5. ABUNDANCE

5.1 The difference between abundance and (financial) productivity

> *"In the early 1970s, it dawned on me that no one had ever applied design to agriculture. When I realized it, the hairs went up on the back of my neck. We'd had agriculture for 7,000 years, and we'd been losing for 7,000 years: everything was turning into desert. Ecologists never apply good ecology to their gardens. Architects never understand the transmission of heat in buildings. It's curious we never apply what we know to how we actually live."*[i]
>
> Bill Mollison, co-founder of Permaculture

Permaculture is based upon a simple insight: a forest produces 1000 times more energy than a wheat field. A wheat field is productive in a narrow sense because wheat is a marketable commodity and can also be harvested for little money using (high energy) machinery. That's the financial logic but it involves turning the countryside into a factory, complete with oil based agrichemicals. It is ultimately a flawed model since intensive agriculture depletes the soil, leading to using for yet more fertilizers. Ultimately as Mollison says it can lead to desertification. Add a global transport system to bring these commodities to (other) markets, plus change of land use (forest and grasslands brought into agriculture as soils erode and/or fail) and you have agriculture as the biggest single contributor to climate change.

In nature nothing is 'lean and mean' it is abundant. That's because only abundance is resilient. If like Los Angeles you have two days supply of food; the rest arrives across the desert on trucks. If there were an energy crisis, there is no resilience in such a system. And given the global dependence on oil to ship food around the world, we all live in a kind of global LA.

In nature there will always be crises, and hence structures like Los Angeles would be selected out by evolutionary pressure. Given we've only had cities for 15,000 years or so and oil-dependent ones for 100 years it's a moot point whether manmade cities are exempt? Natural systems are resilient because they produce a cornucopia of excess. We have 10,000 times more energy than humanity uses arriving every day from the sun[ii]. And the rest of nature capitalizes on this, always storing away for a rainy day.

Leanness is the result of 'profitivity', not true productivity. It depends what you want to maximize. Long term positive contribution to wellbeing, or short term financial profit? Large farm yields are often reported by the agribusiness lobby in yield per farm worker. 'Lean' produces a narrow range of goods (like wheat), with 'productivity' gained through mechanization and also routinisation. It turns farmers into mechanics. The profit per worker stats also hide a troubling truth; many studies show that large scale industrial agriculture is less productive of

food *per hectare* than small farms. That's partly because small farms raise a variety of crops, making more efficient use of space. It may also be a matter of small farm initiative and care, of healthier farming for the soil. George Monbiot reports:

> "... an unexpected discovery. It was first made in 1962 by the Nobel economist Amartya Sen, and has since been confirmed by dozens of further studies. There is an inverse relationship between the size of farms and the amount of crops they produce per hectare. The smaller they are, the greater the yield. In some cases, the difference is enormous. A recent study of farming in Turkey, for example, found that farms of less than one hectare are twenty times as productive as farms of over ten hectares(3). Sen's observation has been tested in India, Pakistan, Nepal, Malaysia, Thailand, Java, the Phillippines, Brazil, Colombia and Paraguay. It appears to hold almost everywhere."[iii]

Yields matter because how we are going to feed the 9 billion is very much a core sustainability issue. The world has, according to Professor Beddington (UK chief scientist) food reserves (16%) equal only to the amount of food *currently in transit*. There is no room for setbacks. And we face many of those ahead. But we should be able to grow or source enough food, enough water and enough energy if we can find new ways to harness it.

The large intensive farms are modeled on factories. And these and many other lean systems are descended from Adam Smith's pin factory, with each operator confined to one simple action. It's a pretty stupid model for most types of production. If Wikipedia were made this way it would be equivalent to each user only being allowed to type one letter "a". It's also stupefying work for people to do, something that even Smith worried would have knock on effects on society. But it's not 'for people' it's for the owner or their bank. The whole system is run purely to optimize money out vs. money in. And yet even in these terms what Smith didn't spot is that is fails precisely because it destroys value too. It is an economic anorexia. Under the force of its own logic, it just makes pins into an almost worthless commodity. That's the scourge of the farm industry; being screwed by free market price fluctuations and rapacious agents representing retail and wholesale. This in turn if you think about it is only because it costs so little to move food around the globe. If the price of oil (or carbon) were higher then your maize, or apples, or coffee would only be competing with other local producers.

The lean systems are not just lean; they are lean and mean; they rely on exploitation. A deskilled job and a maximally competitive job market means that the owners and buyers can extort lower wages.

If the abundant system is a highly distributed network, the image of a lean and mean system is 'the bottleneck'. The narrowing of bottlenecks are deliberate – they are controlling systems and serve narrow interests not the common wellbeing. It is the result of 'cornering a market'. They used to be justified on the basis that delegating to a few meant they could be done efficiently on a large scale. We've seen this factually wasn't true of farming. Rather the small farmers were driven out of business by price competition.

Ownership is the simplest class of bottleneck. For instance ownership of intellectual property (patents, copyright) allows a few to make money from the many. All bottlenecks are like mountain passes: they raise the possibility of a bandit asking for money. The free software movement grew out of opposition to this banditry (before Microsoft, the operating systems were freely shared; one commentator compared their business model to 'charging people for the washing instructions that come with the clothes'). Another rearguard action was the move to produce generic life saving drugs in India and Brazil, breaking the drug companies' patents if necessary. The new networks explode bottlenecks: for example P2P systems exploded software (Linux), music (Napster) and telecoms (Skype). Another sustainability bottleneck is GMO (genetically modified organisms). Firstly the idea of someone *owning* genetic code, designed so that you have to buy new seed every year to ensure the license fee is collected...? Secondly the bottleneck this presents in threatening biodiversity. Why would someone produce these Frankenstein Foods? Because they are a money making machine. Like all bottlenecks they create restriction in a market, with paid access and disproportionate profits. They brought food under intellectual property rights. Instead of farmers storing seeds (to use indefinitely) you could now license them like software.

The bottleneck exists to create a maximum return on investor capital. This is heightened in markets with shorter patents; for instance pharmaceutical patents last ten years. The entire marketing and distribution machine of pharma is about maximizing returns during the patent period. They also exploit loopholes; for instance if they can prove that an existing drug is effective against a new condition, then the patent is reset. One of the more (perversely) inventive areas of pharma marketing is the invention and branding of new 'conditions', for instance 'Social Anxiety Disorder'– which serve the dual role of persuading patients (and doctors) to take (or prescribe) drugs, and justifying patent claims and extensions. And yet often these drugs were invented by university research teams or similar:

> The pharmaceutical corporations and others claim they need this protection via patents and intellectual property rights so they can recoup the costs of research and development. But have a close look. A very substantial part of the research and development is paid for by the public

> anyway. In a narrow sense, it's of the order of 40-50%. But that's an underestimate, because it doesn't count the basic biology and the basic science, which is all publicly funded. So if you get a realistic amount, it's a very high percentage that's publicly paid anyway. (Noam Chomsky, 2000[iv])

Business from an investor point of view is only to do with why your model will reliable provide financial returns on investment; through patents, know how, access to markets and so on. Investors in other words only really care about bottlenecks. Investment is a gamble.

The bottleneck is what makes investor returns. But from a whole society perspective it is wasteful. The need to own and to protect your intellectual property means there is needless duplication and reinventing wheels to get around incumbents' patents. Compare this with the big science like the internet, the human genome project, the *Manhattan Project*. There are on the other hand plenty who successfully cornered the market in what arguably should have been a public utility. If 'Doogle', an 18th century company had patented the dictionary format and stuffed it with classified ads, would we be hailing this as progress? Smart to invest in, but hardly Samuel Johnson.

Lean and mean systems are also fragile. They have nothing in reserve. They have to be highly specialized to generate the highest returns on capital. That means when things change they often have nowhere to go. Investors are used to this, they expect to exit early and for many risks not to pay off.

What lean and mean implies in established companies is things like 'leverage'. Again the true nature of big business is poorly understood. You have to see large companies as fronts; they may look like they are making cars, or tinned cat food, but really they exist as *legitimate outlets for making money* out of money. For instance Porsche out-hedged the hedge funds last year (although this nearly took the Western economy over a cliff in the process) by holding a large hidden stake in VW, while hedge funds bet Porsche would drop their (apparently small) holding since it wasn't enough to buy the company.

Leverage is borrowing money from the bank to supplement what your investor put in. If the business grows fast, and the bank only wants a 5% return, then the shareholders or investors absolutely coin it.

Here's an illustration of the algebra of leverage:

> As an investor you put in enough money to cover 20% of a company.
> The other 80% is bank debt or 'leverage'.
> The company doubles in size.
> The bank is paid back its 80, plus interest let's say a further 20.

> The company is now worth 200 .
> - you pocket 100 for your initial stake of 20.
> 100/20 = 500% return.

I've just described Private Equity by the way.

Capitalism today is optimized for return on investment. Not for the overall result for human wellbeing. It is inefficient from every point of view than one. Investment as betting on financial returns. This way of organizing has become ingrained. How else could things work? I find it really helpful to look back at some of the models preceding the 'lean and mean' (laissez faire) system. History as ever puts things in perspective. And it refutes the idea that our present ways are the only way.

The justification often given for the status quo is that without this we are incapable of self-management. We need private owners, authoritarian governments or some such elite to protect us from the fact that left to our own devices we would not look after our collective best interests. We would otherwise, the pyramidists say, descend into anarchy.

This is an old argument. The British said India was incapable of self-rule. Gandhi's response was the idea of *Swaraj*, meaning self-rule not by a new hierarchical central power but through self- and community rule. The *tragedy of the commons* is one modern version of this idea that human communities are incapable of self-management. This is widely accepted, even within the green movement. Originally the title of a 1968 essay by an ecologist named Hardin, it traced the environmental problems we face (the essay was particularly concerned with overpopulation) back to Adam Smith and the concept of *the invisible hand*: the idea that an individual who "intends only his own gain," is, as it were, "led by an invisible hand to promote . . . the public interest". Hardin's answer to Adam Smith was to point out that led only by self interest, a population would always overshoot its resources:

> The tragedy of the commons develops in this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy.

Hardin I believe misjudged the commons. Hardin started from a critique of Smith but ended up advocating private landlordism. Whereas real instances of giving back land rights to communities (for instance in Scotland's Isle of Eig) has led to advanced sustainable communities. Hardin assumed the absence of co-operation and the primacy of individual selfish interests. He ended up reinforcing free market capitalism; we need owners and masters to stop us descending (in Hobbes phrase, when making the same point in *Leviathan* about monarchy) to a mode of life which is "nasty, brutish and short".

In the real history of the common grazing lands is that for over 500 years they suffered no tragedy (not unless you count being snatched at the end of this era private interests). The organization of the commons bound individuals to mutual responsibilities. And it wasn't as Hardin suggested that there simply weren't enough people to put a strain on the land. In the UK, lacking commons organization for woodlands, we'd already proved capable of almost total deforestation (tree cover being reduced to 15% of its original extent) by 1066[v]. Medieval commons (common meadows for grazing) operated, as did their counterparts in towns, the guilds, precisely to restrict destructive overuse (commons) and competition (guilds). These were self-regulating communities. And they were active, moral, intentional communities – capable of agreeing and managing their limits, bringing members into line.

It was only after these commons were enclosed (i.e. the land taken by private land owners) and the self-organised responsibility that went with them was smashed, that Hardin's modern tragedy began in earnest. Mechanised fisheries, turf wars on American ranges... these were products of the free market being let loose on commons, without community self-management.

