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Relative Abundance

Fuller's discovery that the glass is always half full

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At the time of writing (2006) the UK press is scaring its poor readers with tales of human extinction caused by environmental disaster. Whilst this is gratifying, it gives me an uneasy feeling of déja vu. I can remember how, in 1973, the Oil Crisis triggered a sudden wave of public fear and alarm. For a short time I felt good. Unfortunately, within a year politicians had negotiated new oil prices and we were back in business-as-usual. Since that time the confused, myopic world of politics has hardly changed. This is deeply troubling. Despite the virtually unanimous warnings from scientists that our current living styles are causing untold harm to the ecosystem that supports our existence, politicians seem incapable of seeing positive solutions that do not involve meaningless taxes or fiscal incentives. They find it exceedingly difficult to be honest with voters where income, energy consumption, materials use, or personal mobility is concerned. Indeed, there seems to be an unwritten law that every voter (i.e. 'consumer') has a natural born right to exploit any of these items as much as they think fit. What did this idea originate? We can probably pick any one of many key moments in the last hundred thousand years (Ponting, 1991). However, let us take a recent starting point and look at the USA's most influential export – the 'American Dream'. In his 1931 book "The Epic of America", James Truslow Adams explored the USA's reckless craving for the good life, arguing that Americans "were always willing to gamble their last peso on a dream". Playful sayings like 'retail therapy', or 'shop until you drop' may not be authentically American but the political sentiment behind them is. Without doubt, the vision of new worlds without frontiers, or a money-based meritocracy based on hard work and ingenuity seems unashamedly American. Many US citizens will be displeased to hear that the American Dream is merely an echo of an older French Dream. Just before America established its constitutional terms of reference, the leaders of the French Revolution concocted a republican vision that, not surprisingly, was based on their experience of the monarchy. They decided that royal privilege had been so divisive that it should be redistributed equally to all citizens. Despite the obvious religious

differences, both visions are aspirational, emancipatory, and deeply humanistic. More to the point, each emphasises rights, rather than responsibilities. How is this relevant to the issues of climate change and the extinction of species on Earth? The clue is in the three guiding principles, liberty, equality, or fraternity. What is missing is any reference to 'Nature'. This is largely why we are in such a mess.

Nor can Britain's role be excluded from this analysis. It is notable that Adam Smith's influential blueprint for an economics of self-interest ("The Wealth of Nations") was published in the same year as the American Declaration of Independence (1776). The idea that diligence by the individual will produce wealth for the many is still a cornerstone of the American economic system but, if you take Smith's logic too seriously, you may begin to value individual rights above individual responsibilities. There is a sense in which consumerism is just the latest manifestation of this creed. Today, multinational versions of the American Dream are exemplified by a dizzy plethora of readily available services, products, gifts, and luxuries. This is what Bill Gates calls 'capitalism without friction' (Gates, 1999), a term that promises ease, speed, and comfort, and gives a hint to what is meant by the idea of 'freedom' implicit in the American Dream. What is this 'freedom'? What would we be 'free' from? Not even the most optimistic advocate of the America Way would claim that it is a Utopian Shangri-La. In essence, it is a pragmatic, money-oriented, product-centred economy. It is a place for honest hard workers who support the economy by creating jobs, buying goods, and 'living it large'. In this context, freedom is the right to choose and consume, rather than to dream. Instead, professional designers dream on behalf of their customers. When this process is added to the availability of networked transactions, easy payment systems, and home deliveries the consumer can choose pretty well anything s/he wants, anytime, anywhere. This reflects the tragic legacy of the French Revolution that is embedded in the Dream of a Free America. Two hundred years ago, in decentralising the monarchy as a citizen-centred republic, the leaders of the new French order wanted to give the people rights that were, loosely speaking, equal to those of a King or Queen. Ideologically speaking, if cake was good enough for Marie Antoinette, or so the story suggests, it must be good enough for everyone. At that time, we needed more cake. A little later, a revolution in mass production solved the problem. Soon, it promised to distribute luxury goods to virtually every individual.

By the end of the 19th century, designers were being asked to create new products that would appeal to different individuals (Forty, 1986). Since then, they have become increasingly important for sustaining the new American Dream. They created products that exceeded the imaginative expectations of their customers. They diversified the range of these products and made them more desirable. In so doing they diversified the market and created more business. By intervening in advertising, market research, and promotional systems they created an industry that created, first, a use for desire, and then a desire *for* desire. The advent of an effective rail network, and Henry Ford's development of the first mass-produced car created even greater potential for business and consumption on all levels. Greater personal mobility led to new vending opportunities and enterprise became rife. The American Dream became immensely appealing to the rest of the world, largely through the enviable charm, glamour, and potency of the lifestyle that could be embodied and exported via novels, movies, automobiles, and other products. Although some aspects of the American Way were artificially packaged for maximum effect, the system worked frighteningly well. Like many shareable dreams it became a self-fulfilling prophecy. Things could not go on like this for long. By the 1980's it was very clear that this system was eventually going to eat us out of house and home. This is why the Brundtland Report was commissioned. It was clear that the American Dream might eventually kill us all and we had to design an alternative. Thirty or forty years ago, the idea of 'eco-design' would probably have sounded a bit narrow or superficial to the pioneers of the day. By the beginning of the 21st century, potty ideas such as 'sustainable consumption', and 'sustainable business' had entered everyday parlance and were clouding the water. Today, we commonly use these terms without irony, and without apparent awareness that they might be ambiguous or oxymoronic. How, and why did we reach this horrifying state of disorientation and self-delusion?

