

Towards a New Manifesto for Sustainable Design

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(Chapter 1. “Imaging Sustainability” Lewis and Ryan RMIT Press 2006).

To be truly radical is to make hope possible rather than despair convincing.

Raymond Williams, quoted in Lovins 2005: ix²

Our era is unique in human history. Depending on how we manage the next few decades, we could usher in environmental sustainability – or collapse.

Musser 2005: 22³

*A sustainable future demands new **knowledge** and renewed **creativity**.*

*It depends ultimately on our ability to change **direction**.*

International Institute for Industrial Environmental Economics 2000.⁴

Introduction to a new territory for design

‘Imaging sustainability’ – bringing a sustainable existence ‘into vision’ – is a critical, urgent and exciting task, one that will redefine the importance and the role of design.

Imaging sustainability will not be easy; it requires stepping boldly into a contested sphere, challenging those who cling (increasingly desperately) to ‘old ways’ and ‘old visions’; it also involves serious questioning of many who are already committed to action to remedy the worst aspects of unsustainable practice, including many working under the banner of *eco-*

design. Everything suggests that imaging sustainability will bring design and designers into a new and critical role in shaping all aspects of development, because of an urgent need to *re-invent the world*. Re-inventing the world – as somewhere that is environmentally sustainable – will not be just about its *reconstruction* (which is the focus for most current efforts in eco-design) but about its *re-animation* with different values, different priorities, different dreams about life and progress. Re-animation requires different knowledge, different creativity and skills and different sensibilities than those considered necessary for design for ‘re-construction’ (which I will refer to from here on as ‘eco-re-design’⁵).

Bringing a sustainable existence into vision is to give expression to an idea that now lies close to the surface for so many people: *the future cannot be what it used to be*.

Tipping-points and crossroads

The future, of course, doesn’t exist, it has to be made, but there is a sense in which it has long been taken as predictable, comprised of attributes to be expected, ‘unfolding’ along a particular trajectory from the past-present. Within ‘Western’ civilisations and in ‘Western’ thought since the seventeenth century that view of the future has been framed by the concept of progress which has provided a sense of continuity and predictability – the pathway to the future is supposed to involve incremental, observable improvements in the human condition.⁶ Today, that idea is being shaken from so many different quarters. Viewed from a global perspective it can be very hard to see any clear line of improvement in humanity’s lot. While it is true that global consumption has expanded at an unprecedented rate over the last century, improving living standards for hundreds of millions of people,⁷ international agencies predict an increasing divergence between those who benefit from economic and technological development and those who do not.⁸ The overall consumption of the richest fifth of the world

is sixteen times that of the poorest fifth. Behind any figures of improvement in the average global living standards lies growing disparities – in wealth, in access to resources, in nutrition, health, education and security. The Earth can only support about 1.2 billion people living at the consumption levels of some of the ‘rich’ countries, such as the USA, Australia, Norway, Finland. As Nielsen points out, at those consumption rates we have a ‘surplus’ of five billion people who cannot be accommodated on the eleven billion hectares of biologically productive land available.⁹ Disparities indeed. When global social and economic conditions and trends are considered, plans and action for sustainable development, for real overall improvements in the human condition, seem unreal and unattainable. The UN Millennium Goals¹⁰ – the elimination of poverty, universal primary education, reducing child mortality, eradicating chronic diseases, and so on – seem at the same time ever more urgent and ever more difficult to achieve.

However, the real spreading doubt about the shape of a viable future comes from the other pillar of sustainability: the environment. These first years of the new millennium seem to mark some ‘tipping-point’¹¹ in global concern about the state of eco-system services, or the *natural capital*, on which our existence depends. In the later half of 2004, and with seemingly greater frequency in the first half of 2005, global organisations and scientific conferences have described the unsustainability of our current conditions in terms that have become impossible to ignore. Read the IUCN Red-list of endangered species,¹² the UN Global Environmental Outlook,¹³ the report of the International Conference on Stabilisation of Greenhouse Gases,¹⁴ the Millennium Assessment Report¹⁵ or the ‘unprecedented’ joint statement on global warming from the academies of sciences of France, Russia, Germany, US, Japan, Italy and Canada, Brazil, China and India for the June 2005 G8 Summit.¹⁶ The overwhelming picture from those reports is one of accelerating deterioration in the conditions

necessary for human life, including the real possibility that we are witnessing ‘accelerating, abrupt and potentially irreversible changes’ in ecosystem conditions.¹⁷ All these reports project a sense of urgency – an implicit or explicit exhortation to take immediate and significant action, before it becomes too difficult or perhaps even impossible. The September 2005 issue of *Scientific American* declares this year to be ‘a crossroads for planet earth’, a point in history in which only a few decades are left to decide between environmental sustainability or collapse.¹⁸

There is little that is really new in these recent reports, or in the frequent newspaper accounts of the predicted effects of global warming (sea level rise, the frequency of major climate events such as hurricanes, rainfall and drought patterns, the spread of some forms of infectious diseases, and so on).¹⁹ Anyone following the scientific data and the debates and deliberations through the last three decades of the UN summits on sustainable development²⁰ will be familiar with the general picture and the trends in the evidence. However, where in the past such reports and evidence could reasonably be a cause for gloom and despair, the current high level of attention to environmental sustainability seems to evoke something quite different – a sense of expectation, even of excitement, the opening up of possibilities that springs from a collective awareness of being at a ‘crossroads’ in history. The difference is that what once seemed to be always ‘at the margins’ now seems suddenly to be ‘at the centre’.

