

Design and the Environment: towards a new aesthetic.

The environmental imperative

1. Design currently faces two conflicting pressures. On the one hand there is a post Fordist industrial economy, whose flexible production systems generate an ever increasing quantity of products, rapidly prototyped, tried out on the market, modified, modularised, or made to order. This puts a premium on the capacity to design new products. As quality and distinctiveness become more significant than cost in mature markets, design finds itself in a pivotal position in the new competition and an important shaper of post modern consumption and lifestyles.
2. On the other hand there is an environmental imperative that is calling the industrial economy to order and exerting a pressure for restraint. No product or process can now be adequately conceptualised without considering its environmental impact. Toxicity, resource depletion, and climate change impacts are the three new elements in the 'environmental' bottom line being applied to products, services, firms, and lifestyles. Design has had form, function and economy as its central concerns. To these must now be added the environment.
3. A Habitat bed can be beautifully designed, and cheaply produced, but what of its environmental impacts: of what wood is it made; are the brominated flame retardants used in its mattress a threat to health; is it recyclable, and if and when it is discarded, can it be landfilled or incinerated safely? For the designer, as for the consumer and the state, these questions open up whole new territories of inquiry and judgement and point to limitations in the traditional aesthetic of design.
4. Materials need to be traced back to their origins and forward to their ultimate destinations. Their impact has to be assessed in terms of hazards, waste and energy and resource use. These in turn raise further questions: what kind of energy, how renewable is the resource, can the waste be reclaimed? There is a daunting complexity of materials, impacts and assessment criteria.
5. Nor are the answers ready to hand. Many rest on scientific research and testing. These can give only partial results. Of the 80,000 chemicals in use only a fraction have been tested, and the results are frequently disputed. The maps and intelligence for these new territories of inquiry are therefore limited. For design to extend into them means it has to internalise the evidence, the uncertainties and the controversies around environmental impacts. In Ulrich Beck's terms, design is now operating in an 'age of risk'.¹

¹ Ulrich Beck, *Ecological Politics in an Age of Risk*, Polity 1995. One of Beck's arguments is that the site of politics is displaced to the field of science and information. For the 40 year struggle to have the dangers of lead recognised in the United States see G. Markowitz and D. Rosner, *Deceit and Denial: the Deadly Politics of Industrial Pollution*, University of California Press, 2002, and for the politics of chlorine Joe Thornton, *Pandora's Poison: Chlorine, Health and a New Environmental Strategy*, MIT, 2000

6. Yet in spite of the difficulties, design can no longer ignore these issues. They cling to the industrial economy like the shirt of Nessus. The restructuring of production to take account of the environment is set to be one of the defining characteristics of the current long wave of industrial development. The pressure on resources and the extent of pollution was a legacy of the period of mass production in the North, but it has intensified with the global extension of mass production and mass customisation. Scientific advances as part of the information revolution have helped to identify the full extent of the problem and at the same time open up a wide range of possible solutions.²
7. The pressure for change initially came from environmental movements. But now governments are becoming the drivers, introducing 'green' fiscal and regulatory measures to reshape the market to take account of environmental costs. Environmental policy, both at the national and international level, (with the temporary exception of the United States), is moving in one direction with profound consequences. Food production, paper, packaging, the automobile industry, tyres and batteries, electronic and electrical goods, construction, oil and chemicals are all industries where the new direction of public policy is encouraging firms to modify their products and processes and radically re-shape their long term plans.
8. Leading corporations in each of these sectors are adopting quite new strategies of development. Dow and Du Pont, for example, are shifting from oil based to agricultural based chemicals, reflecting the so called movement from a hydro carbon to a carbohydrate economy. New packaging materials, such as those made of bio-degradable plastics, are being developed in response to the cost and limitation of mandated recycling. In petroleum BP and Shell have long term plans that move them "Beyond Petroleum". And so on.
9. What this means is that environmental innovation is on the way to becoming a central consideration in corporate competitive strategies. This is also true for national economic policy. A number of countries have recognised that in an era of increasing liberalisation, environmental legislation provides a means for countries to introduce measures nationally which promote innovation and with it provide protection. The legislation provides a national first mover advantage since it gives national firms that have innovated in response to national measures, a competitive advantage when environmental norms are themselves internationalised. It represents a new environmental mercantilism.
10. Germany, in the spirit of Friedrich List, is the most noted example of this green mercantilism. A number of Canadian provinces have adopted similar strategies, and in 1998 Japan - post Kyoto - set MITI onto re-manufacturing and waste minimisation as a key instrument of industrial strategy. A new industrial norm is being established, one that emphasises resource productivity alongside capital and labour productivity, and eco-efficiency alongside technical efficiency.