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In the early 1970's, for those of us who were driven by anxieties about environmental catastrophe, much of the agenda was defined in terms of an 'alternative' world that seemed elusive but attainable. Today we no longer use the word 'alternative'. It was one of those idealistic words – like 'radical', or 'collective', which were associated with a Marxist affiliation. Implicitly, 'alternative' meant 'alternative to a capitalist approach'. Unfortunately, as I have said, the idea of 'alternatives' had become unthinkable in the 1980's. Or, as Mrs. Thatcher in the UK had so charmingly explained it, "there is no alternative". So when the idea of 'sustainability' came along, we all fell for it. Why not? For poor countries the principle behind 'sustainable development' was perfectly commendable. Once the Cold War had ended, terms such as 'alternative technology', 'alternative energy system', or, indeed, anything with the word 'alternative' in it slowly began to lose their credibility in an increasingly pragmatic language of 'development', 'regeneration', and economic growth. Even by the time that the famous Brundtland Report arrived in 1987, the Berlin wall was already beginning to crumble. By 1989 there seemed to be one world, rather than two, and everyone was talking about 'sustainable development'. It all seemed so reasonable. This is how things go. Given enough time it is inevitable that you will forget you are sleeping with the enemy. Before we knew where we were we had stretched the original idea of 'sustainable development' and were talking about 'sustainable products', 'sustainable approaches' and 'sustainable housing'. By now, the ice was getting thinner, and we were dressed for skating, rather than for swimming. Politically, the idea of sustainable development created the idea that there was a common agenda or consensus. If this was just an illusion, at least it might act as a conduit between East and West, between idealism and pragmatism, or between Left and Right. In reality, the single term 'sustainability' began to mutate into a set of variations, some of which were less than environmentally benign. We soon had more than 70 different definitions (Holmberg & Sandbrook, 1992; Pearce et al., 1989, cited in Davey, Wootton, Boyko, & Cooper, 2005).

Where do designers fit into all this, and what have they achieved? After the Cold War, the vast majority of designers saw little option but to what industry wanted. They created new fads, continued to design non-returnable packaging, or devised and refined new advertising techniques. Some even helped to 'de-future' products (Fry, 1999) by making them become artificially obsolescent. In short, designers became the 'fixers' who guarantee a return on capital investment (Heskett, 1984). Those who were environmentally active were overawed by the way things were going. Most gave up the idea of working against the economic status quo and valiantly set about 'greening' the market place as much as possible (c.f. Dewberry, 2000). This shift of emphasis in the mid to late eighties posed enormous problems for the more idealistic eco-pioneers because they soon found that even familiar ideas such as 'small is beautiful' (e.g. Schumacher, 1973) now sounded just a bit too soft, worthy, or uncommercial for the new order. Many with the temerity to call themselves 'eco-designers' acquired an undeserved association with 'lentils and sandals', a taunt that was hard to shrug off in a dizzy world of thoughtless novelty and quick profits. There were mixed results. Some products, such as washing machines became far more energy efficient, but the 'green-washing' of less deserving products and brands helped to push up sales figures across the board. The net result has been disastrous. By the end of the 20th century, the underlying tension between 'eco-design' and 'design' was becoming painful for many. By the start of the 21st century, idealism was well and truly 'dead-on-arrival', and pragmatism was the new green. This is where we are now. Today, self-deception is rife and the 'me' culture, aided by the advertising industries, has brought a consumption-oriented style of hedonism into the world. Without an alternative vision the American Dream lurches on, albeit as a pallid parody of its former red-blooded self. At the time of writing (2006), road vehicles continue to get bigger and even more preposterous, with some drivers managing to believe that their 4x4s are 'greener' than the smaller cars. Because governments have no new dream we cannot formulate a joined-up policy that is positive. Instead, threats of disaster and mindless carbon taxes are the latest TINA (i.e. 'there is no alternative').