In the past, evidence and predictions about deteriorating environmental conditions have been regularly assailed by criticism, doubt, scepticism or outright ridicule from political parties (think Canberra over the last decade, or Washington under George Bush) and highly organised business and energy lobby groups.²¹ Whilst there is nothing to suggest that such attacks will cease (the stakes for some are too high), they do seem to be getting more

defensive. ‘New initiatives’ from Washington²² (and Canberra²³) on greenhouse reduction technologies suggest they detect a political swing; they are now trying to reassure their publics that they really intend to do something even more effective than the Kyoto Protocol (which they have refused to ratify).

This is a ‘crossroads’ time because the idea of global warming, and the issue of environmental deterioration, has seeped into the general consciousness to become part of a new (political and cultural) reality. We are on the edge of a truly significant global *paradigm shift* which will transform our ideas of development.

Paradigms reframed

Paradigms are a way of describing the shared theories or world-views which are fundamental to the way humans engage with, and make sense of, the world. Paradigms shape the mental space of interpretation, understanding and knowledge production; they are, as Turnbull expresses it, the ‘exemplary ways’ by which we ‘conceptualise and intervene’ in the world.²⁴ In the generation of scientific knowledge, a particular paradigm dominates as long as it provides a framework coherent enough for the process of discovery to be fruitful and productive. But the history of science shows that knowledge does not develop around an ever-strengthening paradigm; the process of discovery is punctuated by major paradigm shifts, when the whole of previous scientific knowledge has to be reinterpreted.²⁵ Such paradigm shifts occur after prolonged periods of social struggle within the scientific community. Dissatisfaction with the current paradigm is articulated first around ‘the edges’ of the community, amongst those who are younger, less socialised into the prevailing world view. The articulation of an alternative paradigm also starts ‘away from the centre’. As the conflict between the dominant paradigm and the ‘testing’ of what works or doesn’t work in the

physical world becomes more and more apparent, more and more people become open to considering alternative paradigms. These become periods of scientific revolution.²⁶

We are in a period of a sustainability revolution. Environmental sustainability is precisely, and most importantly, a test of what works or doesn't work in the way we have conceptualised and intervened in the process of development.

Our current-past interventions in the world – our modes of development – and the conceptual frameworks that have shaped or guided those interventions, *do not work*, they are unsustainable. Our past paradigms of development are wrong and the growing attention to alternative paradigms is visible to anyone who cares to look for them; alternatives 'from the edge' are moving to the 'centre'.

One defining characteristic of the 'old' passing paradigm of development has been the idea of continuous growth, in the economy, in production and consumption. To most people growth has been synonymous with progress. In the words of Herman Daly, who has been a critic of the idea of growth for many decades, growth has been accepted as the panacea for all problems of development:

Poverty? Just grow the economy (that is, increase the production of goods and services and spur consumer spending) and watch wealth trickle down...Unemployment? Increase the demand for goods and service...Overpopulation? Just push economic growth and rely on the resulting demographic transition to reduce birth rates...Environmental degradation? Trust in the environmental Kuznets curve, an empirical relationship purporting to show that

with ongoing growth in gross domestic product (GDP) pollution at first increases but then reaches a maximum and declines.²⁷

Daly has been proposing a ‘steady state economy’ as a necessary condition for sustainable development (and for real community prosperity) since the first wave of global action on the environment in the early seventies.²⁸ In spite of a stint at the World Bank, his core argument – that the economy is a subsystem of a finite ecosystem, so that it must cease growing and at some point to reach a ‘steady state’ – has largely kept him outside the centre of mainstream economics. As an indicator of this crossroads-time of paradigm shift, many of the major tenants of the economics of growth (what Hamilton calls our ‘growth fetish’²⁹) appear to be less certain than they have been (although not within mainstream economics or conservative governments). *Scientific American* chose Herman Daly to present ‘Economics In a Full World’ (from which the above quote was taken).³⁰ Here he repeats his core critique, which is that mainstream economics – and our measures of progress – have confused quantitative growth with qualitative development. Like Hawkins and Lovins in their important book *Natural Capitalism*,³¹ Daly is concerned about the depletion of ‘natural capital’, the resources (materials and living matter) which are extracted from the biosphere to create useful goods and support useful services, until they are returned again (usually in a different ‘non-natural’ state) to the biosphere as waste. Since the biosphere is finite, sustainability can be defined in terms of throughput [of natural capital] by determining the environment’s capacity for supplying each raw resource and for absorbing the end waste products.³²

Of course, Daly’s argument is not new, or unique, even amongst economists (as Hamilton shows). The finite nature of nature underpins all ideas and action on sustainability

(along with concepts of the maintenance of diversity, ecosystem complexity and so on). Constraining the throughput of resources, reducing materials flow, has become one of the key concepts of the idea of industrial ecology³³ and fundamental to what we might call eco-technology and eco-re-design. Using fewer materials, increasing the ratio of outputs (useful goods) to inputs (raw materials), recovering waste material (recycling), reusing product components, or designing things to last much longer, are all well defined strategies for reducing material flows. In the last decade or so these ideas have gained their own terminology – eco-efficiency – and measured as the resource (materials and energy) input required per dollar of GDP, most industrialised economies show significant overall increases in eco-efficiency over the past decades.³⁴