² For a recent discussion of long waves and their stages of development see Carlota Perez, *Technological Revolutions and Financial Capital*, Edward Elgar, 2002.

11. Initially, in the 1970s and 1980s, environmental policy concentrated on 'end of pipe' solutions. During the 1990s its emphasis shifted to redesigning what goes into the pipe in the first place. Eco-design, and how to promote it, has become central to environmental policy. This holds true nationally, internationally, and at the corporate level.
12. Take for example the 7 guidelines for eco-efficiency set out by the influential World Business Council for Sustainable Development³:
- Reduce the material intensity of goods and services
 - Reduce the energy intensity of goods and services
 - Reduce toxic dispersion
 - Enhance material recyclability
 - Maximise the sustainable use of resources
 - Extend product durability
 - Increase the service intensity of products

For each of them design is central. Together they can be taken as a contemporary agenda for environmental design.

13. What this means is that designers, if they have not already done so, will have to respond to regulatory and competitive trends by taking environmental impacts into account. Nor is it just a question of response. The direction of eco-efficient industrial development opens up a wide range of new areas for pro-active design-led innovation. Since product design and development influence 80% of the environmental and social impacts of a product (and more than 80% of the cost) designers have a pivotal role to play in improving eco-efficiency.

Conflicting directions, conflicting life worlds

14. Yet designers face profound difficulties in integrating ecology into the dynamic of post modern consumerism. Each appears to contradict the other in approach and objectives. Contemporary consumerism asks designers to work in a world of an ever multiplying quantity of products, with shorter life spans and fashion cycles. New products pronounce a death sentence on those that exist, creating an unplanned

³ DeSimone and Popoff (1997)p.3. DeSimone was from 3M, Popoff from Dow Chemicals. They chaired the working group on eco-efficiency for The World Business Council for Sustainable Development. The Council is the representative body for major corporations concerned with the environment and sustainability issues.

obsolescence, which leads to ever greater problems of storage and waste. It is a world of exuberance, and excess, of desire and possession, of personalisation and social distinction. It is a world of surfaces and transience, of endless longing in which more is less.

15. Eco-design, by contrast, counsels restraint in consumption, and a more austere lifestyle. It looks to the long term and to more durable products, to leasing and sharing rather than possessing. Its focus is on the shadow side of objects, of the resources they use, and the hazards they carry with them. It looks beneath the surface and beyond the immediate. It appeals to the universal rather than the particular, and to utility rather than the pleasure principle. It champions an economic minimalism in which less is more.
16. Can these two forces be reconciled? Many designers clearly find it difficult. There is a recognition by some of the significance of environmental issues, but limited success in fully integrating ecology into design practice. There is splitting, too, in the profession, between a small but growing number of ecological designers, and many mainstream designers for whom the environment is still peripheral, if it is acknowledged at all.
17. In a recent collection edited by Charlotte and Peter Fiell of contributions by a 100 leading industrial designers on design perspectives for the 21st century, fewer than a quarter made any mention of the environment or showed a sensitivity to environmental issues as factors in the future of design. Their predominant concerns were with the possibilities opened up by new materials and new technologies, the potential for individual design, and for the psychological shaping of design.⁴
18. Their perspectives read as letters from the front line of the relationship between the commodity and the post modern consumer. For many, the starting point can no longer be form and function alone but the consumer's emotions. "The future of design is seduction" suggests Mathew Hilton. For Prospero Rasulo "Design is ultimately about the game of attraction." The Argentinian-Spanish designer Jorge Pensi sees the designer living between two worlds, one of desire and one of reality, with the design task being one of bringing the two together. Jerszy Seymour writes of 'carnal desire' and consumer allegiance to sensual and intellectual status values. "Good design sells emotion" says Peter Schreyer of Audi. For his Jaguar counterpart, Keith Helfet, design adds value by "appealing to customers' emotions by creating visual appeal... If a product has emotional appeal, customers look for reasons to buy, because they want to own it. Emotional appeal offers real competitive advantages, and hence the opportunity for premium pricing and/or incremental volume". These designers are working within and helping to shape an economy of emotion.