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A glance at any reasonable newspaper will confirm how deeply schizophrenic we have become. On the one hand we lament the loss of polar glaciers, ancient woodlands, or worry about the hourly extinction of irreplaceable species, etc. On the other hand we are even more terrified that share prices will drop, or that we will fail to achieve 100% employment figures. Instead of discussing how we would really, really, *really* like to live we stay too long at the office in order to do our bit for the economy. Thankfully, the mood is changing from one of confusion to fear, just as it did after the oil crisis in 1973. Let us be optimistic. Where there is anxiety there is hope, and we must make the best of this situation before politicians find a new way to distract and terrorise us with less important issues. For the moment, even in polite circles it is still acceptable to talk openly about climate change, extinction and, well, not to beat about the bush, energy wars. Perhaps the American Dream is finally in retreat. However, although the world may be about to change, designers still find themselves between a rock and a hard place. Unwittingly, they have helped to create a society of pampered individuals who believe they have an inalienable right to possess anything they purchase with their own money, and then to discard it in any way they choose. In 1927, Coca Cola created the first non-returnable bottle, for use on ocean going cruise ships. This was a historic moment. Like many similar and subsequent developments it was welcomed as a convenient and indispensable way to speed up economic growth. The rest of the story is far too complex, bewildering, and upsetting to recount. In any case, we can all see, feel, and smell the result. A more important question is how designers can best contribute to the change, in as short a time as possible. Many have been unthinkingly oblivious of the issues, or feel exempt from blame because of their specialist training. However, it seems churlish to reproach designers for their part in the disaster. The vast majority of them are let down by an education system that that fails to prepare them for practice as ethical entrepreneurs, and that sees eco-design as a passing fad, or, at best, a specialist subject area. Generally speaking, our failure to integrate specialist knowledge and skills has been an important barrier to the creation of an eco-society.

For me, the most optimistic scenario is the advent of a new, government-sponsored design profession that is unified within a common environmentalist agenda. For the moment, I refer to this new practice as 'metadesign'. At present most designers are specialists who have been trained to delight, persuade, pamper, and mollify consumers. Few see themselves as responsible professionals on a par, say, with doctors or lawyers. This not only affects how they are perceived, and therefore how they see themselves (c.f. Whitely, 1993; Bevers, 2006), but also – more importantly – how they behave. It may make them susceptible, for example, to commercial pressures rather than to long-term social interests. In other words it makes them susceptible to parochial interests, rather than national interests, or to national, rather than global interests. It is gratifying to find that the UK Design Council's 'RED' initiative has been allowed to rock the boat a little, but where most professional bodies devise ethical codes of practice, the design industry seems more interested in asking what skills designers need to enhance Britain's economic competitiveness. It was inexcusable that the UK Government's 2005 Cox Report on Creativity in Business made no mention of ethics, or sustainability. And if industry treats designers like mercenaries, it is hardly surprising that most simply do what they are paid to do. This is a complex and vicious circle that is sustained by society as a whole. It is hardly surprising if designers feel confused and alienated. If the governments have failed even to meet their own dismal targets on greenhouse gases, why should designers shoulder the burden by being more strategic, devious, and far-sighted than the so-called experts? The education system and industry have not yet given sufficient inducement for change. Indeed, even some neo-cons from within the design community have dismissed this kind of unilateral subversion as 'un-designerly' (Macdonald, 2003). Nonetheless, if, as it is claimed, 80% of the environmental impact of today's products, services, and infrastructures is determined at the design stage (Thackara, 2005), designers have failed to live up to their full potential in regard to the above problems. In my view, the most important question is not what kind of skills designers need, but what is their deep, long term purpose and potential in upholding the wellbeing of the biosphere as a whole?

To be fair, many lone pioneers have given it their best shot. Unfortunately, even though many exemplary practices are now widely known, thanks to authors like Edwin Datschefski, (2001) or Alister Fuad-luke, (2005) this awareness has yet to transform the way that most designers practice. Whiles some are passionately aware that we should emulate nature (Benyus, 1997), 'de-materialise' products (e.g. Diani, 1992) or make them leaner (e.g. Stahel, 1982), cleaner, slower, or service-based (e.g. Manzini, 1994) rather than product-based, few of these approaches have made a lasting impression on the average designer. In the meantime, we now need a radically new way of thinking that will offer fresh visions of the future. With it we hope to transform the American Dream into a network of transient micro-utopias that will mutate and evolve like living organisms. This sounds fine, but it is certainly ambitious. It would probably call for the development of a new, consensual, holistic, non-teleological, self-reflexive discipline. This would entail an integration of existing design practices, in addition to a few more. However, what specialist designers understand as design cannot simply be scaled up without significant changes occurring. Metadesign has already been mooted as a superset of design practices and as a metaphor for emergence and control at the ecological level (Maturana, 1997). This scenario therefore places the 'metadesigner' in the role of 'systems integrator' (Galloway and Rabinowitz, 1983). According to Elisa Giaccardi, metadesign would entail a shift from normative planning ("how things ought to be") to the humanistic enterprise of seeding ("how things might be"). At a more interactive, practice-oriented level, the traditional notion of 'design as planning' can be transformed into 'design as a seeding process' (Ascott, 1994). It would therefore become more 'extensive' than design, because it would be less constrained by the specialist disciplinary constraints of 'product design', interior design, graphic design, etc. It may also need to transcend the 'problem-definition' aspects of these disciplines by acknowledging and addressing issues that may fall outside, between, or across the boundaries of a given issue.