Lovins, in particular, has become one of the best known of a breed of new green optimists, describing case-studies of new products and systems (and creative concepts for new approaches) where design and technical innovation have significantly reduced environmental impacts (resource use and waste) whilst increasing economic returns. He talks, in the article from which the Williams quote (at the beginning of this article) is taken, of ‘signs of renewal glimmering all around us, even in the darkest of times’.³⁵ In the *Scientific American* ‘crossroads’ edition he repeats his attack on the ‘basic misunderstanding [that] skews the entire climate debate’, the idea that ‘protecting Earth’s climate will force a trade-off between the environment and the economy’.³⁶ Both the conservatives (strongly represented in Canberra) and environmentalists seem to agree on this point, he says; they differ only in their estimates of the cost and the returns. But ‘both sides are wrong’:

Using energy more efficiently offers an economic bonanza – not because of the benefits of stopping global warming but because saving fossil fuel is a lot cheaper than

buying it...The world abounds with proven ways to use energy more productively and smart businesses are leaping to exploit them.³⁷

In that piece, 'More profit with less carbon', he summarises many of the examples of technology, policy and design which he has done so much to publicise.

Daly too sees this as a real hope for a passage to a sustainable future, eco-design, life-cycle thinking, reducing material flows being a critical part of the new paradigm:

The sustainable economy must at some point stop growing, but it need not stop developing. There is no reason to limit the qualitative improvement in the design of products which can increase GDP without increasing the amount of resources used.³⁸

Eco-re-design is indeed a 'great news story' and the demonstrated potential to redesign production processes, products and infrastructure, to gain 'win-win' outcomes (a win for the environment and a win for business or the economy) is surely playing an important part in the current paradigm shift (making 'hope possible', as Williams says, being part of any revolutionary change). The success of product eco-design does have lessons for the design of the whole of our constructed environment.

However, the pitfalls and limitations of the 'eco-product route to an environmentally sustainable economy' are also evident and reasonably well understood. Daly would seem to be overly optimistic, there *is* reason to question the limit to the 'qualitative improvement in the design of products', at least in the way that has typically been interpreted, as 're-engineering' or 're-constructing' the existing world. The lessons from experience show that we need to shift the focus of eco-design for a sustainable future beyond the shaping of

materials and technology in products and buildings. The new focus for change is systems – to move beyond eco-re-design, eco-design will need to bring about changes in economic and physical systems, in organisational structures, in services – and cultural values, behaviour and lifestyles.

A sustainable future requires a shift from re-shaping our material existence to revaluing the immaterial.

A brief history of the successes (and the limitations) of product eco-re-design

In not much more than a decade, the theory, the practice and the potential of *designing-out* the life-cycle environment impacts of manufactured products – consumer goods – seems to have become reasonably well understood and accepted. Starting with large government-supported programs, in the early 1990s, which combined university-based research with practical experimentation in companies,³⁹ eco-re-design methodologies⁴⁰ have been developed that have proved themselves with a range of well publicised new products.⁴¹ Smaller scale research-industry-government projects were initiated in other countries and many larger corporations developed their own ‘in-house’ eco-re-design systems and projects.⁴² There is an extensive and growing portfolio of commercially successful products, in almost all areas of the market, which have been improved in this way.

The development of theory, tools and support systems and new education programs, combined with that tangible evidence of experimentation and investment in ‘eco-product’ development, has helped to create expectations about the potential for eco-design to contribute to an overall reduction in the environmental load of current systems of production and consumption. Daly’s optimism is widely echoed. ‘Expanding the sphere of eco-products’

is now an explicit goal of environment and industry policy in most OECD countries, a goal supported by most major industry groups and major environmental organisations.⁴³ Policies to stimulate investment and competition in product eco-re-design have been developing across most OECD countries, focused on a mixture of:

- demand side measures (such as eco-labelling, performance standards, green procurement programs);
- supply side measures (such as education, new manuals and guides, life-cycle data); and
- new regulatory systems aimed at end-of-life (eg minimum recycling requirements, extended producer responsibility) .

There is a well known set of *eco-design* (or ‘design for environment’) rules which, when appropriately applied, can reduce the whole-of-life environmental impacts of products by somewhere in the order of fifty to seventy-five per cent, within current market conditions. These rules focus on changing materials, reducing energy and resource inputs to manufacturing and the use phase of product and various ways to reduce end-of-life impacts and ‘material flows’ (already described above).

The pitfalls and limitations of the ‘eco-product route to an environmentally sustainable economy’ have also become evident over this same period and are reasonably well understood. There are, firstly, practical limitations which can be summarised as:

- the need for real methodologies. Eco-re-design rules do not form a menu of actions which can be applied to deliver new low (environmental) impact products. Eco-re-

design needs a systematic way to identify the relevant life-cycle impacts areas for a particular product and to select the appropriate rules for ‘designing those impacts out’;

- cost: the time and the resources needed to conduct life-cycle assessment of products, to identify the design focus, is often beyond the resources of small to medium sized companies.
- creative and analytical skills: successful eco-re-design requires the creative exploration of alternatives, the right mix of design, creativity and environmental skills; and
- education of designers (and managers) – we need designers (and technical and managerial people) to be educated in the principles of sustainability.

