisoned the air and ruined the ocean
They ruined the ocean and damaged the land
Their quest to expand made them damage the land
They damaged the land, they swallowed the lie
But I don't know why they swallowed the lie
Perhaps they'll die

There once was a culture that showed no remorse
They died of course!

(Spotted on the internet, 21 November 2012)

> *Debt is the engine of economic growth, and economic growth is treated as if it represented value, even though it is measured without regard to utility and totally disregards whether its effects are positive or negative. A mine that produces $100 million dollars of minerals but leaves an environmental disaster that costs $200 million to clean up has contributed $300 million to the economy, to the GDP.*
>
> *David Ewing*
> *on an internet discussion forum*
> *17 December 2012*

Editorial in The Guardian

31 December 2012

This editorial from *The Guardian* is a succinct account of our current situation, as a polluting, destructive force on our only habitable planet. But maybe it leads to a view that as long as we can produce sufficient energy from non-carbon polluting sources we can continue on our merry way, with growth as our goal. Certainly this would be the view of many people, including most politicians, economists and business people.

As *Nature and Society* has argued, time and time again, to save our environment and ourselves, we have to realise that physical growth is bad; that is, growth in population, consumption of material resources, and the myriad forms of waste we produce. We need to reverse the physical growth of human society, and instead focus on social growth, human physical and mental well being and life satisfaction. We must concentrate on learning to live within Earth's budget, making room for all those other life forms that actually make the Earth the wonderful, interesting, enjoyable and above all livable place it has been. It is in severe danger of becoming unlivable as a result of our growth - and it is up to us to change.

Climate: another year of living dangerously

The signals could hardly be clearer: climate change is on the way, driven largely by the burning of fossil fuels and other human activity

This coming year, according to the UK's Met Office, could be one of the warmest ever. This forecast is the latest in a cascade of ominous observations. Just in the last month US scientists warned that West Antarctica was warming twice as fast as expected, and three times faster than the average for the planet as a whole; and the European Space Agency revealed that snow cover in Europe and Asia in June had been the lowest since satellite observations began 45 years ago. It has been a year of extremes, in which the Arctic summer sea ice fell to its lowest ever; in which the 48 contiguous states of the US experienced the hottest ever temperatures and protracted drought; in which wildfires in the tundra darkened snow over

Greenland and precipitated melting at an unprecedented rate. The largest Atlantic hurricane on record crippled New York, while Britain, which began the year with one of the driest winters on record, then experienced what for some counties proved to be the wettest year ever.

In global terms, 2012 was probably only the ninth warmest on record. But 11 of the 12 warmest ever have fallen in this young century. The signals could hardly be clearer: climate change is on the way, driven largely by the burning of fossil fuels and other human activity. More than two decades ago, scientists warned that these things would happen: they are happening, and faster than anybody expected.

Ice reflects sunlight: it helps insulate the planet. Dark things – soot, blue water, tarmac and brick – absorb sunlight, and accelerate warming. So the loss of ice cover is itself going to feed back into extra warmth and even faster melting. For every 1C temperature rise, saturated air can hold 7% more water vapour. So with rising temperatures, there will be devastating drought in some regions and catastrophic floods and cyclones in others. But glacial ice is also water waiting to reach the ocean. Researchers warned in 1978 that the West Antarctic ice sheet was likely to melt as carbon dioxide levels rose. There is enough ice there to raise global sea levels by at least 4.5 metres: if that happened, London, New York, Shanghai and other estuarine megacities would become uninhabitable and most of Bangladesh could disappear. Already, as we report in connection with Britain today, food security is back on the political agenda in the rich world.