For all these reasons, metadesign is not something that can simply be grafted onto our existing world without some careful reflection and adaptation. Fortunately, some of the processes and ideas needed to encourage a culture ready for metadesign are already emerging. In the workplace, for example, Gerard Fairtlough (2005) advocates the emergence of 'worker autonomy', and industrialist Ricardo Semler speaks (2001) in a similar way about what he calls 'heterarchy'. In the social sphere we have seen the emergence of the 'Walking Bus', in which children with their meet friends, get fresh air and exercise, and are safely ushered to school by foot, rather than by car. We may also have been delighted by the spontaneous and wacky antics of 'flash mobs' (Wasik, 2003), pondered the wisdom of 'smartmobs' (Reingold, 2003), 'bioteams' (Thompson, 2005), or contributed our knowledge to Jimmy Whale's 'Wikipedia'. Some of these processes evolved out of the computer industry, with movements like the 'Free Software Foundation', 'Creative Commons' and 'ShareAlike'. They all relate to what is now referred to as the 'gift economy' (Barbrook, 1998), or the 'sharing economy'. All of them celebrate the benefits of collective, unremunerated action. Up until now, our economic system has run almost entirely with a debt-based currency system. Even Michael Linton's down-to-earth invention of the Local Exchange Trading Scheme (1982) is essentially debt-based. As such these systems do little to encourage the spontaneous emergence of creative spirit, unaccountable optimism, or – to use a rather unfashionable word 'love'. In the last decade or so it is therefore encouraging to see the arrival of new processes such as 'glamourbombs' (c.f. http://en.wikipedia.org/wiki/Glamourbomb), 'Random Acts of Kindness' (c.f. http://en.wikipedia.org/wiki/Random_Acts_of_Kindness), or 'pay it forward' groups (Ryan Hyde, 2000). Other work is being carried out within the quest for a greater 'collective intelligence'. All of the above ideas may need to be added to the repertoire of the responsible designer of the future. In some respects the growing resurgence in creativity has great potential for liberating citizens from a dreary life as passive consumers. However, this will require a shift of consciousness in which the creativity is understood as a manifold act of adaptation and integration that reconciles inner realities with their surroundings, rather than emphasising self-expression, or delivering a flood of exotically innovative ideas or products.

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One of the reasons that designers are so important is their ability to imagine new possibilities and to think 'creatively'. They can therefore play a unique and crucial role in establishing a new vision for how we can attune ourselves to Nature. In part, this is because of our egotistical attitude to innovation that has been responsible for much of the mess we are in. In a talk given in 2005, the architect Frank Gehry is alleged to have said, "I don't do context". To be fair, this was probably more of a humorous conceit than a serious statement, but it sounds dangerously like a claim to 'creative licence' in order to avoid social, political, or ecological responsibility. This tendency is familiar within the history of avant-garde art movements over the last few hundred years. Many have tended to emphasise the transgressive, rather than the adaptive aspects of creativity. In many cases, it demonstrates an intrinsically amoral tendency. Ultimately, however, it has greater implications at the environmental level than at the social and political level. This is a double-edged sword. Designers are indispensable because they are 'creative'. They can create an ecological society, or they can increase profits. In some situations they can do both, but this can be a misleading expectation. Just after the start of the new millennium, creativity became fashionable in economic and political circles, partly because it was presented as the latest and coolest catalyst for economic growth. Books such as Richard Florida's "The Creative Class" (2002), or John Howkins "The Creative Economy" (2002) reflect an enduring faith in the effectiveness of competitive, 'laissez-faire' economics. This renewed affinity between economic growth and the creative spirit is worrying, because it is part of a deeper assumption that a rising GDP will deliver wellbeing and happiness. This belief is what has helped to perpetuate the power of the (old) American Dream. However, the rate of economic growth has run a close parallel with the rate of discovery of new oil fields (Douthwaite, 2003). Unfortunately, it is now clear that cheap fuel is virtually a thing of the past. What we proudly refer to as 'creativity' is traditionally seen as a peculiarly western habit of thought that emerged over several thousand years. We can track it via a trajectory of ideas running from the Hellenic spirit of fierce competition, through Socratic individualism, Platonic idealism, Augustinian subjectivity, mediaeval humanism, and the Enlightenment's confidence in an 'objective' and rational truth. Today, what we would recognise in the word 'creativity' is best characterised by the Romantic Movement's somewhat theatrical, confident, and self-absorbed mode of thinking. In seeking a practical environmental solution for our predicament, the purpose of 'ecological creativity' is to offer the capability to adapt to our context or environment. This ability is already innate. It has evolved out of the evolutionary need to anticipate unknown conditions and to interpret aspects of a given situation in way that will prove advantageous. As such, it differs from the popular notion of creativity as, merely the ability to initiate ideas propositions, or artefacts that are unique and/or innovative.