⁴ Fiell, Charlotte and Fiell, Peter Design for the 21st Century, 2003. The contributions are presented alphabetically, and the quotations that follow are taken from the designers listed in this way. The introduction by the Fiells pp 15-25 summarises the pre-occupations of the contributions, and is notably silent on the environment.

19. For them, as for almost all the 100 contributors, the commodity remains central. It is seen in terms of an object of desire, the repository of meaning, and/or a means of communications. Marx spoke of the fetishism of commodities from an economic point of view, wherein relations between people appear as an economic relationship between things. Many of the contributors evoke a parallel cultural fetishism, in which the objects themselves have projected onto them unfulfilled longings so that commodities apparently possess emotional value (in Rasulo's words "an autonomous expressive energy") and social relations appear as relations mediated by objects.
20. A number of the contributors are uneasy about the position in which modern designers find themselves. Stefano Giovannoni foresees a movement towards what he calls 'an emotional supermarket'. He writes:
- "I have asked myself many times whether we really need new products. Everybody in a developed society is in possession of the objects that answer the functional need. But to create wealth, companies have to produce in larger and larger quantities - on the one hand we have no need of new products, but on the other we must develop a new virtual system in order to anticipate the new and increasingly sophisticated fictional architecture of our desires. Products belonging to this kind of virtual reality are further and further removed from real function. Our reality is built step by step by annexing new virtual landscapes which extend the borders of our wonderland"⁵
21. This is both an explanation of an empirical development, and the posing of a dilemma. When design was providing the 'tools for living' - that met self evident needs in the period of mass production - it had an unequivocal social legitimacy. But now its attention is switching to the provision of what the Fiells call 'tools for loving',⁶ in a world where choosing is becoming more important than using⁷ its legitimacy is now in question.
22. This could hardly be farther from the environmental perspective, constituting as it does a kind of manifesto for increased commodity consumption. But what can designers do, responding as they see it to the facts of the market on the one hand (reflecting the manifest changes in the psychic nature of demand) and the requirements of the client on the other? Is any resolution possible?

Triangulation

23. I want to suggest that connecting post modern consumer design to eco-design will not only give new relevance and social legitimacy to mainstream design, it will also connect ecological design to the 'fictional architecture' of consumer desires. Instead of splitting the two, leaving an inherent enmity between them - consumerism as a threat

⁵ Ibid, p.175

⁶ ibid p.22

⁷ ibid, p.189 (Sam Hecht)

to the world's resources, and environmentalism as a shackle on desire - I want to explore whether some form of triangulation is possible, mediated by design.

24. From the environmental point of view, there have been two main approaches to the issue. The first is through the transformation of consumption, the second through technological innovations. The consumption route has made least headway, and in most versions runs directly counter to the trends and spirit of the post-modern consumer. It resolves the tension by collapsing it. In one version there is a straightforward appeal to cut consumption on sustainability and equity grounds. Korea now has a National Campaign Against Excessive Consumption for example, but for the moment at least it is difficult to see such campaigns being widely adopted - in peacetime at least. Another version invites a return to pre-modern consumption - with an expansion of the domestic and local economy, and a redistribution of working time to permit this to happen. A third advocates a change in lifestyle and the pattern of consumption.
25. Of the Fiell's 100 designers only one, the British designer Jane Atfield, addresses the issue. She forecasts a collapse of commodity centred consumption as the result of a rejection of consumerism, branding and materialism. "The reduced demand for choice and possessions will be replaced with an emphasis on social experiences and better designed systems and communications"⁸ and she suggests that environmental concerns will become one of the moral and political factors that will increasingly determine what is developed and where.
26. There is some evidence of these trends, but they remain limited in scope and political sway. Directly cutting back consumption - by restricting cars for example, or airline travel - has tended to lead to the political graveyard, and has to be advanced with great care even by green oriented governments. The juggernaut of consumption has tended to crush barriers to its advance that stand in the way.⁹
27. This leaves technological innovation as the route of advance. The most prevalent supply side approach of this kind is eco-efficiency, an approach that characterises the contributions of those designers in the Fiell volume who do refer to environmental questions. A number advocate the integration of ecology along with form, function and economy (and we could add emotion) into the process of design. Design for durability would be one guideline, for recyclability another. "When we build things", writes Stephen Peart, "we should consider their side effects and the substances used."¹⁰ Designers should cut down the material and energy intensity of goods, they should favour renewables, and those materials with low or zero toxicity and which can be economically recycled. They should find multiple ways of extending product life. The commodity remains the focal point of the design process, but its material

⁸ Fiell and Fiell (2003b) p.47

⁹ The juggernaut of consumption is also at times a juggernaut of production, as evidenced by the pressure by US household goods manufacturers on Japan to expand the size of their dwellings, which the US Government argued was a constraint on trade.