Alan Greenspan – the architect of the credit crunch as former head of the Federal Reserve - wrote that "it was left to Adam Smith to identify the more-general set of principles that brought conceptual clarity to the seeming chaos of market transactions". But arguably what Smith put forward as common sense was political and radical; far from the common sense of the time. Free market principles do apply in a market with ferocious competition, with workers forced to fight over scraps, employers free to hire and fire at will. It depended in other words on a smashing of the prior steady-state system, where guilds in the towns and the commons in the country had regulated supply and demand, keeping the number of bakers and the amount of bread and the quality just right, and keeping prices and wages stable in the process.

Adam Smith was writing near of the end of the time of the guilds; with skilled work's replacement by the mechanical looms. The medieval guilds had acted as a self-regulating force in markets for over 500 years. In the Middle Ages and Renaissance, capitalism existed, but was limited to the merchants, speculating in

import/export type businesses. The means of production, the trade secrets, the number of workers in a town and their competition were all controlled by the guilds. It was the guilds that prevented workers competing destructively over prices. It was the guilds that prevented too many workers entering a trade and depressing prices. It was the guilds that stood in the way of self-interest ruling in the way Smith described. And it was with the introduction of mechanical factories, where unskilled workers could be hired for minimum wages, that the world Smith described became a possibility. What this move did is give the speculative merchants (capitalists of the middle ages) access to production, rather than just its output.

The guilds were a (highly religious) moral, benevolent and democratic order. They were self-regulating co-operative networks; with instructive parallels with emerging guild-like movements today, like the open source movement: self organization, self government, a common store of knowledge, a duty to future generations and towards the wellbeing of the whole community, protection against authoritarian controls. It's a different position from later versions of organized labour – the unions – who operated from a position of protest, because they were otherwise powerless. The guilds enjoyed considerable power and autonomy because they were the expert artisans of their day. They were willing to critique the religious and political status quo, but did so largely peacefully and free from reprisals; a medieval town simply *was* a network of guilds, and while the guilds tolerated independent artisans who paid their dues, taking on the guilds by authorities would not be done lightly. In many cases the guilds actually ran the towns anyway.

Guilds were the equivalent in the towns of the commons in the country. The commons were also being enclosed at the time Smith wrote (this trend started earlier, but peaked between 1760 and 1820) as landowners appropriated public land for private benefit. At the same time in the textile trades mechanical looms displaced skilled artisans; the Guild of Stockingers were the famous 'Luddites' who rebelled against this. Being out of work, starving and desperate, what else could they do? The two trends – enclosure in the countryside and the mechanical factory in the town – were intertwined; displaced and starving country farmers being forced to move to the new industrial cities, and take any work at any pay.

The Luddites of 1811 are pictured in the cultural imagination as protestors against progress. They were actually up in arms about a more complex set of grievances; for a start the country was close to starvation due to the Napoleonic wars. And the UK was a virtual police state. Between The Luddites targeted magistrates and food merchants (profiting from near famine by pushing up prices) as well as the industrialists. In 1799 and 1824 collective bargaining was forbidden by: "*An Act to prevent Unlawful Combinations of Workmen*". Historian

Kevin Binfield points out that Stockingers had been organizing strikes and similar since the 1670s. But only now was the legal framework in place to make this an act of terrorism against the state rather than a legitimate grievance. Lord Byron the romantic poet was a passionate supporter of the Luddite cause. Speaking in the House of Lords on the poverty - which appeared to be the true cause of the uprising – he said that "never under the most despotic of infidel governments did I observe such squalid wretchedness" and he described the out of work Stockingers as "meager with famine, sullen with despair, careless of a life".

The Stockingers complaint was not only that the new machines needed less workers, but that they did not need skilled workers. In deskilling the work industrialists were able to 'race for the bottom' as we would say today, hiring by the day purely on the cheapest wages. And Byron complained, "it is to be observed that the work thus being done is inferior in quality, hardly marketable at home and hurried over with a view to exportation." This was perhaps the precise moment when craft died and was replaced by the "cheap" (in both senses) manufactured goods. Byron's charges would apply well to today's production. Cheap goods are in abundance, but being made only for profit many of them are shoddy, unhealthy, far from durable.

It was also at this precise moment in history that modern capitalism was born. Not a natural order, but a mechanised society with a deliberate lack of internal social structure and co-operation to offer any protection against exploitation. Much attention has been paid to the productivity of the new factory machines, the wealth and advancement brought by the industrial revolution. But less to the beautifully self-regulating and sustainable system it replaced, where people were engaged in a spiritual and professional career based on skills, community and 'masterwork'.

What about the thought system that replaced the guilds? Reading *Wealth of Nations* there is much to like about it – Adam Smith was a beautiful writer, a philosopher, a humanist, and he did evidently believe in social moderation of markets. Nonetheless he put forward a radical experiment, masquerading as a description of the natural order. He was part of the enlightenment project – in crude terms their hope was that everything might be as predictable as clockwork. Smith put forward 10 key propositions (he didn't frame these as 10 points, this is my own précis of some of his key points):

1. Society is based on self-interest. "The butcher, the brewer, the baker" do not work from a philanthropic concern. They do it for their own gain, and this promotes the interests of society more effectively than if they had welfarist intentions."
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2. The counterpart of self-interest is healthy competition. A monopoly will not serve society it will scheme against it. But vigorous competition will – leading to the best bread at the best prices.

3. The division of labour is the wellspring of productivity – creating the most efficient returns on capital.

4. The ultimate value of any object is measured in the amount of labour required to purchase it. The price of any labour demands on whether supply or demand for workers are greater.

5. Monopolists always use either their control of overall production or trades secrets to distort prices and cheat the public by limiting supply.

6. The 'market' should be allowed to set prices and wages. (But don't worry, it will not set wages too low because, below a living wage, tradesmen would starve or find another trade).

7. Profits tend to be highest where competition among workers is greater than competition among employers.

8. Any society is only able to increase the amount of employment and hence hold high wages, and also a general mood of enthusiasm, when it grows in economic output. Growth (rather than size) is the key.

9. A free market will act as a wise "invisible hand" leading society to produce the right amount of goods at the right prices.

10. Subsidies should be avoided because these will draw more workers to a trade, suppressing prices and wages in the long run.

What Smith's propositions emerged as a challenge to – although he glossed over any historical context unless it suited his arguments for a rational economy – was the system of crafts guilds. Smith barely even mentioned guilds, but when he did it was as if describing a coven or conspiracy:

> "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices. It is impossible indeed to prevent such meetings, by any law, which either could be executed, or would be consistent with liberty and justice. But though the law cannot hinder people of the same trade from sometimes assembling together, it ought to do nothing to facilitate such assemblies; much less to render them necessary."

The Wealth of Nations was one of the most influential books of its time. It's hard to read these words and not read the intellectual justification for the Combination Act of 1799, which actually *did* ban any such meetings. Capitalism in its modern form represents the original hostile takeover. The deskilling of work – the mechanised looms – gave capitalist merchants access to production. And once established they could compete on price, starting with fabrics, but extending to mass production of most items, eventually (in the 20th century) even farming. The merchants' whole model was based upon speculation on future earnings. Pretty apt when you don't know if a cargo ship will make it past storms and bandits. But a rather loaded game when you run factories?

Adam Smith had mixed feelings about investment. He argued against loans for speculative projects, and for low interest rate loans to the poor; in modern terms he was against venture capital and for micro-credit. Smith was a transitional figure, nowhere near as mechanistic nor heartless as his later supporters. The propositions he advanced came from intellectual ambition; to show how quasi-mathematical laws could be applied to human society.
In the popular historical view today, what came before industrialism was dirty, squalid, diseased - a mass of labouring peasants dominated by a few feudal nobles. We conveniently forget that the Renaissance dates from the 14th to 17th centuries; that Isaac Newton, Gallileo, Leonardo De Vinci, Francis Bacon, William Shakespeare and so on were children of this age. I doubt the 20th century will go down as so culturally productive. Especially if our mechanistic technocracy is seen as barbarous; complete with mechanised world wars?

Another myth is that 'leisure' is a new invention. That's true if your reference point is sweatshop industrial cities. But the Middle Ages are misremembered as a time of unrelenting toil, which somehow technology has saved us from. Their true cultural history is one of festivity, in innumerable feast days. We forget that those (now) sterile Norman churches were in their own day not whitewashed, but as colourful as a Brazilian carnival. Farming can be hard work, but it's not like working in a call centre let alone a pin factory, and large periods of time are spent watching the herd or crops - and mucking around with your mates.
Factually peasant farmers and labourers in the Middle Ages had much shorter working hours than today's averages[vi]:

Year	Type of worker	Annual hours
13th century	Adult male peasant, UK	1620 hours
14th century	Casual laborer, UK	1440 hours
Middle Ages	English artisan worker	2309 hours

1400-1600	Farmer-miner, UK	1980 hours
1840	Average worker, UK	3350 hours
1988	Manufacturing workers, UK	1855 hours

Take careful note. The success of the last century has been in undoing (or more accurately exporting) the ruinous working hours of the industrial century before. Historically, people have lived more balanced lives.

The medieval guild emerged some time around the 11th century. The central idea was that of a fraternity of artisans in a given trade. They co-operated in training, avoiding destructive competition, mutual support in hard times and so on. The place of production was a household not a factory. A master baker would have all his workers living on site, apprentices working for their food and lodging, plus training. The factory was a later idea - the project of which was to apply (mechanistic) scientific rationality to the organisation of society. On the plus side this mindset brought us the encyclopedia. On the less positive side it brought us the sweatshop. Not that all factories have been bad (the Quaker pioneers of ethical business such as the Cadbury's set up exemplary facilities with schools, sports clubs and so on). But most were. The modern prison and tower block were born out of the same mindset.

So how did medieval guilds work? Firstly – at least originally – every guild corresponded to a distinct craft. That is not to say that the workers only had one trade, it was common to practice a number, giving you some flexibility in turbulent social, political and economic times. There were also household synergies. For instance baking families often also made beer (both using yeast), butchers often also grazed flocks and herds. Ferrell, 1999[vii] lists over 76 trades in a typical medieval town which each had their own guild. Contrary to Smith's claims, these were heavily regulated by the town authorities too. There were harsh penalties for instance if bakers made too little bread, or bread of insufficient quality.

Guilds were based on rules and agreements. These were as powerful in their own way as the church or legal system, although their sanctions gentler (fines rather than floggings). In general the guilds operated through a set of positive group norms and codes of practice which benefited all, and which seldom needed enforcing in the way criminal law might. The central principle was co-operation; acting for the common good instead of only self-interest.

The artisans had their own businesses and these were not subsumed within the guild. Guilds were learning organizations. Their primary aim was the protection

(through trade secrets) and transmission of craft skills. While you could argue this was restrictive IP in modern terms, the restriction was to prevent exploitation by merchants or there being too many workers. It's how law or London black cabs still work today. The organisation to achieve this aim consisted of apprenticeships; journeymen free to work for various masters, for a salary; and masters - the brewers, bakers and so on in town.

Guilds were self-help support networks, helping members who fell on hard times or widowers. They provided a type of insurance role inherited by the modern welfare state. They also played a vital role in dispute resolution and had many benevolent activities within the broader community. They were high minded, religious and spiritual too – pursuing both piety and profits. Guilds relied on mutual obligation and responsibility. Members would swear an oath and share out administrative duties. Importantly they were swearing allegiance to the guild – rather than simply joining a club or union devoted to their own or any others' self interests, they were signing up to the group.