The idea of creativity as self-expression is not especially pernicious in itself, unless it is detached from a shared sense of wholeness. It is a strange idea that grew out of attempts to expand the horizon of 'objective' rationality. It entailed cultivating a strongly humanistic, inward-reflective mode of thinking, in order to complement the rational laws of science. We may think of this when we hear avant-garde music, or listen to 'lifestyle' interviews with a professional fashion model. Philosophically speaking, it had already taken root before the Romantic era, around the time when John Locke (1632-1704) proclaimed, "the mind can furnish the understanding with ideas" (1689). This tendency grew bolder over the next few hundred years, with Kant's famous challenge to the independent spirit, "dare to know" (1784) informing the Apple Macintosh slogan 'think different'. Over this time the unprecedented idea that individuals could originate their own concepts, rather than deriving them from God or 'Nature', became bolder and increasingly strident. Since this apocalyptic moment we have become increasingly adept at re-inventing agriculture, science, medicine, transport, communication-at-a-distance, and the experience of 'being in the world'. In the 19th century Nietzsche suggested that a sufficiently determined and creative individual might transcend the realm of ordinary mortals to become a superhuman being (German word: 'Übermensch') through his 'will to power'. We may experience an afterglow of this idea when we think of charismatic figures such as Byron, Van Gogh, or Dali. We are still enthralled by the notion of a tortured, messianic genius who produces artefacts or concepts that are unique, unprecedented, and awesome. This caricature of

artistic superstar is a useful signifier for an extreme type of creativity that, in the past, has tended to celebrate controversy, self-importance, and an emotional claim to freedom. This is exemplified by popular anecdotes about the elderly Beethoven as a cantankerous composer, tormented by the onset of madness and hearing loss. At the time that he produces his best work, he is as indifferent to the opinions of his critics as he is deaf to the actual sounds his music will make. This is a popular stereotype of creative genius that could also be characterised in the word 'arrogance'.

This myth continued into the 20th century Pablo Picasso, who blurred the line between predilection, appetite and self-expression by emphasising the importance of individual need over an external agenda. Today, the image of self-indulgence, coupled with creativity is now commonly used to sell products or services such as Apple Macintosh. Individual creativity has even been fetishized. In 1999, the Citroen car company bought the rights to Picasso's signature and used it to spice-up the brand value of an otherwise rather ordinary MPV bearing his name. These developments coincide, however, with changes that have also accelerated de-forestation, species depletion, pollution of air and waterways, and the exhaustion of natural resources. They have made the threat of human annihilation a foreseeable probability, rather than a distant possibility. Today, creativity is finding its way onto the skills menu of today's managers, entrepreneurs, and civil servants. This is not to suggest that corporate managers will become more eccentric, or that they will try to break all the rules, but who knows? Bureaucracies work by imposing meanings and habits that are constrained by epistemology, rather than by environment. This can easily lead to alienation between personal belief and professional action. If wild animals tried to live by such rules they would soon die. The introduction of a more creative culture might therefore be more helpful to the questioning of purpose, rather than for the changing of process. In reminding us that we are *here*, *now*, Zen Buddhism serves to reduce the disconnection between our inner values, and the actative world that sustains us. It represents a kind of 'design shamanism'. One story describes the way a good host should assess the amount of food to be cooked for her/his guests. When it works correctly, the guests are invited to eat until they have had as much as they want. When this point is reached there is not a single grain of rice left over. In effect, the experience of the guests is optimal, rather than maximal, because they can share a feeling of satisfaction in not feeling responsible for wasting food. Indeed, when a host is sufficiently shamanic to anticipate the whole event, everyone involved would probably feel more involved. This model of creativity makes an interesting contrast with our previous examples by being more altruistic and less transgressive. In figure 1) we may assume that 'ecological creativity' would be in the upper right-hand quadrant of the map, and that our received prototypical 'creative' would be somewhere in the lower left corner. The need for a more complex map of relations in creative practice has emerged because our ethical systems have tended to focus on the rules of 'being' or 'doing', rather than on establishing a more comprehensive system of contextual relations. This is where the 'ecological creativity' of the Zen host is relevant. In 'guesstimating' how much rice will be eaten by others, the 'creative' cook works to reconcile several factors that apply in different domains. It is not a linear assessment of fixed quantities, because some factors are anticipatory. As such, they are co-contingent and require interpretive insights that are probably more interpolative than extrapolative.

One way to explain this mode of creative thinking is to refer to Charles Peirce's idea of 'abductive reasoning'. Abductive reasoning is commonly found in the average Sherlock Holmes story. Another example is the cognitive process found in 'reverse engineering'. Charles Peirce coined the term 'abduction' to account for the logic of pragmatic actions in an uncertain world. Abduction is a mode of anticipatory interpolation in which the thinker conjectures possible explanatory schema from outside the problem space in order to account for a surprising event. Mathematically, this process is akin to factoring, in which two unknown numbers have been multiplied together to produce a factor. Abductive reasoning is equivalent to deciding which numbers might have produced this outcome. This use of the notion of abduction is attributed to C.S. Peirce: "A surprising fact, C, is observed. But if a proposition, A, were true, C would be a matter of course. Hence, there is a reason to suspect that A is true." (Wood & Taylor, 1994). Gregory Bateson (1973)

suggested that 'abductive reasoning' is common within the natural order. He argues that there could be no evolutionary change and adaptation in the ecosystem without this kind of creative thinking. How can we bring the richness and colour back into this myopic method of creative thought? One way is by thinking of abduction as a 'stereo' rather than a 'mono' system - i.e. by making many abductive inferences at the same time. What I call 'parallel abductive reasoning' also starts with a surprising fact (e.g. 'C') but imagines a very complex situation that might be coded as an interrelated set of conditions (i.e. A, B, C…n). Alternatively, we might imagine the answer to be a four-dimensional picture that resembles a real event rather than a 2D movie. This is where imaginative designers may be more qualified to make a new contribution than politicians and civil servants. At present, the language politicians speak is still based on the old idea of economics, and the old economic system tended to take Nature for granted.