¹⁰ *ibid* p.374

composition, its use and its disposal are designed to tread more lightly (and breathe less noxiously) on the environment.

28. Eco efficiency in these terms, as in those of the World Business Council for Sustainable Development cited above, is a starting point. We could even say the starting point. In the last decade there have been a rapidly growing number of corporations adopting it, using life cycle analysis and similar tools to assess and reduce the environmental impact of their products, and formally reporting on it. In some cases shareholders, including insurance companies and pension funds, are requiring environmental reporting as a condition for their support at annual general meetings.¹¹
29. The limitation of the approach is that it may draw out the environmental agony rather than healing it. In the words of the ecological designers Michael Braungart and Bill McDonough, "eco-efficiency only works to make the old, destructive system a bit less so. In some cases it may be more pernicious, because its workings are more subtle and long term." ¹² In other words the danger is that eco-efficiency will not go far enough. More radical approaches are required to bring consumerism and the environment into line.
30. At this stage we need only note two of the best known. The first, Factor Four (or Factor 10 in a yet more radical versions) sets the target as doubling wealth and halving resources. This is eco-efficiency taken to the point when the conflict between growth and resources disappears. The key concept is resource productivity, which it is argued, should replace labour productivity as the lodestar of industrial practice. The proponents of Factor Four, many of them engineers and designers, are confident that radical technological innovation can provide the answer, "the efficiency cure for the wasting disease".¹³
31. The second radical approach is eco-effectiveness. Braungart and McDonough use this term to distinguish it from eco-efficiency. Their goal is for human production to enrich the environment rather than deplete it, and they argue that designers (in the widest sense) should do this by creating:
 - (i) Buildings that, like trees, produce more energy than they consume and purify their own waste water
 - (ii) Factories that produce effluents that are drinking water

¹¹ This is the position of Morley Fund Management, a leading UK fund manager owned by the largest UK insurer CGNU and managing £100 billion worth of stocks - equivalent to 2.5% of the UK stock market. In 2001 they announced they would vote against the annual accounts of any of the top 100 companies which does not filer an environmental report, and abstain for those in the top 250 which are in high risk sectors (including oil, gas, electricity, chemicals, automobiles and construction).

¹² McDonough, and Braungart, (2002)p.62

¹³ See von Weizsacker, Lovins, and Lovins (1997) and Hawken, Lovins, and Lovins, (1999)

- (iii) Products that when their useful life is over, do not become useless waste but can be tossed on the ground to decompose and become food for plants and animals and nutrients for soil; or alternatively that can return to industrial cycles to supply high quality raw materials for new products
 - (iv) Billions and even trillions of dollars' worth of materials accrued for human and natural purposes each year
 - (v) Transportation that improves the quality of life while delivering goods and services
 - (vi) A world of abundance not one of limits, pollution and waste.¹⁴
32. Central to their approach is the restoration of cycles, one biological the other technical (point iii in the list). Materials should be tracked, using a 'life cycle development' methodology, from cradle to cradle rather than eco-efficiency's cradle to grave. They should be chosen so that they close loops, and not only conserve resources but expand them. Their examples at times suggest an upward spiral rather than a static cycle, using solar energy and biology as the primary growth forces (to be harnessed as in (i) above, or to generate (vi)).¹⁵
33. One of the distinguishing features of Braungart and McDonough's work is their emphasis on the positive. They react strongly against the spare, dour puritanism of eco-efficiency, its verbal vocabulary - minimising, avoiding, reducing and sacrificing - and its nouns - scarcity, waste, limits, and sustainability. They are champions of abundance, of sunlight, health and waste that is food. They use the image of the cherry tree that on the eco-efficiency reading wastes most of its blossom, but in eco effectiveness terms returns fallen blossom as nourishment.¹⁶
34. In terms of the contradiction between consumption and nature, eco-effectiveness requires no general restriction on growth or consumption. It embraces the capacity of mass customisation to respond economically to difference and diversity. The question is not one of growth but what kind of growth. "The key is not to make human industries and systems smaller, as efficiency advocates propound, but to design them to get bigger and better in a way that replenishes, restores and nourishes the rest of the world."¹⁷ A view of this kind is certainly more in line with some aspects of post modern consumerism, as is Braungart and McDonough's celebration of delight and fun. "It's very important for ecologically intelligent products to be at the forefront of human expression. They can express the best of design creativity, adding pleasure and delight to life." To English ears at least, this evokes the spirit of William Morris, revived within a 21st century flexible production system, with the artisan craftsman now the eco-designer.