Guilds controlled the numbers who entered professions. That's not to say you had to be in a guild to practice those trades. Guilds were quite flexible in allowing non-members to practice, usually in return for a fee. They regulated the numbers in a trade to match demand. Without the necessity to suffer from overwork, or penury that come from a free market. This is a key theme of co-operative systems: it is possible for groups to consciously and morally control their group activities. Hayek the free market economist claimed markets should be left alone because they were too complicated for mere human beings to understand. He claimed people understood markets about as well as frogs understood ponds. But we are not frogs – even if free market philosophy would like to reduce us to that - and the perils of creating systems that are 'out of control' may outweigh any claimed benefits.

Guilds played a prominent role in civic society. In many areas the guilds effectively were the town councils (although the rich merchant guilds were often more prominent in that than the humbler artisans). Being in a guild made you a 'freeman', bestowing the full rights of citizenship too. Guilds fundamentally existed to moderate the market, make life less risky. All of their restrictions against 'free runners' meant that from one year to the next work, pay and prices remained more constant. Guilds proved remarkably resilient. They survived invasions, plagues, revolution, Reformation, civil wars, abuses of currency by the monarchy, financial crisis after financial crisis. They offered safety in numbers. And were quite powerful enough to act as a channel for dissent; for instance guilds staged annual 'miracle plays' featuring banned characters and storylines such as Robin Hood and (a wicked parody of the venal church) Abbott Unreason. Why could they get away with it? Because they ran the town and feudal lord or

church official beware overstepping *their* own power. Guilds seldom armed or got involved in violent conflicts, but why would they need to? They *were* the town.

Fundamentally guilds did provided an alternative – and an answer – to all of Adam Smith's 10 propositions. If he had been truer to his professed empiricism he would have perhaps have troubled to test his propositions against the systems that had pertained for 500 years. But you have to see the *Wealth of Nations* as something of a break with the past book. Questioning our inheritence today – an infernal growth machine set to self destruct – we would do better to hear the guilds' side of the story too:

1. "Society is based on self-interest."

   Actually no it isn't. Dogs do not eat dogs either. In civil society a bit of 'give and take' is the norm. Society and especially trading is founded in trust. Competition divides people and you need another co-operative system to ensure that positive relationships prevail.

2. Competition is in society's best interest.

   Guilds regulated the core of the market and prevented members from destroying each other through price competition. They acted for morality and wellbeing, with community good works and member mutual support and duties being central obligations. Their central idea was to match supply (of skilled workers) intelligently to demand. They actually did act out of altruistic concern and higher values.

3. Productivity – creating the most efficient returns on capital.

   It's a false economy. The reduction of labour to mechanical actions leads to deskilling, reducing the working population to tedium. It opens you to competition from those who can make the same old cheap crap even cheaper. Most innovative fields are 'craft' based – compare the thoughtful design of Apple computers to a cheap generic PC.

4. The ultimate value is the amount of labour required to purchase it.

   On the Guild view it's the opposite. The value of a good depends on the labour, knowledge and resources that went into producing it. Guilds didn't make things that weren't needed, otherwise they wouldn't sell. But they cost what they cost to make.

5. Monopolists using control or trades secrets will seek to distort prices.

What if you substitute the word ‘maintain’ for ‘distort’? Relative prices still pertain because if a guild made goods too expensive people would find substitutes. Plus in key trades like bread they would face the magistrates. Being in a collective makes them more accountable too.

6. The market will not set wages below a living wage.

   If we have learned anything since Smith it is that regrettably this is not true. Smith himself criticised the East India company for exploitation of ‘the Hindi’. Corporates can and do destroy communities by economic means and they will justify themselves in economic terms. It doesn’t make it right or even ‘natural’ though; any more than slavery.

7. Profits are highest where competition among workers is greater.

   True. The question is what good to society are those excessive profits? Making the richest asset holders richer? How’s that an ultimate good? And these excessive and exclusive profits come from workers being hungry or overworked.

8. Economies need to grow for employment and other structural reasons.

   This is also absolutely true. It is the result of several features of the free market capitalist system, notably speculative capital. It’s hence a circular argument; if you create a pyramid scheme it will need to grow.

9. A free market will act as a wise “invisible hand”

   The bailout of UK banking has saddled my 6 year old with enough debt that it will not be paid off until he is 30. Banking on the other has recovered sufficiently in 12 months to be paying big bonuses. Under-regulated self-interest is not always aligned with the common good.

10. Subsidies should be avoided – they draw more workers to a trade.

    It not is valid in the case of guilds because they also regulated the numbers entering, through restricting the intake of apprentices. Also skilled work is not exactly easy to chop and change.

Would the industrial revolution have taken off in the same way had guilds been allowed to regulate and moderate it? Possibly not. Would we be better off today if the guilds *had* impeded the industrial revolution? Given every indicator of crisis of the book, including the fact that we are close to having burned half the

world's entire oil reserves in under 100 years... you've got to admit it's a possibility.

The co-operative networks emerging today are not trades guilds. They are new forms of co-operative network. In place of village style localness, they have global village extensiveness. Instead of secrecy they have transparency. We are as much into a new paradigm as Adam Smith was, perhaps more so. But it's important not to lose sight of the living traditions behind our modern guilds; they are so much more than organisational system innovations. And many of the key features of these antique abundant systems; learning, craft, ethic, democracy, loyalty, narrative and (judging by the mystery plays) a certain amount of joyous mischief ... are still pretty valid?

1.1 Abundant systems; Permaculture & complementary currencies

The "Life of Aesop" (a book from the 2nd century) tells the story of Aesop and his master Xanthus' conversation with a gardener. The gardener asks Xanthus why it is that the weeds always grow up faster and stronger and threaten to overwhelm his fruit and vegetables. Xanthus can't think of an answer and says it must just be divine providence. Aesop however has an explanation: The weeds are like Mother Earth's children and they thrive on her love and attention. Whereas the fruit and vegetables are like stepchildren which her husband burdened her with from a previous marriage. The gardener is delighted with the answer and gives Aesop a box of vegetables in reward.

This is a good starting point for thinking about abundant systems. One approach takes effort because you are trying to restrict the outcome to a marketable crop. The other 'just grows' under nature.

Abundant systems represent a shift to frugal, elegant ways to get more with less. I think of Abundance as possibly the next 'ethic' – a sense of what feels like progress, is socially valorized, considered beautiful. We need to approach this with a new mindset. And recover from 'lean and mean' systems anorexia. Many have seen this transition, but none more so than the Permaculturalists.

Permaculture was the brainchild of Australians Bill Mollison and his then research assistant David Holmgren. Mollison had spent the previous 15 years studying forest ecosystems. Based on the insights gleaned from these observations, Mollison realised there was an alternative to mechanised industrialised agriculture. Instead of piling energy (oil) into growing a single, fragile crop (e.g. wheat) and waging war on nature with pesticides and chainsaws, his vision was of a forest garden approach, where an abundance of edible and otherwise humanly (or mutually) useful plants and animals would grow themselves. In this way we could stop destroying the earth's remaining resources – the forests, soil, biodiversity – and live in harmony with nature.

The way that permaculturalists go about designing is that they think carefully about the needs of each element of the system, and what services they can provide to other parts of the system. Even fast growing weeds can play a role in these systems (as fuel or fodder), or can be managed into the periphery by other elements like shady trees. The key principle is to minimize the amount of energy, waste and ongoing human input required. As permaculture has evolved it is increasingly designed. It may look like an unkempt patch of forest but actually it is a purposefully arranged. It uses experimentation alongside uses innovations from previous projects – for instance the use of straw overlaying potato beds. (This means you don't have to dig, the potatoes will do this for you while protected by the straw from birds, the elements etc.) Other typical innovations

include water-harvesting methods for arid areas with occasional heavy rain (like Australia). There are plenty of videos, and short courses online, showing permaculture design in action.

You may not work with agriculture, but the style of thinking is highly applicable to other areas; it's about managing a whole system for abundance rather than a narrow (mean and lean) monoculture approach. It's about reskilling human beings and working forwards, problem solving by reasoning and experimenting in interaction with nature. The process is slow, because you need to observe nature working at its own pace. For instance it is common to observe a site for a year, so you can see it through all the seasons, before even starting to make human interventions. The "just in time" and "hurry-hurry" approach of quarterly-returns capitalism rule out this way of working. But how costly are the mistakes we rush into instead?

Permaculturalists think in terms of functional zones, but also place a high value on understanding the creative interactions that often occur at the boundaries. Again this is simply - empirically - how nature works. The most thriving action is at the edges, on the land and sea of coastlines, in the hedgerows. It's partly because of the mercurial creativity that happens as different systems interact. We certainly see parallels in human systems.

The recent agricultural revolution in Cuba – prompted by an energy crisis, post the endless supply of soviet oil - has consisted of moving to more diverse seed stocks, organic methods (to heal the soil) and smaller farms. And also to co-operative independent farms rather than centrally state controlled ones. In the city the co-operative principles are even more evident: 90% of Havana's food is now grown within the city limits, most of it by citizens working with ingenious permaculture methods, making full use of roofs and vacant lots. Urban farming is a hot topic in the West too now. Not least because growing food near to markets is itself less energy intensive. Havana has been planned differently too; the whole layout in zones rethought. For instance the university has been split into local campuses, so that students don't have to travel from all over town just to get to one central point. The development of Cuban agriculture blends traditional techniques with entirely new and innovative solutions. For instance nets over growing areas have been used to keep insects out – rather like mosquito nets over beds. Of course the agriculture now is more labour intensive but still only 200,000 out of 11 million Cubans are full time farmers. In an article in Successful Farming magazine (2003[viii]) Hal Hamilton described how, initially cynical about the stories from Cuba, he returned convinced "from a research trip that challenged all conventional assumptions about progress and feeding the world". Not only had the system successfully overcome the lack of oil, chemical fertilizer and pesticide, but also food yields had actually increased.

Like social ventures perhaps the most promising thing about permaculture (for its future applicability) is successes in the harsh economic and climactic conditions of the developing world. In Malawi a government supported initiative since the 1960s had pushed growing maize as a cash crop, making heavy use of fertilisers. The IMF is heavily implicated in this kind of move; telling countries to grow cash crops to repay their loans. There was a scandal in 2002 when the IMF was claimed by local officials to have told them to sell off their maize reserves... just before a famine struck, affecting 76% of the population[ix]. But the problem goes deeper than the reserves – to why the population was so dependent on a single crop in the first place?

The permaculturalists in Malawi have been training people to grow a wide variety of indigenous plants (over 500 varieties, including food and medicinal herbs) without relying on chemicals that are both expensive and damaging to the soil. This also meant that there could be food all year round rather than having what locals called 'the hungry season' between maize harvests. Maize had become a staple, rather like rice in South East Asia. But unlike rice it's a fragile crop prone to dramatic shortfall such as in 2002. After many years of education classes, demonstrations and patient work on the ground –supported by the US Peace Corps, and Malawi Ministry of Health - the permaculture revolution in Malawi has really started to take hold. As in Cuba it's been as much about cultural change as farming change; maize had become the high status crop in Africa – the diverse diets (millet, sorghum, green bananas, cassava and many varieties of fruit, nut and vegetable, including wild varieties) of the grandparents' era, becoming seen by Africans as uncivilised. This example nails the difference between abundant systems and lean and mean ones. The 150 local varieties will grow all year and avoid the need for any hungry periods. But just growing maize creates money, it's something you can sell. Something the government can raise taxes from to pay debts. Something to export for currency.