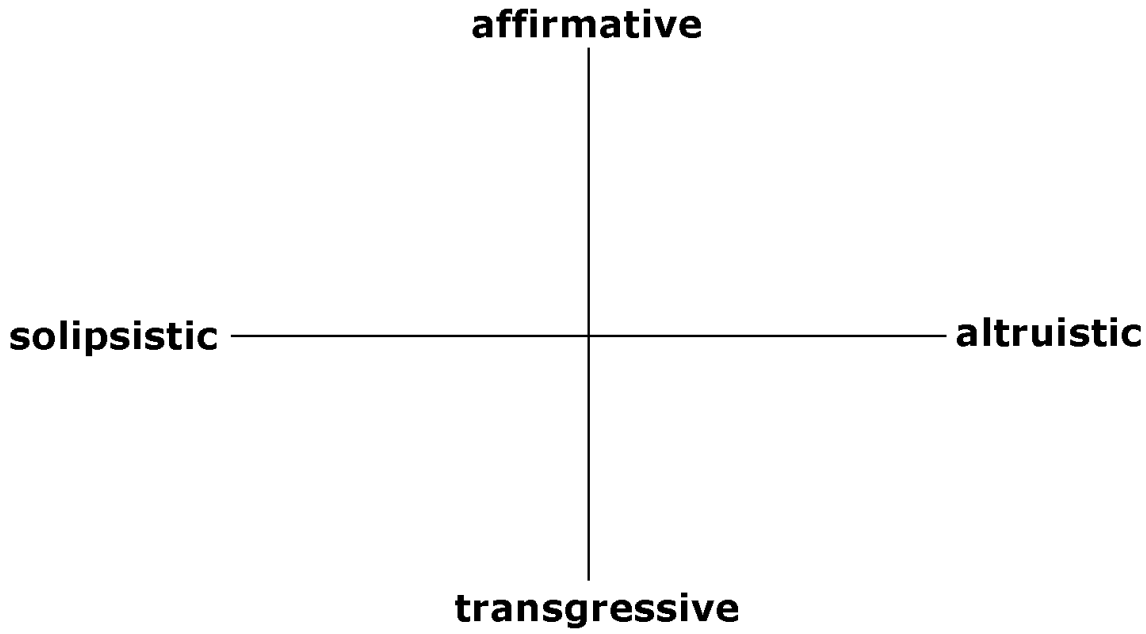

Figure 1 Mapping different aspects of creativity

At the national and international level, change will need to happen very quickly (Douthwaite, 2003) because the timescale of climate change and biodiversity collapse is unpredictable. If we look at the problem from a familiar economic standpoint, things seem very bleak, or even impossible. Fortunately, there are new ideas and possibilities that are lurking just around the corner. Some of them are well known or obvious. Others are subtle, and will require us to shift our expectations in order to understand and to make them work. The first one challenges the myth of economic wealth. We have known since the mid 1970s that people are no happier in rich countries than they are in poor countries (e.g. Easterlin, 1974). We also know that economic growth does not increase wellbeing (Oswald, 1997). These ideas have taken a long time to sink in, perhaps because money is strangely powerful, and assumes an independent existence in the form of numbers and mechanical units. For this reason it does not quite correspond to the qualities of a living organism. Hence we still adhere to Aristotle's emphasis on a 'division of labour' rather than newer visions that are less Darwinian, and which see the ecological system as a more symbiotic whole (Margulis, 1998; Lovelock, 1988; Lovelock, 2006). Similarly, the legacy of Fordism perpetuates the perceived importance of an 'economy of scale', rather than an 'ecology of scale' (Wood, 2005). In the 21st century we cannot afford to sustain this mindset. What do we mean by 'economies of scale'? This term is so widely used that it is worth exploring. It assumes that there is a reasonably linear relationship between the level of a given resource and the benefits that it will bring. It is complementary to the 'law of

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diminishing returns'. Both are essentially mechanistic models. As Alfred Marshall, the 19th century economist put it: "the more coal you dig, the more you are forced to exploit less favourable resources". In this model, the return for your effort is reduced because you are forced to compete with similar mines and prices get pushed down to the average cost of production. In a sense, the old American Dream is predicated on this idea. It epitomises a faith in 'absolute abundance'. Once you have 'exploited' a resource – say an oil well, or rain forest – you must expect an inexorable reduction in the absolute value or abundance of the resource.