And the political response to these ominous signals? Ministers met in Doha, agreed once again that planetary warming should be limited to 2C rather than, say, a possible 4.8C, and promised to meet again in 2015. They then went back to worrying about economic growth. But unsustainable growth is the problem. Successive UK governments have grasped the gravity, but have acted slowly and inconsistently. This one – avowedly the "greenest government ever"– should be vigorously pursuing carbon-free ways of delivering energy and inventive ways of saving it. Instead, it has seconded energy executives into the civil service; it is contemplating the exploitation of shale gas; and it is watching rail fares rise by twice inflation, and so encouraging fossil fuel use on the road. In the US, attitudes are changing: senators and members of Congress may remain sceptical, but – according to a December poll – four Americans in five now think that temperatures are rising and government should act.

That is good news: politicians respond to electoral alarm. The bad news is that the longer the delay, the more radical the action needed, and the more single-minded, wholehearted and hard-headed the requisite international co-operation to deliver it. The auguries are not promising. Rationing resources is never easy politically, and nation states tend to compete, rather than co-operate. But headlong climate change presents hazards on a global scale, so global agreement and concerted action is the only option. We don't have another planet to go to. We really are all in this together.

A sane person to an insane society must appear insane.

Kurt Vonnegut
Welcome to the Monkey House

Animal rime

Alligator, beetle, porcupine, whale,
Bobolink, panther, dragonfly, snail,
Crocodile, monkey, buffalo, hare,
Dromedary, leopard, mud turtle, bear,
Elephant, badger, pelican, ox,
Flying fish, reindeer, anaconda, fox,
Guinea pig, dolphin, antelope, goose,
Hummingbird, weasel, pickerel, moose,
Ibex, rhinoceros, owl, kangaroo,
Jackal, opossum, toad, cockatoo,
Kingfisher, peacock, anteater, bat
Lizard, ichneumon, honeybee, rat,
Mockingbird, camel, basilisk, mouse,
Nightingale, spider, cuttlefish, grouse,
Ocelot, pheasant, wolverine, auk,
Periwinkle, ermine, katydid, hawk,
Quail, hippopotamus, armadillo, moth,
Rattlesnake, lion, woodpecker, sloth,
Salamander, goldfish, angleworm, dog,
Tiger, flamingo, scorpion, frog,
Unicorn, ostrich, nautilus, mole,
Viper, gorilla, grasshopper, sole,
Whipporwill, beaver, centipede, fawn,
Xantho, canary, polliwog, swan,
Yellowhammer, eagle, hyena, lark,
Zebra, chameleon, butterfly, shark.

Author unknown; said to have been composed in 1883 and to have appeared in the Cincinnati Gazette. The author wrote that he put it together to please his two sons, 4 and 6 years old.

Seeing blue

William Gladstone, the nineteenth century British prime minister, was a keen student of Homer. One thing that troubled him was that Homer always described the sea as wine-dark, never blue. Homer also used wine-colour to describe hair and iron. Gladstone postulated that the ancient Greeks must have all been colour-blind.

Studies of ancient texts, in other languages as well as Greek, have found that in all of them the most common colour terms are black and white. Red comes a poor third in frequency of use and yellow and green tag along behind, but blue is never mentioned. The Egyptians are the exception, they are the only ancient people who had a word for blue.

On the RN's *Science Show*, 5 January 2013, which itself was a rebroadcast of an American *Radio Lab* dealing with colour and perception, it was suggested that this was because blue was of no use to these early people: no natural food is blue and there are few blue objects in the environment. It was postulated that people could only see the colours they had named, and colours were only named when people had discovered suitable pigments they could use. Red would have been easy – just use some red clay for painting. Yellow and green pigments would have been discovered later, and blue much later again.

Indeed a present day tribe living in Namibia was also found to have no word for blue. These people could not identify the square that was different on a colour chart that contained one blue square amongst a number of squares of various shades of green. To us the blue square would really stand out. When asked what colour the sky was, they replied black even during the day.

It seems strange to ignore the fact that the sky is blue and very obvious. One researcher who had tested the Namibians decided to experiment with his own infant daughter, persuading his wife never to say anything to the child about a blue sky. Once the child had learnt all the common colour names including blue, and used them confidently, the father pointed to the sky one day and asked her what colour it was. For two months she could not reply to this question, and at last hazarded white.