There's more at stake with how we farm than avoiding global 'hungry periods' (such as that of 2008). It also is a pivotal issue, perhaps even more than energy, in the effort to avert disastrous climate change. Mollisson's description of a high technology war with nature is a losing battle, as the crops grown with oil and chemicals have low resistance, as the soil gets degraded, as the natural predators of new pests are killed off. Meanwhile neighbouring conservation areas get wiped out, biodiversity gets lost. And then the soil fails and new fertile lands are often converted from grasslands and forests. Lovelock estimated in his latest book *The Vanishing Face of Gaia* that agriculture and food account for 50% of all manmade carbon emissions.

Conversely healthy soil – as campaigned for by the organic movement for 60 years - has been recognized recently by the IPCC as a key ally in the fight with climate change. A group of scientists pointed out in an open letter to the IPCC

(2009) that “Soils store twice as much carbon as global vegetation and the atmosphere combined. Loss of historic soil organic carbon due to degradative land use has been dramatic, resulting in poor soil fertility, environmental pollution, food insecurity and poverty.[x]”

The IPCC (in 1995) had already estimated that healthier soil could absorb up to 80 Gt (giga-tons) more CO2 across the century. A more recent scientific study (2004[xi]) put the potential as high as 1.2Gt/y, which is a third of the current rate (3.5Gt/y) of manmade carbon emissions. How can soil be helped to store more carbon? One answer is organic agriculture has been found in studies by the Rodale Institute to preserve soil fungi called *Mychorrhiza* (killed by chemical fertilizer). The fungi lock carbon into a protein that has a 1000-year half-life. Hence agriculture – currently a major source of carbon emissions - shows its true potential to be a major carbon sink instead.

The reason we have industrialized agriculture is that it was previously believed to generate higher yields. Many recent studies dispute this. A recent report by UNEP and the UN Conference on Trade and Development surveyed 114 small-scale farms in 24 African countries (2008[xii]). Yields had more than doubled where organic, or near-organic practices had been used, with the in yield jumping to 128 per cent in east Africa. Studies in southern Brazil, showed that maize and wheat yields doubled on farms that changed to green manures and nitrogen-fixing leguminous vegetables instead of chemical fertilisers. In Mexico, coffee-growers who chose to move to fully organic production methods saw increases of 50 per cent in the weight of beans they harvested. In an analysis of more than 286 organic conversions in 57 countries, the average yield increase was found to be 64 per cent. (Leu and Pretty, quoted in The Ecologist[xiii]) The UNEP study found that organic practices outperformed traditional methods and chemical-intensive conventional farming and also found strong environmental benefits such as improved soil fertility, better retention of water and resistance to drought.

A terrifying recent development is the movement of the investment sector (venture capital funds and similar) into this space. They beat their chest and with little knowledge of farming say they will bring “industrial efficiency”. Since the collapse of the banking sector billions have flowed into investment funds buying up farmland in areas like South America and Sub Saharan Africa.Abundant systems are the precise opposite of a traditional investor mentality. They are about patience, letting things grow and develop at their own natural pace. Farms that are organic tend to use conservation tillage (i.e. they don’t plough) which produces healthy soil and higher longer term yields. They also absorb carbon[xiv]. Whereas rushed farms emit carbon and perform poorly on every measure except making a quick buck for the agribusiness.

Permaculture has cut its teeth in arid and difficult conditions, in Australia, Africa, even on city rooftops (the permaculture roof gardens spreading through the UK are little short of horticultural and engineering miracles). Another form of arid condition forcing people to try different approaches with low inputs is economic recession. That's why many in sustainability privately welcomed the downturn. Not so much for taking the heat out of the economy (although there was an element of that) but providing a context where more radical experimentation and development could be possible.

What is a recession?

There are all sorts of technical answers; it is more than two quarters of negative economic growth, a cyclical business slowdown or contraction, a period of falling employment, falling investment, under utilization of capacity. In summary: a big decline in economic activity, lasting a fair while. But these are symptoms; like describing smallpox as a fever and skin spots.

Bernard Lietaer, in *The Future of Money*, offered another analysis; a recession is a time of restricted money supply.

This point had already been made by Milton Friedman. In *A Monetary History of the United States 1867-1960* he showed that "a decline in the nation's money supply has preceded every recession except one (1869-70) in the last hundred years."[xv] Friedman's prescription to tackle this involved central government issuing more money. The UK government tried "quantitative easing" in 2009 to the tune of $75B. But this could be a total waste of time, missing the key question Lietaer posed: *<u>why</u> is money in short supply?*

According to a monetarist view, an economy is an inanimate machine, controlled by government. What Lietaer realized is that an economy is something different than that. It is a human consensus. The reason money goes into short supply in a recession is not a lack of spending or borrowing by government. It is that people are acting out of fear and panic. In these circumstances they hoard money. If they have it they hold onto it, just in case. It's exactly what we have been seeing for the last year or two of an impending global recession. Consumer saving ratios increased for the first time in decades. And corporations stockpiled cash.

That looks like a prudent policy. Just wait and see. The trouble is everyone else waits and sees too. And the economy goes into seizure. That's because anyone who has cash isn't spending it. And that freezes everyone's income. A recession, if you look at it this way is a shortage of money in circulation. It's an economic heart attack – a circulation failure. With money not in circulation there is no money to pay workers or debts, firms close and unemployment booms.

In the 1930s they discovered a new solution to this problem. One so scandalous to the establishment it was stamped out, a move Lietaer felt led directly to WWII: People started printing their own money.

What to do in the 1930s if you were the mayor of a little town in Austria, where the entire economy had ground to a standstill? Fortunately the mayor in the town in question had read a book by a radical Austrian economist called Gessell who was opposed to usury and interest rates and argued for issuing new currencies, which avoided these. In 1932, Herr Unterguggenberger, mayor of Worgl, facing 35 percent unemployment issued 14,000 Austrian shillings' worth of "stamp scrip". In other words he printed his own currency. These were covered by exactly the same amount of ordinary shillings being deposited in a local bank. He then paid people to do public works, using stamp scrip, fixing school roofs and roads. And then they paid each other. Within two years, Worgl had returned to full employment. Not only that but through the public employment scheme it was in tip top shape, with new roads, houses repaired, forests replanted. Why the economic miracle? Because the Worgl managed what the real money Austrian Shilling did not. It circulated, from buyer, to seller, from employer to worker, from worker to tax payment and then back out again in public works. On average the Worgl circulated 14 times faster than the Shilling, which means (Lietaer points out) that it created 14 times more jobs.[xvi]200 other towns in Austria and Germany tried to follow suit at which point the regulator in Bonn blocked community currencies. A legal appeal was made and lost.

What was it that made issuing a new currency so successful? A key factor was the ‘stamp scrip’ system recommended by Gessell. You have to pay every month to keep a note in this currency current (and it then gets stamped). This policy called ‘demurrage’ ensures that no-one is tempted to hoard the replacement currency. You could even pay local taxes in stamp scrip which to one of the few cases in history where people have wanted to pay their taxes early (to avoid paying the scrip as well). Another way of saying ‘demurrage’ is negative interest rate. What the clever economist and canny mayor had found was the economy’s missing reverse gear! Just as interest rates impel people to hoard (at the first sign of negative growth) negative interest rates impel people to spend now, before their savings decrease. In real currencies this could prompt a spiral of inflation, but in the well-controlled stamp scrip it just got the whole town ticking over nicely.

We face a difficult and unreliable economic future. Transition periods usually are choppy. There will be opportunities, but also probably long recessionary slumps, when flooded world cities, a collapse of confidence in oil supplies and similar will trigger collapses in the conventional economy. Along with schemes like microcredit, complementary currencies offer a safety net. For a couple of years

we can at least trade and share what we have while the economic storms blow over. And invest (hopefully in our education, energy efficiency and suchlike) when times are fatter. Because it acts like a safety net in recession hit communities, these schemes have in modern times been given a regulatory break; literally in the case of Timebank which was made tax exempt by the IRS. The green dollars prevalent in New Zealand received a different ruling. If you were a plumber and you were paid for plumbing then you should ensure at least part payment is in real currency so that you can account for it and pay tax. But if you were a plumber and went fruit picking, or sold some old records that's fine, just take the green dollars.

I'm as unsure as anyone at the time of writing if we face a ten-year ongoing depression or a surprising (if slow) recovery. But I am convinced that we will face periods like that in future. And any thwarting of the - already stretched to the limit - corporate and investor growth model will lead to a rapid slump. In financial language we face crises that are by no means 'priced into the system'.

We cannot keep growing in the old way as we are running out of planet (food, water, energy, forest, species, dry land...). The reason I got into considering alternative currencies was musing about how to meet people's needs (for instance keep everyone fed, happy and entertained) while substantially reducing the carbon emissions? The obvious target is all the duplication in goods between households - from lawn mowers to books. If we could get people to turn a whole community into a library then substantial savings would be possible, because they would need much fewer goods over time. Especially if the same platform also encouraged them to share lifts and so on.

There have been many attempts to create such sharing platforms

Public services. We all pay taxes then use them on a needs basis.

LETS. Mutual credit schemes; earn green dollars by lending or selling goods (and services); spend green dollars when there are things I need.

Libraries. Not just for books eg the power tool library in Oakland.

Rental. A hot area of innovation. For instance city car clubs. And *Bag Borrow Or Steal* (works like Netflix or Love Film, but for Handbags)

Pooling. A Heidelberg community scheme, whereby one person bought and maintained one item each from an inventory list; when anyone needed something on the list they'd phone that holder.

Peer to peer rental. Rentmineonline and Zilok are two recent attempts at

this. Whereby people hire goods off each other for real money.

Freecycle. If you are about to throw something away, see if someone else wants it first.

Swapping. Find someone who does want to barter. For instance readitandswapit.com Or clothes swapping parties (called Swishing).

Liftshare. A 'dating site' for sharing lifts to your given destination.

Landshare. The idea of turning gardens into allotments. 30,000 already signed up. A similar scheme called Yard Share from Hyperlocavore.org in the US has a more grassroots community model.

The opportunity I could see was to do something similar to the LETS schemes. But with three differences:
1. We would pay people to reduce their carbon emissions
2. The way people traded would use an innovative new system
3. We'd make it an abundant model that could scale to large volumes

Robert Colwell and old friend and much more of a business person than me, thought this sounded like a great plan – and we've spent a great deal of time trying to find the model that could break through and both provide community support and carbon reduction.

We explored quite a few options including mobile libraries. That one went out of the window after Robert drove around Camden timing how many people/items we could cover in a day. It's often the case that you need to look at lots of different formats for the same basic community scheme, to see which might fit. Another of our ideas was called *The pRawn Shop* - a pawn shop with a Rental twist. You could bring in your guitar (say) and get £50 for it. Then come and pay to get it back in six months. Usually a pawn shop would charge 200% per year interest for this service. We would charge 0% interest and would even service the item. Just one condition: you had to sign a service agreement saying we could rent it out. This looked like a pretty cool service and retail idea. There was a catch though. When we did some financial modeling we found problems, given that we wanted to rent out cheaply. What we thought would be a problem (the cost of capital, to loan out) really wasn't because rental incomes easily outstripped this cost. The problem was the typical UK high street costs for premises, storage and staff would cost a fortune relative to a nice little bric-a-brac style rental business. We'd have to be turning over many thousands of guitars (or whatever) a week. Plus we would have service bottlenecks when everyone used the shop (say) on Saturday. It might actually be worth revisiting sometime soon though with high street rents plummeting, and community

schemes to use vacant lots getting government grants and support?

We looked at a number of variants. All had the same problem, a central processing bottleneck (they had to pass the goods through us). We needed to find a more abundant framework that would sit more effortlessly in a community. So we went back to my original idea (covered in my last book), which was an internet "Barter Bank" (i.e. similar to a LETS scheme). Except with one difference: what if we could do it through messaging media like mobile phones and email? Then we would have a scheme that could work in any country. And we would have something with no central admin, just a contact service. The result is a system called Co.in, which stands for community involvement (and also refers to the currency).