The idea that the economy is more important than the ecosystem is not only bad business, it is bad for all of us. The attendant idea that Nature can be understood in terms of an 'economy of scale' or a 'Law of Diminishing Returns' are now part of a dangerously outmoded economic approach. In the 1960s, Chaos Theory led to new ways to understand the way that nature works. It led to new theories of abundance, that some call the 'Law of Increasing Returns' (Romer, 1986; Arthur, 1996). If nothing else, these theories pose a wonderful challenge for creative thinkers. They may remind us of Erwin Schrödinger's (1943) concept of 'negative entropy' (i.e. 'negentropy'), or Ilya Prigogine's theorem of minimum entropy production (1945). In these phenomena a given system dissipates some of its entropy to surrounding region or regions. Hitherto, such ideas had tended to be regarded as being 'against the laws of nature', and on a par with fairy tales or a mad inventor's perpetual motion machine. What we now know is that Nature seems far more chaotic and altruistic than we had thought. It is also, therefore, more fecund. Abundance is intrinsic to the world, but it may not be in familiar forms, and may not be accessible in familiar ways. Many projects fail because of tiny errors or mismatches within a large and complex whole. Often, it is clear to all the interested parties that a particular major scheme would deliver advantages to all concerned, yet there is nobody willing to initiate the chain reaction that would ensure success. Many dystopic situations are therefore 'vicious circles' because they are configured in such a way that they reinforce and therefore sustain their own negative features. The poverty trap is a simple example. One of the new challenges for metadesigners is to know how to convert 'vicious circles' into 'virtuous circles'. This way of thinking is challenging to conventional designers, because it involves an extremely cross-disciplinary teamwork, and a highly imaginative, opportunistic approach.

Part of the system we are developing is inspired by Richard Buckminster Fuller's idea of 'Constant Relative Abundance' (Fuller, 1969). This is a controversial idea, largely because it is ambiguous. Fuller insisted that the minimum number in the world is 2, rather than 1. This is usually assumed to refer to Euler's Law, which we will come to shortly. In another explanation he argues that the world consists of many spinning entities and therefore, in any process of turning, there must always be two poles. Intuitively speaking, a solitary entity cannot exist unless one half can relate to the other. This is also implied in René Descartes' realisation, "I think, therefore I am", which nicely reflects the point that that there can be no point unless it is reflected. Bishop George Berkeley (1685-1753) put this in a less solipsistic way when he said, "to be is to be perceived". All of these insights underpin the familiar idea of a 'win-win' situation, a bi-polar situation commonly used in the world of business and politics. Whilst 'win-win' is politically problematic because it invokes a competitive scenario implying loss, it is handy because it is auspicious (i.e. it is both familiar and appealing). Adam Smith's theory that self-help leads to collective advantage implies a 'win-win' scenario. By contrast, the fundamental sustainability argument presents a 'lose-win' offer. It is therefore a less attractive alternative. This is one reason why appeals to 'sustainability' have so far failed. But instead of applying a basic 'win-win' scenario, let us double the stakes and take four mutually advantageous aspects of a situation, rather than two. It is convenient to represent this scenario as a tetrahedron, as it clearly shows how, merely by doubling the number of components we can get six times the benefits (see figure 5). 'Win-win-win-win' is a way of clustering small advantages in such a way that they synergise together and become visible enough to attract additional commitment and interest. If we view the nodes as 'players' and the edges as their 'relations', there are six times more peer relationships between four players

than there are between two players (see figure 5). Hence, by merely doubling the number of 'players' from two to four, we achieve a six-fold increase in the number of mutual relations that can be utilised. In short, the tetrahedron is special because it combines a graspable, non-hierarchical topology that offers possible symbiotic advantage to each of the four players.

Buckminster Fuller championed the unique properties of the tetrahedron in 1975. They were already implicit in Euler' Law (1752), which states that the number of vertices plus the number of faces in any polygon will always equal the number of edges plus two. (i.e. V + F = E + 2). This '2' is what Fuller called the 'constant relative abundance'. As the surplus is always the same, irrespective of the complexity of the polygon there is a relative advantage in adopting one with a small number of sides. In the case of the tetrahedron, there is an auspicious balance between its simplicity (e.g. it is mnemonically convenient) compared with its relational richness (i.e. in its high ratio of edges to vertices). This can be presented to untrained users as a 'Win-Win-Win-Win' situation. This is unlikely to change until we devise a model of creativity that explicitly reconciles a number of components within a single entity. According to the British psychologist Michael Kirton, it is useful to polarise people into two extremes, 'adaptors' and 'innovators' (Kirton, 1980). According to this theory, where adaptors seek to do things 'better' using more ordered, existing terms of reference, the innovators challenge problem definition, create new definitions, and thrive on chaos. Both sets of abilities are needed within most collective endeavours. However, it can prove difficult to get these opposite characters working closely together, because they tend to be irritated by the habits and views of the other. For example (see Figure 2), we may combine the following players within a single relational structure. This is intended to enable different types of innovator to collaborate with minimum conflict.