So in a way it really does seem that Gladstone was right. The Ancient Greeks were colour-blind, blinded not by lack of colour cones, but by language and usage.

Confirmation bias

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….

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

Tool use by fish

Back in September 2011 *Australasian Science* reported on the first clear evidence of tool uses by a fish, specifically a black spot tusk fish. The animal was observed using a rock as an anvil on which to break open a cockle shell.

The fish picked up the mollusc in its mouth, swam to a convenient rock, then swung its head strongly to strike the shell against the rock. The fish repeated these blows until the shell broke open. The actions were very accurate, and the fish did not damage its head.

There are many piles of broken shell found in the Great Barrier Reef, but it had been assumed these were the result of wave action. Now it seems, some of them could be middens left by fish.

This would strengthen the case for accepting that fish belong in the ranks of the animals which we agree are conscious.

Farrago

Life on ice – Emperors in peril

Life in the Antarctic depends to a large extent on krill; these little creatures are a major source of food for penguins, seals and whales. Krill in turn depend on sea ice – young krill shelter and feed under it.

Emperor Penguins are particularly dependent on sea ice – all their colonies are situated on fast ice, sea ice securely attached to land. These big birds are not agile enough to climb up on cliffs or rough shorelines, but they can march long distances over sea ice. The birds come ashore in March or April and mate. Once the female has laid her egg, the male takes over the incubation and the female goes back to sea. The males endure all that the winter can throw at them, losing about half their body weight, but keeping the egg warm. The females return in July or August, as the eggs hatch. Then the parents take turns feeding the chick, or going to sea to feed themselves.

The colony near the base at Dumont d'Urville has been much studied. A warm spell during the 1970s and early 1980s saw average winter temperatures as warm as -14.7°C, rather than the more usual -17.3°C, reducing the sea ice by about eleven per cent. As a result the penguin population halved.

The Emperors need good ice for about eight months if they are to breed successfully, so if the ice is late forming, or breaks up early, they are in trouble. But there is another danger period for them, too, when they moult in January and February. They must stay on the ice while they are moulting – they would freeze to death in the water.

Almost all Antarctic sea ice melts in summer. And areas of sea ice are in decline, by one or two per cent per year. As conditions change on the Antarctic Peninsula, Adelie and chinstrap penguins, native to the Antarctic, are in decline while penguins from the north are invading. Gentoo penguins have already arrived on the Peninsula, and could be followed by king and macaroni penguins.

New Scientist, 8 December 2012

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

A progress report on fishing

The race to fish has seen more and ever-bigger boats that can go farther, fish for higher volumes, process the fish on board and store them for long periods before getting back to port. This sounds efficient, but in fact it's a sign that we've been mining rather than harvesting our fish stocks – and the process is getting more expensive as the quality and volume of the "deposits" declines.

Our oceans are a natural resource of extraordinary richness that supports an estimated 25 per cent of the world population's protein needs, but various sources say that 75 to 90 per cent of the large fish in the ocean are now gone. Fish reproduce themselves and should be a renewable resource, but only if we take our catch up to a certain level and no more. It is increasingly clear that globally we have far exceeded that level. Technical improvements after World War II and then the advent of the supertrawler factory ships have enabled us to deplete the oceans. (Classical economic theory says little about the depletion of fish stocks and permanent damage to ecosystems and natural resources on which we depend.) The theory says that the market will "sort it out".

The major consumers of fish are humans, cheaply and intensively reared poultry, pigs and farmed fish and cats. Australia's pet cats eat more fish than do Australian humans.