The other key feature of our system is that, to issue the currency, instead of paying people (like the mayor of Worgl) for doing manual work for the council, we will pay them for doing carbon saving actions. This provides some ballast, as it isn't easy just to issue lots of money. Carbon savings are like a gold standard. But what they get us out of mutual credit which we figured was unlikely to work in a larger and less tightly knit community: in our version no-one has an overdraft.

At the moment we are developing the system and will be testing it soon in a community. It will probably evolve. But through exploring the 'market' we have become aware of hundreds of other complementary schemes starting. Mobile based encrypted currencies. Actual coins called S.Coop which you can redeem in Petticoat Lane market for ice-cream (a promotional thank you from the store owners). The Transition Towns developed a currency in Totnes, also to encourage people to use local independent shops more. HubCulture a managed office and professional network has its own currency, the Ven.
By far the most interesting parallel though is the M-Pesa.

Critics of microcredit point to the high (by Western standards) interest rates. In Bangladesh these are limited by the government to 20%. And Grameen only charge those rates when the income is more than sufficient to cover the loans. There are microcredit schemes charging much higher rates than 20%. In Africa where the populations can be harder to reach (a couple of days bus and bike ride into the bush) costs are quite high and there are also substantial security risks when carrying cash around. That was the reason why Vodafone and the DFID (the UK Department for International Development) created a scheme in Kenya, to support microcredit using a mobile phone currency instead. The result is M-Pesa, which means mobile-pay.

I went to a talk by one of the technical developers Dave Birch, recently. One interesting detail he explained was about mobiles and the developing world. How

can people afford mobile phones when so many (97% - see section 3.A) earn less per day in equivalent local spending power than the price of this book? The answer is they cant. What they can afford is SIM cards which price local phone calls and texts at levels the local market can afford to pay. There will generally be one phone handset shared around a village, cluster or enterprise. Also given high illiteracy rates among some rural segments there is also substantial co-operation in the use of these phones (people dialing or entering security PIN numbers for you). The phone is a lifeline given the number of families whose husband is working in the city most of the time, while the wife tends the farm, and raises the children. In sub-Saharan Africa women do up to 80% of the farming[xvii]. When I visited Nairobi in the 1990s, there were reckoned to be about 500 mobile phones in the country all of them corporate employees based in the city. There were 11.7 million mobile phone subscribers by 2007. This is more than half the number of adults in Kenya. The call charges are quite high (about 20p per minute for voice). So it is probably safe to say that the usage would be more essential than chitchat?

The idea behind M-Pesa was to reduce the costs (and hence interest charges) of microcredit schemes. The M-Pesa system is SIM based. When you unlock your SIM, if you have credits on the phone you can text them to another user. You get credits on the phone by paying in cash at the many Safari (Vodafone) outlets; the exact same place people get their SIMs and phone minutes. There are 3700 agents, but over 100,000 outlets nationwide. If someone has sent you M-Pesa currency you can cash this at an outlet too, just by texting the person in the kiosk. The service is free to use, as Safaricom makes its revenue from the text messaging. If someone sends you M-Pesa and you don't have a Safaricom SIM you can still cash the text at an outlet. You just can't pay others.

How does this help with microcredit? Firstly the microcredit agent does not have to bring cash with them when they assess you for the loan. Or as was return a second time with the cash, or to collect all the regular payments. They can just text you the money. And you can repay by text. Thus the transaction costs are dramatically reduced.

Birch explained that the microcredit proved an excellent way to get the currency into circulation and accepted by a critical mass of people. But by now people are using the M-Pesa outside microcredit as a fully blown currency. There are 5.5 million users (defined as people who have sent M-Pesa) i.e. about half of all mobile phone subscribers. They make around 160,000 transactions a day. They are also still joining the scheme at a rate of 300,000 new users per month. A second use is sending remittances back from a husband working in the city. This saved a long regular bus trip, or paying a driver, so is a convenience. Another common usage is for safe storage. Not in a long-term savings manner, but depositing an amount before traveling, and then withdrawing it at the other end.

A SIM if stolen is useless to anyone without pass numbers. Robbers tend therefore to be after cash.
M-Pesa is also planning to support the government welfare social service payments. And new mobile phone based services have sprung up around the currency, for instance a translation service where you can text in a message in one of the many tribal languages and get it translated into your own.

The existing system of banking could not possibly meet all these needs. The bank branch network barely reaches beyond major towns. Yet Birch said that one of the reasons that M-Pesa wasn't on its way to being a universal global payment system was that banks had succeeded in getting regulators to block this new form of (as they see it) competition. Notably this had already happened in India. But uses of mobile phone are bringing many such abundant systems to the developing world. One is Tradenet which helps farmers to check where the best prices can be found for their produce, and contact buyers there.

5.3 Putting abundant systems design into action

What exactly *are* abundant systems? How are they different? Let's get into the details. What follows are some of the key principles that differentiate abundant systems from lean and mean 'mechanistic' systems. We'll see from the examples that these apply to almost every area of collective human activity, from town planning to social media. In this section I will outline a range of typical project starting points, large and small, with which world builders could look to create their own abundant systems.

Systems Thinking

I think of abundant systems as like sailing. It's about catching abundant resources from your surroundings, rather than chugging away with a motor (i.e. high energy inputs). And because of this you need a sailors 'nose' for patterns in the systems around you; weather, tide and so on.

A good example of systems thinking for sustainability is industrial symbiosis. Symbiosis is when several organisms in an eco-system co-operate for mutual benefit. Industrial symbiosis applies this to business clusters. An initiative of this sort that my friends at theGINlady.com (GIN = Green Independent Natural) are championing is the development of farmer co-operatives so that organic meat farmers can find decent markets for secondary products like wool - for instance supplying these materials to UK eco-fashion brands, or for use as loft insulation. The rates they would get as individual farmers for these material streams are piffling (for instance 30p a kilo for wool). And also the quantities they could supply would be too small to be significant. But it could be a prime material if co-ops aggregated the quantities and found direct buyers for sustainable materials who would value not shipping all that wool in from New Zealand. Similarly *WornAgain* are making fashionable clothes and bags out of materials like old plane seats and balloons; doubly fashionable because they are reclaimed materials and hence sustainable in a more 'street' way than the old beard and sandals look.

Systems design nearly always involves looking 'one level out' at the larger context. So if your task is a community centre, look at its total interactions with the community, literally everything that flows in and out (deliveries, staff, flows of air or materials...). I worked on a local government sustainability innovation project ('i-Team') and one of the councils, Kirklees decided to do just this. For instance one of their idea was training midwives who worked from the centre to act as carbon/energy saving coaches. Similarly I really like the sound of the scheme to twin schools and local farms – a much bigger more nested idea than having a school allotment garden.

The way to look at a human system is 'panoramic'; a word taken from Patrick Geddes an inspiring chap from the 19th century when it comes to town planning, sociology and much besides. Geddes advice for instance looking at his native Edinburgh - don't get lost in the details of the (then worst slums in Europe) just yet. But just look at the big picture. What are all the influences from distant places and times that make it exactly how it is now? The agricultural supplies that start in the glen. The remains of the medieval market? The economics of landlordism which accounts for the appalling lack of both public and private space? That's a better way of saying what systems thinking is really about, which is that it is born out of respect for living systems, including human ones, rather than (mechanistic, false imposition of physical science) abstract systems. You could just as easily call it narrative thinking, to avoid confusion with the men in white coats with clipboards.

Maximise laziness

I've watched and worked with quite a number of social ventures, and seen some flourish, while others really struggle. Paradoxically it is often the ones with fewest resources that seem to thrive. I've come to believe that one key is to find an *effortless* model. Finance is a bit like oil, you can pump a business with that and see results (lots of this went on in the dotcom years) but often those ideas don't really take root or become self-sustaining. Rather, as with oil fueled intensive agriculture the system becomes less resilient, and addicted to constant input of further resources to keep it going.

The effortless model is born out of having almost nothing – except goodwill and the potential for people in some way to help themselves or each other - and wondering how things could almost run themselves. Freecycle for instance was just a 'service idea' if you could call it that. It didn't need to build a million pound website it just used Yahoo Groups. It didn't need to market itself because people recruited their friends. And after a while the media and writers like me picked up the story. The key to their success though is the volunteers, both the actual organizers but also everyone involved at every level doing their bit. And I am sure the founder Derron Beal must have done a lot of hard work behind the scenes liaising with local moderators, and everything that went into gaining a million users with a staff of one. And from there they have rolled up past 6 million and counting.

Laziness is actually another key idea from permaculture. That's because things thrive when nature or the elements do most of the work. Permaculture farms look more like forests, with interacting crops, animals and other elements at different levels all providing services. They look like they 'just grew' but don't be fooled. In common with internet systems like 'open source' they are very carefully planned and constructed using experience based rules. It's a matter of

things in the right place to thrive together. The effort goes into design, rather than constant struggle.

When it comes to social production (internet or community) systems another key to this kind of abundant effortlessness is the proverb “many hands make light work”. Amazon.com gets untold value from its 10 million free book reviews, or the fact that it simply harvests data from other readers’ choices to create recommendations and choices. It’s the same with raising one million pounds. You could pitch someone with a lot of money to invest. Or (if it was a truly inspiring, unique idea) ask a million people for £1. Fordhall farm, the Obama election fundraising... there are numerous examples in this book of people who have gone the second route. One of the key things open source software developers say about their approach is that the quality control is much higher because many more coders are checking each others’ work and challenging it from new angles. An open source community consists of lots of little fresh perspectives and angles.

Bottlenecks in systems – the common feature of many lean and mean systems - are places that become hard work. From high volume internet systems (Twitter hit a crisis of this sort) to children’s party arrangements (it’s a long story!) bottlenecks are also the place where systems most often fail. Bottlenecks are often deliberate, for instance SMS allows heavy charging for moving tiny amounts of data. New systems are coming that will challenge this, developed originally for aid workers to be able to use their phones in emergency zones where the central systems are out. Instead of going through the network, this system relays packets of info between nearby phone handsets, passing them along a chain.

Lazy doesn’t mean low quality. Or ‘lazy’ in moral or artistic terms. It means designing something so elegant that it supports itself without the need for constant input. Like the idea we will meet later for desert greenhouses below sea level (so that the sea water they will evaporate to use for moisture can run downhill, rather than having to be pumped). The old technology tries too hard. 21st century society will be more *Taoist*. High effort systems will look as crude tomorrow as steam engines look to us today (mind you steam engines will likely enjoy a comeback too, in combination with solar thermal).

Laziness extends to needing minimal inputs. Abundant systems are often self-supporting. Grameen bank for instance hasn’t taken in a penny in funding since the early 1980s. It gets what it needs from its customers and also, because they are also the owners, shares any excess (profit) with them too.

In technical terms what maximizing laziness means is an optimal position on the curve describing the relationship between energy/input and work/output. It

doesn't mean putting no energy into the system. It means designing things so that you put in a wise amount of work to ensure abundance. Howard Odum described all this through 'power curves' . You see this in the distance, speed and energy consumption of vehicles. If you drive at a steady 50-60mph in a car you cover the distance with the lowest fuel use. Go faster or slower and you use more fuel. Many modern systems are not optimal simply because they are so impatient for short-term results.