1) Designer/author/ideator/initiator
2) Client/user/recipient/problem holder
3) Proposition/design/idea/solution
4) Context/world/background system/all that is not the task-at-hand

Figure 2 A relational map of ethical relations within design

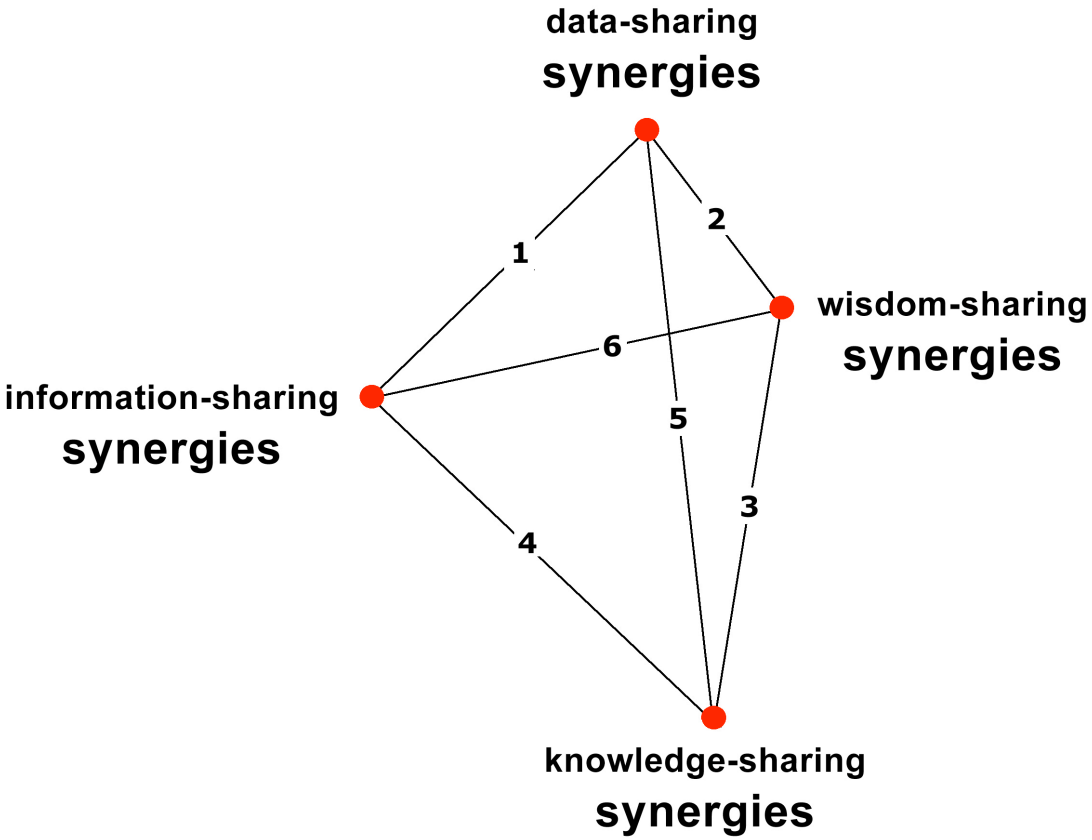

Figure 3 – Using our 4 Orders of Synergy to map a 'Synergy-of-Synergies'

Today, many are too overwhelmed by the power of the economic system to believe that tiny, local changes will have a sufficient impact. This is where we might initiate a change. In the early twentieth century, any sign of positive change is a big relief to someone who has been awaiting it for thirty years. Optimism is at hand. There is even a website called 'New American Dream' (http://www.newdream.org/index.php) that explores the pleasures and benefits of a less wasteful way of living. But how can we sell this idea? While politicians still identify the issue in negative terms as a need for taxes and a curtailment of consumer rights, a positive remedy needed. Fortunately, the solution may be surprising, but it is not rocket science. It is right under our noses. Some researchers have already sought to see the whole cycle from production-to-consumption as a sequence of opportunities that would make bring business closer to Nature by bringing each stage closer to one another (Hawken, Lovins and Lovins, 2000). The use of resources would need, ultimately, to become a 'zero-waste' system (Murray, 2002) that is designed from 'cradle-to-cradle' (McDonough, 2002). The shift of view these innovations represent is beyond what we currently recognise as within the remit of any known practice of design. If we interpret this idea in terms of existing value system we may therefore fail to understand its full potential. Within a highly corporate and consumer-oriented vision this would probably mean customers paying for their lifestyle benefits in more places, and at more frequent intervals. In short, this would mean devising a system that is de-centralised, but comprehensive. This is because a less centralised alternative offers more opportunities for increasing the level of synergies within, and across the social, political, cultural, and industrial domains. It would also facilitate a range of new and surprising benefits, both tangible and intangible, to be shared across a more autarchic community in which production and consumption, enterprise and altruism become increasingly interdependent. It may mean persuading producers to accept rewards that place less emphasis on income, and more on an enhanced quality of life.

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