However, the most significant ‘limitation’ of the ‘eco-products’ approach is evident at a societal level. The improvement possible through eco-re-design of existing products, within existing systems of production and consumption, is simply not high enough to reach what is considered to be the necessary ‘factor’ change (resources used for a given result) for long term sustainability.⁴⁴

The fundamental environmental challenge to the sustainability of modern industrialised economies comes from patterns of consumption. In OECD countries, the consumption of resources, through the consumption of goods and services, is continuing to grow in spite of improvements in product design and in the technical eco-efficiency of the economy. From a global perspective, sustainable development cannot be based on the current diffusion of OECD patterns of consumption. Think of China, India and Africa with the same level of car ownership (and fuel consumption) as the US (in the order of 900 cars per 1000 people).⁴⁵ Even with the most optimistic projections of the efficiency of eco-re-designed cars

(smaller, lighter, hybrid-electric vehicles using fuel cells, hydrogen or ethanol), a US (or Australian) pattern of transport/mobility as a global development goal is incompatible with human survival.⁴⁶ Cars are just one example of so much else in our economy, those patterns of production and consumption we (in industrialised countries) have come to accept as indispensable for life and prosperity (as measures of progress). These patterns of consumption offer no pathway for global development.⁴⁷

Broadly three lines of thinking can be discerned in the various debates and actions to address this problem:

- Dramatically increasing the ‘factor gain’ through greater technical innovation. This scenario means ‘leap-frogging’ the simple ‘waste=food’ approaches focused on recovery, recycling and reuse of ‘waste’ materials.⁴⁸ New manufacturing and re-manufacturing systems would be required based on sophisticated recovery and refurbishment of components (as distinct from materials). Retaining the manufactured form of materials as components and refurbishing and reusing those components in a ‘new’ product, offers much higher overall (system) efficiency.⁴⁹ This new high eco-tech future would incorporate all the strategies of reducing material flows (described earlier) as well as maximising the use of renewable energy in processes as well as products (‘decarbonising’ the economy).
- Dematerialising consumption – shifting the economy from material to immaterial value. Again this means much more than simply ‘light-weighting’ the existing range of goods (although this would continue to be a feature); it means shifting patterns of consumption to non-material (non)things. Already this is partly discernible – and greatly possible with the right design approaches – from the use of information technology and the internet (moving bits rather than atoms).⁵⁰ But current interest is

more focused on services. If product consumption can be replaced by the consumption of services then potentially material consumption can be reduced.⁵¹ More importantly, most products can be thought of a 'service-providing' machine and there is a whole new eco-design approach which starts by asking 'What service does the consumer want from ownership of this product?' This brings the (re)design of services into the scope of the material designer (industrial or architect).

- Shifting from individual ownership to 'distributed possession'. One key policy to drive eco-re-design has been to place the responsibility for end-of-life effects on the producer of products ('extended producer responsibility'). This, in effect, returns ownership of products, at end-of-life, to the producer. The 'service design' approach to dematerialising consumption has also opened up ideas of ownership. If a consumer merely needs the 'service' derived from a product why do they need to own it? The use of a product can be provided as a service via a leasing arrangement (as companies such as Xerox have done with office machines) or through systems of sharing. Shared use has led to new systems for access to a car, to sophisticated shared laundries in residential apartments, to tool libraries and so on. There are services where a product is 'lent' by a producer to a consumer who then only pays for the service of its use. A new design terminology has developed to describe these approaches: product-service systems.⁵²

A future sustainable economy is likely to involve a mixture of all of the above; so some of the dimensions of the change of focus for design for sustainability (and its departure from eco-re-design) are clear: it is less about products (or physical things) and more about systems (which will still involve the transformation of products); it is not about sustainable materials but reducing material flows.⁵³

So, what we can learn from the success and limitations of the last decade of work on the eco-re-design of products is that we have to redesign systems of production and consumption, transforming the economy, patterns of living and quality of life, to reverse the cultural addiction to measuring prosperity and happiness through material accumulation (to cure what Hamilton has dubbed, a little too cutely, ‘Affluenza’⁵⁴). The cultural skills of designers, which for decades have been focused on ‘making the material desirable’, will be greatly tested in the need to give meaning to a new low material-flow world – to make it desirable. Whilst design as re-engineering will always be in demand, the major role for designers in the articulation of the new (sustainable) paradigm appears more likely to be as architects of immaterial delight.

Does this all amount to the need for a new manifesto for sustainable design? Even with the overriding challenge to reduce material flows, eco-design will have to ‘re-balance’ its current obsessions with the transformation of the material and the technical in favour of projecting and satisfying new cultural values. This is what I referred to at the start *as* re-inventing the world, forging a new unification of culture and nature, capable of being sustained. We need a new manifesto because we need new ways of imaging what can be sustained, new metaphors to transform design inspiration, because our constructed world, our ‘designed’ world, shapes our lives, physically, culturally and spiritually.