Distributedness

It's not communism its communalism. Abundant systems have no central authority, no top down control. While many of the examples in this book are social ventures, social networks and social change campaigns, it must be pointed out that not everything 'social' is a co-operative network. Many being part of the old paradigm emphatically do not have distributedness. For instance, most NGOs run 'campaigns' which are centralized ways of telling each person to do something which is far from engaging their full human potential or giving them an active and free part in creating the campaign. I am happy to sign worthy petitions mind, but there is a slight feeling of 'is that all you want?'

We struggle to operate something like an airport or a logistics (delivery) business using lean and mean systems. Bees on the other hand with no central control, but rather a beautifully choreographed series of evolved micro (bee-to-bee) behaviours manage to visit several million flowers (the right flowers for the season, for the maximum yield of nectar and pollen) every single day *in the right order*. One elegant little move in this schema is that a bee - when a flower is empty of nectar - will mark it so with a pheromone. This scent fades at roughly the rate that the flower replenishes itself. So that other bees don't waste time checking until it's full again. Bees also follow established learning trails, for instance returning to the same location a number of times. The colony also has large reserves of foraging bees dormant at any one time, so that upon an exciting new find (the bees not only 'direct' the other bees to these, they 'sell' their discovery with varying degrees of enthusiasm), up to a third of the whole colony can be mobilized fast. Bees also maximize the yield for the flowers – a trans-species act in favour of common wellbeing - as a single bee while foraging will stick to a single type of flower, even if there are others around in the same location. That's because the bees are gardening; more flowers next year if they help flowering plants thrive. And rose pollen isn't much use to marigolds. Steps in the bee direction in human logistics include back haulage (offering empty delivery vehicles on their return journey to other firms) and parcel tracking. Here you can see the beginnings of co-operative distributedness.

Distributedness is in some ways a special case of lazy (low energy and complexity) design. Hierarchies are bottlenecks. If you want a nimble organization on any scale, make the decision as close as possible to the ground. Anything else is a recipe for massive bureaucracy.

This brings us back again to the revolutionary idea of social production - of many hands making lighter work than a centrally organized corporation. It's the success story behind such internet giants as Craigslist, YouTube, Wikipedia, blogging, Flickr, Facebook. All of these are aggregated out of small contributions by each member. But smart contributions, not menial tasks mind. They are also organized by members; for instance by the rating (or viewing) of videos YouTube gets something like a 'chart'. By tagging of content, you get the ability to search things like photos in the terms that people would use to describe them. Contributors are happy to do this because they want their content to be seen. And because they benefits from others' tagging. And for all sorts of co-operative ethic reasons.

Distributed tagging in internet systems leads to what's called a folksonomy (as opposed to a rigid centralised taxonomy). Instead of centrally defining what someone might be looking forward when searching for something, you employ the natural (and often diverse) ways that people classify things themselves. Looking for a particular song one might search by era, another by artist, another by a lyric and so on. It's a branch of a bigger shift in culture, from official culture to a folk system, based on consensus.

A lovely little example of the distributedness and abundance in action is *ReCaptchas*. Captchas are those annoying little boxes where you have to type in the fuzzy words and letters to get access to some result or site online, for instance to post a comment on a blog. It's intended to create a trap for non-human agents (little parcels of code, called 'bots', spreading spam by posting links across millions of sites). It works because recognizing indistinct and distorted type is a hard task that only humans can perform reliably. Recaptcha uses this process to help with digitizing old books, one word at a time. These display words that computers did not recognize in the process of scanning books. How do they know that they are dealing with a human who will get it right, not a bot who might enter something wrong? Because they give you two words to transcribe, one that is already known, and one which has been thrown up - as not recognized - by scanning a book. If you get the first one right, they assume you probably got the second one right too. It's just one example of how tiny tasks in large-scale interactions can become productive by drawing on human talents that exceed that of scanning computers; rather like in a bee colony.

Multi-cellular Organisation Design

When I say multi-cellular, I mean structured like multi-cellular organisms. In internet systems, the joining up of single cells (linked blogs, content directories or user pages) is what helped abundant systems move ahead of mechanistic hierarchies.

Why did (biological) multi-cellular organisms evolve? Why didn't amoebae and bacteria just get bigger? The answer is that the multi-cellular design is evolutionary genius at work. One reason is that cells die and are replaced all the time. In 'amoebae the size of a beanbag' self-repair might be trickier! In a superorganism (like an ant or bee colony) the bees themselves take on this cell like role, within a larger intelligent design. The colony becomes the unit of selection; there is no survival for any individual unless all thrive. It's a suggestive metaphor for a time when the human colony faces global crisis.

In a human system a 'cell' would usually mean about 20-140 people. The size of a small village or tribe, or a large extended family, a small business, or an independent working unit in a big business. On that scale you can have smart interactions. Relate your ideas and spark off others and be bound by strong relationships. Which – note – doesn't mean it is all peace and love, by the way. Nor that co-operative systems lack sharp individual competition.

This is the scale of optimal collaboration; a sports squad, a science park outfit. On this scale there is passion, autonomy, identity, a real sense of belonging. Whereas within larger groups, unless there is this cell like structure, individual contribution and identity gets lost. Decisions through longer chains of double guessing and patchy understanding can turn into lowest common denominators. A multi-cellular design allows many smart cells to act in a beautifully choreographed and interrelated way. A multi-cellular organisation can work on any scale, but avoids the bureaucracy and the alienation that happens in any larger crowd.

The only time larger structures are helpful is swarming. Like if a billion of us decide on something and all do it together. It's an emergency, once in a lifetime sort of action; like when a swarm of bees need to split from the hive.

One of the functions of multi-cellular organizations is distributed learning. How to benefit from learning in one cell, across the whole community of cells? A new social network called Ivili.com is seeking to spread great grassroots sustainability solutions across a whole network of those facing similar challenges in geographically remote locations. The idea was born out of research the founder Jeremy Smith was doing into a book (called *Clean Breaks*) on sustainable holiday hotels and hostels. Smith saw similar solutions emerging in locations across the world; often variants or different solutions to the same problems, such as

harvesting rainwater. Smith's idea is to use video clips to demonstrate ideas so that others can pick up the whole recipe in an accessible format. It's a new idea and time will tell if this community reaches a tipping point, but the concept seems well founded. It relies on the fact that the participants are generous sustainability-minded types who do want good ideas to be adopted by others to have a bigger impact. They don't want to be in a Starbucks style chain, but they do potentially want the shared learning effects of a larger scale association.

Similar learning sharing groups are springing up around crafts; knitting groups were the 'coolest' scene in fashionable East London 5 years ago. Trashion – making household objects and clothes from salvaged materials - has probably taken over that mantle now. Artisanal bread making, foraging, woodwork, building with stone – these sorts of craft skills are attracting a whole new generation of environmentally conscious young adults. The waiting list for allotment gardening in the UK is over 100,000[xviii]. Many are about getting back in touch with nature, with healthier or slower or less consumerised options. They may also prove to be handy in an uncertain century ahead. And while the crafts are often traditional, the tools they are using, like eBay and self-designed community sites (like .ning) are cutting edge. Why read a recipe on a page, when you can watch another chef demonstrating it?

Another current example of multi-cellular learning is creating a format, which abstracts the learning from one setting into a 'recipe' ready to be applied in other settings, without going through all the trial and error. SPIN (Small-Plot-INtensive) farming is a programme designed for people new to farming. It is organic based (and hence produces high value crops to sell locally) and they claim it is easy-to-learn, non-technical and inexpensive to apply. SPIN Farming is designed to be used on half-acre plots and they say is equally suitable for city or rural farming. You can buy their instruction guides online for $12 each (you buy a set of these depending on what you are planning, but it's likely to cost you less than $100 in total) and you also get free email support as part of the deal. The guides are a complete how-to guide to buying and running a tiny farm, with titles like: *Tools and Investments*, and *Work Flow Practices*. There are also specific farm operation model guides, for instance the snappily titled: *GARLIC. Part-time, Multi-site Operation (6,000 square feet, $23,250 in gross annual sales).* Which if you were planning to buy a plot of land and grow garlic on it would quite possibly be priceless!

In a much deeper green vein, but also about collaborative learning, is the *Open Source Ecology* project. This centres upon the development of a real world model village, which is completely off grid (no external power or water supplies), which runs on permaculture principles and is entirely self-sufficient. I've some doubts personally about self-sufficient eco-villages being the community format that ever could support 10 billion of us. But the learning potential and the

networking and documentation is really spot on. They are not just looking at farming, they are developing construction techniques, ways of fabricating metal and plastic, machining, a steam engine, various power sources including a solar steam array and biomass burner. But all done to a regenerative zero-waste model. This is not just a local experiment. It is an online open source learning project, with collaborators both inputting to and drawing on the project. Open Source Ecology are also aiming to fund the project collaboratively, through 1000 donations of $10. It's a fascinating hybrid of ancient and futurist technology too, with computer networking alongside compressed earth bricks. In many ways the question is 'what if we ran a farm like an internet development project'?

Designing Out Waste

We already saw examples of this (as industrial symbiosis) under systems thinking but it is an enormous subject. Broadly speaking living ecosystems are like reservoirs, collecting energy and using as much as possible for their own work. Waste in the extravagant human sense is a big hole in the dam.

Cradle to Cradle is a seminal design book. The authors, McDonough and Braungard, hate the vision of sustainability as just leading to restriction and rationing. They think we just need to design smarter material flows. In nature there they argue, there is no waste, it is always food for another process. Actually there is always some waste escaping from a system, for instance in heat energy; and my only minor criticism of their book would be that (compared to the work in a similar vein by Howard Odum) they focus too much on material rather than energy. For instance it would be possible to invent harmless new uses of existing designs which because of their energy requirements (including transport, processing) created huge CO2 emissions.

Landfill sites are full of valuable materials that have been used for a while then 'thrown away'. In the *Cradle to Cradle* view, every component of an artifact should be designed to be a technical or biological nutrient in its next phase of life. In the 1950s Alfred Heineken had the idea (when on holiday in Jamaica, and seeing so many discarded bottles) of designing a square beer bottle that could subsequently be used as bricks to build houses with. It was called the *World Bottle* and the story goes that he got as far as getting a test house built from this material – to prove the concept – and pitching it to his board of directors (who voted it down for reasons unknown[xix]).

Many sustainable systems today simply find a waste stream they can sit in and create value out of. One such initiative is REiY, from Bioregional (their most famous project being BedZed an affordable and zero carbon housing community in South London). REiY takes in building waste and either resells it as is, or reworks it into new products (for instance furniture) to sell in shop outlets. It

hence creates opportunities for employment and training. A similar (but simpler version of this) idea has been operating in the USA for some years, under the name RE stores or the less snappy title Building Material Reuse Centres. The first three centres, funded by the UK government are planned to open in the UK in 2009 in the Wirral, Waltham Forest and Tees Valley. There are also a number of specialist wood recyclers out there; making new products (from furniture to equestrian flooring) out of old wood. A similar idea for electrical waste called *RUSZ* (Repair and Service Centre) has been successful in Austria, training the unemployed to repair electrical goods – otherwise on their way to landfill - for resale. RUSZ also provides an affordable repair service for households. In the last ten years RUSZ claim to have repaired 2 million kilos of electrical goods, and have also won awards for employment creation (they only employ long-term unemployed).

Another vital step, as well as processing materials is creating desire for the new products they get turned into. In many cases it's an almost invisible choice. But it can be made into a positive.

Kept, from Luke and the team at More Associates, is a brand that celebrates keeping things you decide not to replace, like a mobile phone getting a second life. The idea is to use stencils or other such devices to help users proudly display the KEPT logo and hence make keeping old stuff iconic. They are currently putting together a shoot celebrating how cool second hand goods are (compared to new). I see it as a kind of 'anti-matter' – making a brand out of not consuming.