Caroline Hoisington, *The Canberra Times* 15 September 2012; Giovani Turchini of Deakin University

Nature versus nurture

I often think it's comical – Fal, lal, la!
How Nature always does contrive – Fal, lal, la!
That every boy and every gal
That's born into the world alive,
Is either a little Liberal
Or else a little Conservative! Fal, lal, la!
IOLANTHE, W S Gilbert

Animals are conscious too

At the first annual Francis Crick Memorial Conference held at the University of Cambridge in July 2012, scientists decided that it was time to declare that consciousness is not just the prerogative of humans - other animals also have consciousness.

The Cambridge Declaration on Consciousness said in part "non-human animals have the neuroanatomical, neurochemical, and neurophysiological substrates of conscious states along with the capacity to exhibit intentional behaviours. Consequently, the weight of evidence indicates that humans are not unique in possessing the neurological substrates that generate consciousness. Non-human animals, including all mammals and birds, and many other creatures, including octopuses, also possess these neurological substrates."

Charles Darwin had pondered this question in the mid-nineteenth century and had come to the same conclusion – although expressed in simpler and more elegant language. From the principles of evolutionary continuity he had decided that differences between species are differences in degree, not differences in kind. Therefore if we have something, other animals also have it to varying degrees.

The declaration on consciousness was not aimed at scientists. It was for the general public, in the hope that it will influence public attitudes to animal welfare, and will help to promote humane animal welfare laws and humane treatment of animals in general.

New Scientist, 22 September 2012

"As our planet gets warmer, as animals go extinct, as the humans get sicker, as our economies bail and our politicians grow ever more twisted, Americans just go shopping", Adbusters says on its web site. Overconsumption is destroying us, yet shopping is "our solace, our sedative: consumerism is the opiate of the masses."

New York Times, 21 December 2012

Animal senses

The ways in which animals sense their environment are many and varied.

Sight - Humans, as is generally recognised, have three types of colour cones in our eyes, seeing red green and blue. Bees see UV, blue and green, and in addition they detect the polarisation of light. Some other insects have four, five or six colour receptors, and we cannot imagine what they are seeing. Pythons, boas and pit vipers see the world much as we do, but they also 'see' infrared, so they sense body heat from up to a metre away.

Magnetism – Many species detect the Earth's geomagnetic field and use this for navigation. They include pigeons, sea turtles, chickens and naked mole rats.

Echo-location – bats are the past-masters in this field, using ultrasound to avoid obstacles or catch prey.

Smell – Dogs have 300 million olfactory receptors, in comparison with humans' six million. The dog's olfactory cortex takes up 12.5% of its brain mass (ours is less than one per cent of our brain). In dogs, each nostril is smaller than the distance between the nostrils, so they sniff two distinct regions of space, thus they are able to decipher the direction of a scent. Stale air is put out through the sides of the nostrils, so it does not mingle with the air being breathed in.

New Scientist, 20 August 2011

Tortoises

The marine environment is an amazing place, filled with an assortment of species more diverse and wondrous than the most imaginative of human brains could ever concoct. This environment continually sustains, influences and inspires us, and many of the ocean's inhabitants have won the hearts of the masses.

One of the more endearing families of animals in this environment is the marine turtles. Marine turtles are an important component of both traditional and modern cultures around the world. They are undeniably beautiful animals, with an inquisitive but laid-back behaviour that attracts snorkellers and divers to them the world over.

For the lucky few who have the opportunity to really get to know these animals, it becomes crystal-clear that the true depth of their beauty is often not fully recognised from fleeting glimpses, but is found in the slight but mesmerising natural variations in shell colour and pattern, the deep, dark eyes that beg for attention and understanding, and, above all else, the eccentricities in disposition among individuals.

Blake Chapman, *Australasian Science*, December 2012

Nature and Society Forum

Contributions for the next edition of *Nature and Society* are invited now from all members. They should be sent to the editor, Jenny Wanless, 22B Jensen St, Hughes ACT 2605, ph 02 6281 3892, or to our office by 21 March 2013.

Contributions may be sent on paper or electronically. Electronic submission is preferred.

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 about biosensitivity.

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

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