‘Tis such dreams our stuff is made of...if our ‘stuff’ isn’t sustainable let’s change the dreams

The patterns of our existence (the unsustainable ones) are embedded in the world we have created. The physical contribution to those patterns are obvious; the allocation of resources, materials, energy, water, and so on, is structured into the fabric of the artificial

environment. Much of our daily life is dependent on structures and products over which we have only limited choice or control. This is why the resource demands of buildings are currently such a focus for change. (There are numerous examples in the other contributions to this book which quantify how significant those ‘structured-in’ resource patterns are.) In the urban design of the built environment it is the system of spatial relationships structured through the configuration of communities, neighbourhoods and cities that determine a great proportion of resource use through, for example, transport. The lifetime of most of the physical structures of our constructed world can make change slow, a significant problem in achieving a more sustainable existence.

But to talk only about the physical structuring of our environment is to miss the real essence of design. The role of design (and our constructed ‘artificial’ world) in the reproduction of our (sustainable or unsustainable) existence, is well expressed by the inversion of Shakespeare’s line from *The Tempest*.⁵⁵ The ‘making of stuff from dreams’ captures simultaneously the nature, the process and the outcome of design. The process of creating and shaping the stuff of our world is not merely functional or technical. As Manzini expresses it, every human object is ‘the embodiment of what is at once thinkable and possible...an intersection of lines of thought (models, culture, forms of knowledge) with lines of technological development’.⁵⁶ Stuff is shaped by physical laws and function, but also by thought – ideas, values, desires, dreams. The ‘thinkable’ is given solid form, through design. The artificial stuff of the world we create embodies and communicates ideas about who we are, about the nature of human existence and fundamentally about nature itself. In the process we shape the world and are shaped by it – dreams make stuff makes dreams make stuff makes...

Of course that process of ‘making’ is not singular, homogeneous or simply deterministic; the forms of the world compete; they spring from different ideas, speak in different voices, allow for new interpretations, contain emergent possibilities, providing for the reinterpretation of dreams in the forming of new stuff. Design vision is only rarely able to impose its will on the messy process of its physical realisation. However, for all that messiness and unpredictable outcomes, and in spite of all the competing forms of our constructed world, there are dominant ideas that are reproduced and re-enforced in our daily encounter with the designed world.⁵⁷ The idea of progress is given tangible expression in our constructed environment. The creation, use (and, ultimately, destruction) of stuff has become a symbol and a measure of the success of human existence. ‘Big stuff’ – buildings and engineering infrastructure – shapes the patterns of our lives and our relationships to each other and, most importantly, to nature. (It has, for much of the modernist movement, focused on the delineation of ‘the human created’ from ‘the natural’, an assertion of human power to ‘re-construct’ nature to express the dominance of human cultural values.) We use the proliferation of the ‘smaller stuff’ – goods or products – as an indicator of the health of our economy, and our productivity as a culture, a nation, and as a species. The idea of progress is demonstrated by the evidence of our success in turning the physical stuff of nature into the artificial stuff of the human realm (through technology and design).⁵⁸

The stuff of our ‘artificial’ human realm thus gives expression to our individual and collective identity; it helps define the present and display the past, giving visible effect to the idea of history and the process of civilisation. In the stuff of the world we see evidence of the passing of time and of a struggle against nature and inevitable decay; in the enduring form of that world and in the expansion of its territory we see the securing of a ‘*niche for human survival*’.

It is the way we have conceived of that niche that has brought us to our crossroads; it is from this we must escape and for that we need a new way of thinking about eco-design and imaging sustainability. Capra calls this ‘eco-literacy’, a necessary step to change which has to begin with an understanding of the ‘organisational patterns and principles common to all life’.⁵⁹ Then, he says we can approach eco-design as the:

...shaping flows of energy and materials for human purposes. Eco-design is a process in which human purposes are carefully meshed with the larger patterns and flows of the natural world. Eco-design principles reflect the principles of organisation that nature has evolved to sustain the web of life. To practice design in such a context requires a fundamental shift in our attitude towards nature. In the words of science writer Janine Benyus, ‘it introduces an era based not on what we can *extract* from nature, but on what we can *learn* from her.’⁶⁰

Capra’s sweeping review of those fundamental organisational patterns across all of life leads him to a set of six principles which can be used as guidelines for building sustainable human communities. His principles are: networks, cycles, solar energy, partnership, diversity and dynamic balance. Capra is a scientist and although he elaborates on these principles,⁶¹ they are hardly expressed in the kind of generative language necessary for a manifesto capable of inspiring a new eco-design movement. John Thackara starts with the ‘parlous condition of the planet’ when he considers how ‘we can design our way out’ of our current difficulty. In his book (*In the Bubble: Designing in a Complex World*⁶²), based on the content of his important ‘Doors of Perception’ conferences,⁶³ he considers the design steps necessary to realise ‘sustainable and engaging futures’. ‘To do things different’, he says, ‘we

need to perceive things differently’, to ‘look at the world through a fresh lens’.⁶⁴ His way of ‘reframing technology and innovation’ is to find principles which can guide design for a ‘world based on less stuff and more people’, which will:

...enhance the ability of all citizens to engage in meaningful dialogue about their environment and context and foster new relationships between the people who make things and the people who use them.⁶⁵

All his design principles emphasise social and cultural issues and ideas of complexity: Lightness; Speed; Mobility; Locality; Situation; Conviviality; Learning; Literacy; Smartness and Flow. His elaboration of these themes provides a rich source for inspiration for a new design movement. However, the relationship between these social-organisational principles and ecosystem principles, such as Capra’s, needs much more careful reflection if they are to contribute to a new manifesto. Turnbull, in his contribution to this book, points to the fact that bio-diversity and cultural diversity are inseparably linked, but what is critical to life is the *process of diversification*, not the diversity of things at any given point. His contributions to a new manifesto would include concepts such as emergence, movement, go-betweenes, local knowledge and his key interest in design as a theatre of diversity in a new nature-culture commons.