Glove Love. This from the folks at *DoTheGreenThing*. The idea came to Naresh, one of the founders when he found an odd glove at home. He threw it away. He then found another glove in the park. So he retrieved the first from the bin. Cleaned them both and made a nice bold LEFT/RIGHT label for each, uniting them as a pair. *Green Thing* will be collecting in gloves that people find stranded at home, and then creating new pairs, complete with a little story about the previous life of each glove.

Another way to design out waste would be to produce things, which are easy to repair and upgrade. If you think about think this is the ultimate loyalty scheme; people will keep buying your parts, software, re-skins and so on. I am amazed no-one has cottoned on to this yet, but I am sure they will. Imagine Sony selling you the last home entertainment system you will ever buy on this basis, and then signing you up to a lifetime of upgrades. In a green utopia we may reconnect with community and need TV soap operas less. But assuming people do still want mass media this would be a good stepping stone. It would also open up Sony's business model to external developers; in the same way as Facebook Apps; independents could design cool upgrades.

Also needed are products designed for long life, not for built in obsolescence. I've been predicting for ten years that Moore's Law will come to an end (I call this Moore's Ceiling). If you think 5 blade razors are daft what about 8-processor Macs (expensive to fabricate and costly in power and cooling)? Most markets reach a point where what the engineers can produce exceeds what people need. Unless you are rendering your own video films or processing huge quantities of scientific survey data, very few things you do with your computer today would even tax the machines of five years ago. The answer may come with cloud computing anyway, when users pay for processing power remotely and their local computing device is just an internet. This extends what the internet already offers with virtual storage (imagine if all those websites had to live on every local computer).

Companies offer choice because they say that is what people want. The evidence is that largely people really don't want choice. Check out psychologist Barry Schwartz's 2005 video on the TED site. There is empirical evidence that offering people more choice makes them less happy, for instance in the gift they are offered as a reward for participating in a (dummy) experiment. They become anxious about what they are missing, rather than rejoicing in what they have. Or consider that Apple only makes four models of computer. I'm all for localized diversity. But not when it comes to global products like mobile phones. The future is design along the lines of the old VW Bug; iconic, easy to repair and customized by the owners in vivid ways that exceed any 'customer styling' options today.

Co-operative markets

Markets are literally co-operative in cases where user needs are incorporated into service delivery. A service in Germany (GTO) allows pedestrians to turn on street lighting late at night as needed, reducing energy costs and light pollution when there is no-one out walking that street. A new scheme from super geek Mark Gorton, aligns public transport routes with clusters of real-time demand. Gorton the founder of P2P file sharing site Limewire calls his proposal *Smart Para Transit*: "Currently on the road networks of big cities, you have lots of people making similar trips in private automobiles. And now, thanks to the advent of cell phone technology, computer technology, and other information technology, it's possible to build a system that dynamically gathers information about where people want to go, and routes a fleet of vehicles to make those same trips much more efficiently."[xx] The system is already being used Portland Oregon and is being trialed in San Francisco. The platform is open source and based upon a platform called Geo-Server with many further applications to smart city planning.

Another approach to co-operative markets is to think about distributing resources more equitably. There have been a number of products marketed on a 'one for me one for the developing world' basis. The One Laptop Per Child project used a buy one give one (or more) free mechanic. Tom's shoes gives an identical pair to a needy kid in an impoverished country. BoGo (buy one give one) light is a solar power charged torch, bought on a buy one give one basis, distributed to refugee camps and other areas where a handy night light can make a real difference.

There was a lot of interest in the early years of the internet in co-operative buying models, what was called *Purchase Power Aggregation*. A group of us who were looking at sustainable innovation in cities had the idea of creating a 'test bed' market (my cheeky name for this was *Bedshare*). There is a substantial small segment of enthusiastic green living pioneers. A survey by the Guardian and Henley Centre suggested that as many as 4% of us are enthusiastic adopters of new ideas in micro-renewables, filtering wastewater and so on. You know the sort of person. They have probably retrofitted their own green home and are always looking for new designs and products to try out. What we would do is recruit 1 million of these, spread across the C40 cities (the climate leadership group; 40 of the world's biggest cities). We would start a technology incubator to develop and commercialise promising new green home technologies. And our test bed members would commit to trying and buying 4 of our ideas a year. To make this fair they would be involved in the selection process too, which would give us access to free market research and early user input too. Having a potential first order of up to one million customers would create a strong case for investment in these businesses. More significant still would be the showcase and credibility a C40 cities endorsement could bring. This is already the model used in IT marketing. For instance the release of a new Nintendo console has one million 'beta testers' who pay the full price but get the ultimate gamer bragging rights of getting a pre-release console and games to play with. They also get to input on finishing off the design, ironing out any bugs and so on.

If you are interested in developing this sort of social network based business idea of your own, School of Everything – a marketplace for tutors and learners - just published a list of 45 tips for anyone starting a social business using social technology. It's a brilliantly lucid, simple and usable piece, that's grounded in their own experience. You can get the outline here http://sociability.org.uk/2009/04/06/45-propositions/ And they are writing this up in an extended book you can get from NESTA.

The same model is being applied to large-scale infrastructure and markets. Smart City Grids will manage the relationship between demand and capacity within the grid, something which is currently done manually and is wasteful. The

intermittent nature of renewable energy generation (it depends on wind, sun and tides, which all can vary) means that smart systems in transmission can pose challenges, as could much larger distances (for instance connecting Europe to solar power from the Sahara). But the best known application of smart grids is creating a co-operative relationship between producers and consumers. Dynamic demand and variable pricing mean that people (or automatically devices in their fridges and water heaters) can use power when it is cheaper, and hence reduce the need to keep spare capacity 'spinning' in case needed. It's an abundant system managing the whole of its capacity, through a network of interactions rather than the old 'use it or lose it' top down (or centralized) 'grid'. A cute version of the same principle is Tea Light an idea by More associates which is a traffic light on your computer to tell you when is and is not a good time to put the kettle on in your office. The sharing of recipes among groups who take seasonal vegetable box deliveries is another example of changing our behaviour to fit supply.

Joy

Grameen founder Mohammed Yunus describes 'Joy' as one of his key business principles. And I couldn't agree more.

Abundance releases a kind of 'joy' to do with creativity and the human energy involved in doing something out of a shared enthusiasm and ethos. It also relates to craftwork; something that draws on your full human capacities, and develops you as you develop in the work.

We need to make quite a transition, not just in our systems, but in our worldview. We need new mental pictures and words to think with and share. Creativity is the source of new ideas to think with. It's enthusiasm and other co-operative social emotions that are – in my humble opinion – one of our key resources. I certainly enjoyed my time at St Luke's as one of thirty plus inventors of a rather crazy, commune style creative company. It got reported as a clever, futuristic sort of system 'the future of work' but I reckon the key was actually our kindred spirit. And a fair amount of joy.

Have An Ethic

If there is no central command and control, how can a community work well together? The answer is that they need a shared ethic. Without this all you have is a set of individuals. With it you have an aligned group working towards something they believe in.

Examples in this book are often born out of a sustainability purpose; for instance the transition towns out of the need to tackle climate change and peak oil. But

the idea of an ethic goes beyond just the idea of a purpose or agenda, or target, or mission. In the case of transition towns, perhaps their defining core belief is in the need for local community revitalization. Many central government and big business actions also target reductions in emissions or increases in resilience or energy security. But they do so within an ongoing central command and control structure. They do not share the passion for grassroots involvement. Conversely the genius of web 2.0 style social production systems, highly relevant to sustainability, came out of a belief in a more democratic, distributed arrangement of society.

The ethic which forms co-operative systems makes them human social enterprises, rather than just abstract 'logistical' systems, and that is something which isn't so easy to define in a few words. It is a holistic, human realization – often experienced by the members of a group as a kind of epiphany. It also varies greatly across the examples, for instance Wangari Matthai's Green Belt movement or Mohammed Yunus' Grameen both took the empowerment of women as a core component. Others such as Freecycle or DoTheGreenThing have an overt environmental root. Others such as the P2P transport systems or CarrotMob take delight in the liberating potential of technology. And all of them are specific ideas and it is often the creative idea itself, which burns in people's minds, inspires and motivates them.

Some common ethic themes do emerge in co-operative systems and while it's not exhaustive, a list may help us to sketch put what I mean by having an ethic;

The Play Ethic
The lean and mean society makes for monotonous heavy work. This was the core idea of *The Protestant (or Puritan) Work Ethic*; an absence of enjoyment or delight in work. Instead work was subsumed into renouncement of earthly pleasures. Co-operative systems of the sort discussed in this book tend to be playful, and joyous rather than heavy. This is a cause that has been promoted by UK magazine *The Idler*. Working from a profound rejection of work as suffering, the clever chaps at the Idler have set out to critique modern society; their *Crap Jobs*, *Crap Towns* and *Crap Holidays* reveling in exposing the aspirations and values most toil under. When I say 'play' I don't really mean a kind of ironic 'playing at' I have in mind something far more committed. Another word for it would be creativity, but again that facility has been debased by the 'brainstorming' commodity view.

The Grassroots Ethic
The ethic that underlies distributed co-operative systems is a fundamental belief in personal and community self-rule, in the Gandhi sense. In answer to the question 'what is this for?' the answer is for people; for their wellbeing. There is a profound split between grassroots, democratic processes and the top down

approach; often what goes in the name of ‘green’ is actually the latter, and what goes in the name of advance capitalism (such as eBay) proves through its community rule to be thoroughly co-operative.

The aim of this book is not to argue that we don’t need central solutions as well; for instance it seems likely to be a good idea for transnational agreements to limit our overall carbon emissions and for systems such as taxation to enforce them. But the grassroots ethic gives voice to a stubborn belief in the rights of all participants to having a say; a commitment to humbleness over ‘big leaders’.

The Partnership with Nature Ethic
There is no split between human beings and nature. There never was. That was always an illusion. Our science, plastics, shopping malls are all a product of evolution. What has been lacking is the ethic of partnership with nature. We have been denying the umbilical chord that links us with our eco systems. We’ve been sawing the branch that we sit on. Partnership is much more than respect or restricting harm, it’s a dynamic, creative union. It’s a moot point whether entrepreneurs who start with a vision of tackling poverty are working from a reverence for nature in the sense of forests and oceans. But human nature is nature too, after all. We’ve been dominated by a vision of nature as competition; survival of the fittest - as a cruel but necessary natural order. It’s taken a looming global crisis of sustainability to point out the perversity of that position. A beehive is capable of intense competition and indeed behaviours that at times appears cruel. But there is no sense in which a subset or elite put their needs before the group.

The Lifelong Learning Ethic
Human nature is defined by our plastic ability to learn and form ideas. Although many recent studies in zoology, for instance into the startling intelligence of the corvus genus of birds challenge the notion that we are quite unique in for instance inventing and using tools, or having self-consciousness. Lifelong learning is not some new fangled invention it’s actually I’d argue our default state. What we have today in our opportunities to experience other culture, to access information and to share insights is still arguably unprecedented. We are, if we want, able to learn for our whole lives. And it appears we do want this, as the explosion of interest in blogging, craft hobbies, the interests in history and popular science and so on suggest.

The Acceptance Ethic
This again is hardly nnews. Most world religions have turned on the need to accept to accept suffering and sacrifice the ego. Modern culture is something like a flight from this realization; to addictions, consumerism, Prozac or anything to dull the pain, which of course is all the stronger for being held at bay. But each generation perhaps has to discover its own version of the human truths,

and acceptance – for instance accepting uncertainty, or accepting responsibility are key moments for individuals and groups.

The Transcendent Ethic
We've been in a quite uniquely materialist phase. Any hint of the metaphysical is seen as hocus-pocus. Any notion of 'God Delusion' is still to this day treated with disdain. Yet we are manifestly a religious species. We are genetically disposed to believe in an implicate deeper order and reality. Otherwise religion and the associated rituals, myths and archetypal images would not be a proven (in anthropological studies) human universal. What you will find anyway, that behind quite diverse stories and characters, many – when you get to know the founders – will whisper that there was some sort of 'spiritual' dimension to their quest, some sort of 'epiphany' at least.

The Ownership Ethic
I don't mean ownership as in "it's mine" (exclusively, all mine). I mean the other sense of emotionally having a stake in something and feeling responsible for it. Within a distributed system this becomes a mutual or reciprocal matter – like the way you might watch out for other kids than your own in a school setting, or raise the alarm in a workplace if someone was trying to steal from somebody else's desk. In schemes like City Car clubs people can still be encouraged to take pride in the vehicle, almost as if it were their own, because of the community pride and ethos.

<u>Division of Brilliance</u>

The idea of the division of labour propounded by Adam Smith may go down in history as a kind of dark ages. Even Smith (as he stated later in *Wealth of Nations*) had profound misgivings over the stupefying effect of monotonous factory work.

Compare that with natural systems and you find the opposite. A colony of bees are each working at the limit of their (exceptional) abilities. They divide labour into crafts, in other words, and each takes skill and dedication. Even the drones (the lay-about, hopeless, romantic poets, is how I like to think of them) are exceptionally well suited to their task of preserving genetic diversity, even to the point of dying after mating so their genes don't get too extended into the bee population, through mating with several queens.

The abundant potential of the human world is apparent when we imagine a large proportion of the population were challenged to work to the limit of their talents, learning and creativity. We don't have that system now because we need to support an order where an elite few gain all the rewards. I have been lucky in being able to work at something like my full capacity to learn, create and

be challenged. In the co-operative view everyone should have such opportunity. It was one of the strengths of the (centralized and oppressive, but far from 'all bad') communist system - that it did create far more democratic opportunities for people to develop. Cuba has 2% of the population of Latin America but it has 12% of its scientists. It also has exceptional achievements in medicine, music, sport and so on. On a per capita basis in terms of utilization of human talents it puts its superpower neighbour America to shame. We all need to be Cuba's tomorrow (although I accept what people say about human-, womens- and other rights, when I put forward this view as if I were extolling their whole system, which I am not).

The Earth Race?

Maybe the new 'space race' – ie a cultural enthusiasm big and broad enough to define a generation and an epoch - will be about climate, biodiversity and poverty rescue: the EARTH RACE?

One exciting Earth Race example is biochar, the so-called "black gold" from traditional Amazonian agriculture. What you do traditionally is take smoldering organic matter and cover it with soil. The resulting charcoal is a stable way to lock carbon in the soil and also promotes soil fertility. Modern versions use anaerobic kilns. Craig Sams the founder of Green & Blacks chocolate is one enthusiastic convert. Sams estimates that if 2.5% of the world's productive land were used for biochar that CO2 levels could be returned to pre industrial levels. (The Independent, 7/12/09). Sams has serious Silicon Valley venture capital backing and is starting trials this year both in the UK and Belize.

The same style of thinking about partnership with nature has been applied in some of the most futuristic architecture and energy projects. One school of thought which makes particular use of this way of thinking is biomimicry. Not because of a romantic drive to go back to nature (which often means copying or incorporating inert natural materials). But because nature's designs given eons of evolution in dynamic interaction with real world environments are often better than ours (for instance photosynthesis is pretty much the most efficient solar power system imaginable). Complex living systems usually do not work like machines. They are more interesting than that; with qualities of complexity like resilience and emergence. To compare human society – how our world works - with a machine is like comparing a human infant with a doll. Our machine thinking has got us so far. But it has also been creating problems, notably in the natural world, where our mechanised farming, logging and building have worked against other natural systems. The alternative is learning from other living systems. To pay close attention to how complex living systems really work. And reapply this to our human designs, and to understanding the rich, emergent processes of our

societies. This is in itself an intellectual revolution, one at least as big as the industrial revolution and scientific age.

Michael Pawlyn, the British architect who designed the massive biomes of the Eden Project is a leading biomimicry practitioner. The inspiration for the biomes came from dragonfly wings; using hexagonal frames and membranes made from a polymer called ETFE. The result was that when the structures were finished Pawlyn calculated that the weight of the domes was less than the weight of the air they contained.

Pawlyn is now working on a future project called 'The Sahara Forest'. The idea is to make large greenhouse structures kept moist by evaporated sea-water. The evaporation and flow of moist air also keeps the greenhouses 15C cooler than the outside air. It could be integrated with concentrated solar power (CSP) generation too. Providing ample food, energy and fresh water from the most unlikely place on earth. The solar farm also evaporates the sea water, and the damp air keeps the greenhouses cool enough for plants to thrive. A prototype was built in an arid region of Tenerife. The system is based upon the way that a particular desert beetle (the Namibian Fog-Basking Beetle if you must know) manages to manufacture its own fresh drinking water in desert conditions by capturing condensation. The full-scale projects would be built in deserts of North Africa below sea level (so that no energy was needed to pipe sea water to the site). It is a beautifully elegant idea, self-sustaining and supportive of life.

The Sahara Forest Project is probably as good an example as any of the sort of 'technology' which we really need going forward. It is not just a clever trick, which has been copied from nature either. It is a system designed to work in partnership with nature. Michael's greenhouses create about 5 times as much water as is needed for the crops and much of this seeps into the surrounding land, creating a microclimate. Compare this with conventional greenhouses that according to Pawlyn take water from the ground, resulting in a drop in the water table, resulting in salination of the remaining water, which ultimately makes the land barren. Pawlyn's greenhouses would reverse that effect. It is not just 'carbon neutral' (whatever that means) it is a restorative technology. And that is the heart of the vision which is so exciting about where technology and human systems could go next; a step change which would make industrial, mechanistic models look crude, compared to the elegance of partnering with nature to meet our needs, with a fraction of the effort (and the damage).

I've seen Pawlyn present these ideas a number of times and there is a great video of him on YouTube doing so and also demolishing the position taken by those (eg Bjorn Llomberg) arguing we should leave these opportunities to innovate for future generations.

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POSTSCRIPT: A CHECKLIST FOR WORLD BUILDERS

Here's a checklist for any stage of reviewing a world improving co-operative idea in progress. Here are some very common features of the examples featured in this book of co-operative networks for the common good. If one of these doesn't apply, maybe it should?

☑ DIRECTED
The difference between a social network and a co-operative network is that co-operation assumes some group goal or ethic, a shared task. In the case of examples in this book the goal will generally be to *increase the common wellbeing*; but obviously in a specific way, like reducing energy use. In this perspective growth (and many examples in this book are high growth) is a means to an end and something not to be achieved with negative wellbeing.

☑ DISTRIBUTED
There is no centre, no chain of command (although there may be central functions, for instance of distributing, editing or monitoring). The network is led by local interactions from which large scale properties emerge. The examples often have a 'multi-cellular' structure where local circuits of links, towns or interest give structure to prevent getting lost in a mass crowd.

☑ DEMOCRATIC
Not just in the sense of getting a vote, but rather in the full sense of being an empowered equal partner; and having systems whereby the group can shape as well as choose outcomes, ie democracy is more than just 'a vote'.

☑ DELIBERATIVE
Creating forums where citizens or members can learn, share ideas, form agreements and commitments. As opposed to communications from a centre. Although good ideas may circulate between cells of conversation.

☑ DESIGNED
These are like pieces of a future tradition; they have a 'way things are done' quality encoded in rituals, rules and formats. They are also carefully designed for abundance, low energy input and waste, responsibility. They often have specific innovations, for instance in ownership models, or tools.

☑ DEVELOPING
These are learning organizations, both for the people involved and for the collective (and changing) genius of the central design. They work on an open source principle of continuous review and improvement. Like living systems.

☑ DIVISION OF BRILLIANCE
Instead of the stupefying division of labour described by Adam Smith, co-operative networks draw upon full human capacities or individual contributors. This in itself releases reserves of wasted of talent, enthusiasm and human energy.

☑ DETOXIFIED
The networks are careful in sifting and rejecting toxic thinking, such as the wrong kind of investment (vampire capital), intellectual property... that work against the common good. In the words of Craig from Craigslist they are 'free as in free speech'.

☑ DECENT
While few are outright moral crusades, all have some basic values locked in, that any reasonable human being would recognize as being decent. The arbiter of all decent values being 'is this for the common good of humanity?'.

☑ DISARMING
These are not (or very few are) activist challenges, mini revolutions against the status quo. Rather they are peaceful, flourishing alternatives. They tend to meet other parts of society in a spirit of co-operation not criticism. They tend to take over in an organic way as they displace the less co-operative.

☑ DECELERATING
Against all the urgency and sense of panic felt by those who have realized the dire straits we are in, the co-operative networks are about relaxing and having a longer view, taking the speed out of society. They aren't about slamming on the brakes, they are about getting off the bus.

☑ DURABLE
There is a different mindset involved in seeking solutions that are built to last. One of caution and observation – being determined to make the right move because it needs to stand the test of time.

☑ DEVOLVED OWNERSHIP
It may be a starting point or a distant goal, but I tend to think that the legacy of any decent system would include ultimately it belonging to the people who build, work in or buy from it. That creates a regenerative closed loop, as opposed to making an economically extractive (and always potentially exploitative) open system. It's also a condition of motivation in co-operative systems that success is shared around, not siphoned off.

[i] http://www.scottlondon.com/interviews/mollison.html
[ii] http://www.greenpeace.org/international/photosvideos/photos/close-up-of-the-sun-globally
[iii] http://www.monbiot.com/archives/2008/06/10/small-is-bountiful/
[iv] http://www.zmag.org/ZSustainers/ZDaily/2000-05/30chomsky.htm
[v] http://www.stewardwood.org/woodland/tree_loss.htm
[vi] http://en.wikipedia.org/wiki/Working_time#Annual_hours_over_eight_centuries
[vii] http://www.antithetical.org/restlesswind/plinth/wimguild2.html
[viii] http://www.sustainabilityinstitute.org/pubs/columns/03.24.03Hamilton.html
[ix] http://news.bbc.co.uk/1/hi/business/2014396.stm
[x] http://carboncoalitionoz.blogspot.com/2009/02/ipcc-puts-soils-on-agenda.html
[xi] http://www.regional.org.au/au/asssi/supersoil2004/s10/oral/1489_ricec.htm
[xii] http://www.twnside.org.sg/title2/susagri/susagri072.htm
[xiii] Andre Leu, Organic Farming, Winter 2007, citing Jules Pretty, 2001
Pretty, 2006. http://www.rimisp.org/getdoc.php?docid=6440
[xiv] www.tucson.ars.ag.gov/isco/isco10/SustainingTheGlobalFarm/P140-HBSo. pdf
[xv] http://www.time.com/time/magazine/article/0,9171,941750-5,00.html
[xvi] http://www.transaction.net/money/cc/cc01.html
[xvii] http://www.un.org/ecosocdev/geninfo/afrec/vol11no2/women.htm
[xviii] http://www.twilightearth.com/2009/03/high-demand-for-uk-allotment-gardens-leaves-100000-people-waiting-list/
[xix] http://www.vestaldesign.com/blog/2006/07/heineken-beer-bricks/
[xx] http://www.planetizen.com/node/35009