Capra and Thackera, like Lovins, see their biggest contribution to a new paradigm of eco-design and a sustainable existence to be the examples of projects and new theories that are moving from the periphery to the centre and which offer inspiration, rather than formulae, for a new direction. In Europe, Manzini and others are extending this process of ‘amplification’ of peripheral change using workshops in design schools as ‘antennae’ to locate localised movements for change. In the project EMUDE (emerging user demands) –

also now called ‘the sustainable everyday’ – Manzini and his colleagues around the world are collecting and communicating these new movements.⁶⁶ The international ‘eco-sense’ project, with studios in design schools, is also attempting to redefine concepts for new social-cultural-technological relationships,⁶⁷ with a strong focus on the role of designers in imaging alternative futures in the same way that companies now compete in a conceptual market.⁶⁸

Rising above the current mainstream interest in technology and materials in sustainable construction there are projects and analysis that provide glimpses of the new paradigm already at centre stage. The architect of the new Melbourne City Council offices (see in this book, ‘CH2 Melbourne: The effect of the image is the real effect’ by Graham Crist) downplays its innovative technology, when he presents it to audiences, emphasising instead its collaborative process of generation (a form of Turnbull’s ‘commons’?) and its key system inspiration – the termite mound. In his review of another Victorian green building icon, the Queenscliff Centre for Marine Science, Melbourne architect and academic Leon van Schaik discusses the building as a complex technological and cultural artefact.⁶⁹ After describing its solar orientation, its energy and water systems and its material choices, van Schaik goes on to elevate the importance of its form, which breaks with the ‘prevalence of linear, laminar flow plan forms in many European schemes concerned with reversing our future eating propensities’. The form of the building in this case is ‘quite clearly driven by the site’. ‘Every site’, he says, ‘needs its own interpretation’.⁷⁰ He quotes Colin Rowe who argues that it is ‘supremely dangerous to have believed you have found the (singular) solution and that all that is needed is for it to be generally applied’.

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The new manifesto for sustainable design is emerging, shaping and being shaped by a new paradigm. As van Schaik says, ‘it is not the content that matters but the intention that leads to interactions which [will create] the necessary knowledge’.⁷¹

Notes

¹ Current position – Professor of eco-innovation, Co-Director Australian Centre for Science Innovation and Society, the University of Melbourne; Director Victorian Eco Innovation Lab.

² A Lovins, ‘Forward’ in *The Natural Advantage of Nations*, edited by K Hargraves and M Smith, London: Earthscan, 2005.

³ G Musser, ‘The Climax of Humanity’, *Scientific American*, vol 293, no 3, September 2005.

⁴ The ‘Millennium Statement’ of the International Institute for Industrial Environmental Economics, Lund University Sweden: www.iiiee.org . (22/12/2004)

⁵ Not to be confused with the Australian program of the same (trade)name which ran from 1993-97, although that program did contribute greatly to the development of the knowledge and methods referred to here. (For more information on that program see H Lewis and J Gertsakis, *Design + Environment*, UK: Greenleaf Books, 2001.

⁶ ‘The human condition’ is usually pictured as a fight for the survival of the human species against a harsh and uncaring ‘nature’.

⁷ UNDP, ‘Human Development Report’, New York: OUP and United Nations Development Program, 1998.

⁸ UNEP–GEO, 2004 ‘Global Environmental Outlook’ United Nations Environment Program, available www.unep.org/geo/geo3

⁹ R Nielsen, *The Little Green Handbook: A Guide to Critical Global Trends*, Melbourne: Scribe, 2005.

¹⁰ See: <http://www.un.org/millenniumgoals/> (18/10/2005)

¹¹ After the term popularised by M Gladwell, *The Tipping Point: How Little Things can make a Big Difference*, New York: Back Bay Books, 2002.

¹² J E M Baillie, C Hilton-Taylor and S N Stuart (eds), *2004 IUCN Red List of Threatened Species: A Global Species Assessment*, IUCN, Gland and Cambridge: IUCN 2004.

¹³ UNEP_GEO 2004, op cit.

¹⁴ Available from <http://www.g8.utoronto.ca/environment/2005steeringcommittee.pdf> (18/10/2005)

¹⁵ 'Millennium ecosystem assessment synthesis report', 23 March 2005. Available from <http://www.millenniumassessment.org/en/index.aspx> (18/10/2005)

¹⁶ Available from: <http://nationalacademies.org/onpi/06072005.pdf> (18/10/2005)

¹⁷ 'Millennium ecosystem assessment synthesis report', March 23 2005, op cit.

¹⁸ G Musser, loc cit.

¹⁹ Of course there is critical new data all the time, for example, the recent discovery of the leaching of carbon from soils as temperatures rise, which seems to be occurring at a rate way above previous predictions. See J Orr et al, 'Anthropogenic ocean acidification over the twenty-first century and its impact on calcifying organisms' *Nature*, vol 437, September 2005, 681-686. This is just one of many disturbing examples of 'non-linear' effects, of the kind that worry many climate modellers, which accelerate ecosystem impacts. Another, submitted before hurricane Katrina, examines the increasing frequency and force of such events and links with global warming. See: <ftp://texmex.mit.edu/pub/emanuel/PAPERS/NATURE03906.pdf> (18/12/2005)

²⁰ The UN Conference on the Human Environment, Stockholm, 1972; The UN Conference on Environment and Development, Rio de Janeiro, 1992; the World Summit on Sustainable Development, Johannesburg 2002. For a short history of the development of the idea of sustainable development over and through these events see: C Ryan, *Digital Eco-Sense – Sustainability and ICT, A New Terrain for Innovation*, Melbourne: Lab 3000, 2004 pp19-29

²¹ Such as the now defunct Information Council on the Environment funded by the fossil fuel industry, or the Centre for the Study of Carbon Dioxide and Global Change also linked to a fossil fuels association.

²² See information on the US Climate Change Technology Deployment Act. The development of this act is available at: <http://www.theorator.com/bills109/s887.html> (18/10/2005)

²³ Follow the progress of the new Australian Government initiative – the Asia Pacific Partnership on Clean Development and Climate – which was announced to show that Canberra took greenhouse warming seriously and would proceed with a new program (with the US) to do better than Kyoto. A meeting of six countries was announced for November 2005 but that date was later postponed. The eventual ‘outcome’ of this initiative can be followed from, for example: http://www.dfat.gov.au/environment/climate/#_Asia_Pacific_Partnership_on_Clean_D (18/10/2005)

²⁴ David Turnbull, *Masons, Tricksters and Cartographers*, Amsterdam: Harwood Academic., 2000.

²⁵ See, for example, Thomas Kuhn, *The Structure of Scientific Revolutions*, 2nd ed, 2 vols, vol. 2, *International Encyclopedia of Unified Science*, Chicago: University of Chicago Press, 1970.

²⁶ The term used by historian of science, Thomas Kuhn, *ibid*.

²⁷ H Daly, ‘Economics in a full world’, *Scientific American*, vol 293, no 3, September 2005, 78.

²⁸ H Daly and J B Cobb, *Towards a Steady State Economy*, New York: Freeman and Co, 1973.

²⁹ Clive Hamilton, *Growth Fetish*, Crows Nest, NSW: Allen and Unwin, 2003.

³⁰ True, they did still feel it necessary to offer space for a ‘counterpoint’ from another mainstream economist at the University of Cambridge who presents a very short ‘measured’ critique of Daly’s position: P Dasgupta, ‘A counter-point’, *Scientific American*, vol 293, no 3, September 2005.

³¹ Paul Hawkin, Amory Lovins and Hunter Lovins, *Natural Capitalism - the Next Industrial Revolution*, Boston: Little, Brown and Co, 1999.

³² H Daly, op cit, 81.

³³ A growing movement which broadly seeks models of industrial systems that operate according to the principles and systems of the natural eco-system. There is an International Society of Industrial Ecology and an *International Journal of Industrial Ecology* published six times a year by MIT Press.

³⁴ See C Ryan, *Digital Eco-Sense – Sustainability and ICT, A New Terrain for Innovation*, Melbourne: Lab 3000, 2004 (Available from www.eco-sense.info, 18/10/2005)

³⁵ A B Lovins, ‘Forward’, in *The Natural Advantage of Nations*, K Hargraves and M Smith (eds), London: Earthscan, 2005, ix.

³⁶ A Lovins, ‘More profit with less carbon’, *Scientific American*, vol 293, no 3, September 2005, 52.

³⁷ A Lovins, *ibid.*

³⁸ *ibid.*, 81.

³⁹ In particular the EcoDesign program of the Netherlands and the EcoReDesign program in Australia.

⁴⁰ The Australian methodology was known as EcoReDesign and the Dutch as PROMISE.

⁴¹ The Australian program between 1992-96, worked with 20 companies, both large and small, across a very wide range of sectors, with industry and government investment around \$25mill AUD. The Netherlands program was of comparable size and expenditure.

⁴² See, for example: C Ryan, 'A review of ecodesign', in *Innovation, Environment and Strategy*, R Roy (ed), Milton Keynes: Open University Press, 1996; C Ryan, 'Designing for factor 20 improvements', *Journal of Industrial Ecology* 2, no 2, 1998; J Gertsakis, H Lewis, and C Ryan, *A Guide to Ecoredesign*, Melbourne: Centre for Design at RMIT, RMIT University, 1996; J C Brezet and C G van Hemel, *Ecodesign: A Promising Approach to Sustainable Production and Consumption*, Paris: UNEP, 1997; U Tischner, E Schmincke, F Rubik, and M Prösler, *How to do Ecodesign?* Frankfurt: Verlag Form Praxis, 2000; Lewis and Gertsakis, loc cit.

⁴³ WBCSD, 'Sustainability through the Market', Geneva: World Business Council for Sustainable Development, 2001a.

⁴⁴ See discussion in Ryan 2004, op cit, 38-45.

⁴⁵ An up-to-date picture of the problems of consumption and the potential for sustainable consumption can be found at the website for the United Nations Environment Program. See <http://www.uneptie.org/pc/> (18/10/2005) and for a global report on consumption see: <http://www.uneptie.org/pc/pc/g2002.htm#gssc2002>. (18/10/2005)

⁴⁶ As one mark of the tipping point change, the automobile industry (which seems to be approaching a profitability crisis) has long seen the emerging markets of China, India and Africa as its future growth and survival, is now talking about the need to transform itself into mobility-systems industry and has established several joint think-tanks to explore alternatives to car-based transport. See: *Automotive Sector Report to the World Summit on Sustainable Development*, UNEP 2002. For an interesting and provocative 're-imaging' of the auto

industry see: P Wells and R Orsato, 'Redesigning the industrial ecology of the automobile', *Journal of Industrial Ecology* vol 9, no 3, 2005.

⁴⁷ Think of tourism for example. Already this industry (which contributed over ten per cent of total global GDP) is based on the movement of over 700 million people each year. By 2010 this is expected to have risen to one billion, with growth from countries such as China. But if patterns of tourism in China – and India and Africa – were to replicate those of OECD countries (as they are expected to do) we will be moving five times the current number of people, all expecting the patterns of consumption associated with 'the tourist experience'.

⁴⁸ In its simplest terms this can never be anything other than a temporary, 'transitory', strategy, as each cycle of materials through reprocessing and incorporation into manufactured products (along with the necessary systems of recovery, disassembly, reducing recovered materials to a form useful for 'input' to another cycle), requires energy input, even if this is less than that required to extract and process raw materials in the first place (as is the case with aluminium for example).

⁴⁹ For an analysis of this approach as it has developed with the Xerox corporation, see: W Kerr and C Ryan, 'Eco-Efficiency gains from remanufacturing: a case study of Fuji-Xerox' *Journal of Cleaner Production* 9, no 2, 2001.

⁵⁰ See C Ryan, 2004 *op cit*.

⁵¹ Of course services depend on the consumption of products, and the input of material and energy resources in buildings and infrastructure etc. They are not 'immaterial products' in the way they are often described.

⁵² For a summary of these ideas see: C Ryan, 2004, *op cit* and <http://www.uneptie.org/pc/sustain/design/pss.htm> (18/10/2005).

⁵³ In fact from this perspective there is no such thing as ‘sustainable materials’ only sustainable use of materials. This distinction seems to be missed by some sections of the construction industry in Australia which seem to think they can pursue sustainability by selecting from a pallet of ‘sustainable materials’.

⁵⁴ Clive Hamilton and Richard Denniss, *Affluenza - When too Much is Never Enough*, Crows Nest, NSW: Allan and Unwin, 2005.

⁵⁵ Science fiction writer Thomas M Disch used this reversal by naming a book *The Dreams Our stuff is made Of*. He was writing about his own literary genre and its contribution – good and bad – to the shaping of the ‘real’, ‘non-fiction’ future – how sci-fi imagination has shaped future cultural and physical realities.

⁵⁶ Ezio Manzini, *The Material of Invention: Materials and Design*. Boston: MIT Press, 1989, 17.

⁵⁷ Only a fraction of the world results from the skilled act of turning *dreams-into-stuff-that-communicates-dreams* – of the sort we would associate with the concept of design and the work of designers. Marx remarked that the difference between the architect and the bee is that, while the bee builds structures – the hive – of great architectural merit, architects first construct their structures in their imagination, envisaging – and re-envisaging and refining – their work *before* it is constructed. This act of imagining before constructing is a human trait not restricted to architects, even if they do become particularly practised at imaging spatial form. This human act of imagining signifies intention to create and such an intention derives from ideas that become embodied for desired outcomes. Even when this process lacks sophistication it can still be called design.

⁵⁸ Just as in a parallel sphere we turn the biological stuff of nature into the processed stuff of human food and fibre.

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- ⁵⁹ Fritjof Capra, *The Hidden Connections*, London: Flamingo Books, 2003.
- ⁶⁰ *ibid*, 203.
- ⁶¹ Both in his book and a website set up for the purpose: www.ecoliteracy.org. (18/10/2005)
- ⁶² John Thackara, *In the Bubble*, Massachusetts: MIT Press, 2005.
- ⁶³ Available at <http://www.doorsofperception.com>. (18/10/2005)
- ⁶⁴ John Thackara, *op cit*, 6.
- ⁶⁵ *ibid*, 8.
- ⁶⁶ See for example: <http://www.indaco.polimi.it/emude> (18/10/2005)
- ⁶⁷ Available at <http://www.ecosense.info> (18/10/2005)
- ⁶⁸ For a discussion of ‘intervening in the conceptual market as an approach to systems change, see: C Ryan, ‘Ecolab: A jump towards sustainability’, *Journal of Industrial Ecology* 5, no 3, 2002a, 9-13 and C Ryan, ‘Ecolab: Learning from the information technology revolution’, *Journal of Industrial Ecology* 5, no 4, 2002b, 6-10.
- ⁶⁹ L van Schaik, *Architecture Australia*, January/February 2005, 58-61.
- ⁷⁰ *ibid*.
- ⁷¹ *ibid*.