¹⁴ *ibid* p.90

¹⁵ We could also imagine technologies that have to rely so little on what they call 'technical' materials, that the stock of technical materials currently used in the economy is reduced on the next circuit, yielding a technical surplus in parallel with a biological one.

¹⁶ Another strong advocate of the cyclical approach is Edwin Datschefski, who suggests 5 requirements of sustainable design: cyclic, solar, safe, efficient, and social.

¹⁷ McDonough, and Braungart, (2002)p.78

Beyond the object

35. The differences between these technological perspectives is first and foremost one of ambition. The Factor Four and eco-effectiveness designers argue that the bar must be set high to meet the environmental imperatives, and that this in turn demands more radical design solutions that go beyond the greening of existing products and structures of production. It is not enough therefore for product designers to add an environmental dimension alongside the economic one in determining the design of a product. Eco-efficiency tools may help to reduce the environmental impact of a given product subject to financial constraints. But they will not adequately address the environmental issue until products are seen as sites for the realisation of the demands made by the environment on the material world. Until this happens there will remain a gap between ecological and mainstream design.
36. The issue is the status of the commodity. In the Fiell collection, the contribution of the French Bouroullec brothers was one of the few to problematise design's relation to the product. They suggested that "the future of design will tend towards a displacement of the fields of intervention" with a movement away from a pre-occupation with objects and property, to the creation of a well balanced personal eco-system. Their interest is in capacities, their interaction and movement rather than in things as such. "Liberated from the concept of the object, design will be generated by a more complex system which will involve an understanding of situations and a permanent freedom of movement."¹⁸
37. "Liberated from the concept of the object". This phrase goes to the heart of the matter. It suggests a way of understanding the significance of the environment for design, as well as the differing approaches to eco-design itself. For what distinguishes all current eco-design thinking is the transcendence of the commodity as the privileged category of attention.
38. Take eco-efficiency first. What it does is to deconstruct the product, in order to reconstruct it within the context of the product life cycle as a whole. Life cycle analysis looks at the commodity in use as only one stage in the cycle of the product, assessing as it does the environmental impact of each stage of its material existence. In a limited sense, life cycle analysis provides a measure of environmental impact, and can be used to compare the relative impacts of different products or processes. Its greater significance is as a stimulus to innovation at various stages of the life cycle.
39. With the life cycle rather than the product-prepared-for-sale as the primary unit of analysis, a range of issues open up. What would be required for the product to be used longer? Walter Stahel - trained as an architect and director of the Product Life Institute based in Geneva - has multiple answers: modularisation to cheapen the cost of maintenance and provide scope for the incorporation of innovation (so called

¹⁸ Fiell and Fiell (2003b) p.91

'dynamic modularisation'); re-skinning; a change from purchase to leasing to encourage manufacturers to use long life materials since they will retain ownership; re-manufacture of worn components; and refining of intermediate products such as oils and solvents.¹⁹

40. What would be needed to reduce energy in use? Or energy intensive inputs? How can products be designed to permit recyclability, including reverse engineering processes of disassembly, reverse logistics, or introducing crackable glues and solders? How can toxic materials be substituted, or preserved through recycling? Each of these questions prompt further ones at other parts of the cycle. In spite of its limitations, eco-efficiency cannot but extend the design questions into areas far beyond those considered in the traditional commodity centred approach. In this sense it is disruptive of the existing order of things.
41. One line of pursuit, explored at length by Walter Stahel and his colleagues, is the shift from commodity to service. This is not a dematerialisation of the economy, since material objects will still be required, but they are demoted to be elements of a service rather having a *raison d'être* in themselves. Manufacturers move to selling performance rather than products. Or outcomes rather than inputs. There is a growing literature on the 'servicising economy', which is most developed in capital and intermediate goods sector such as vehicle fleets, integrated pest management, and energy services.²⁰
42. What Stahel does is to follow through, with great imagination and institutional insight, the implications of the questions posed by eco efficiency. The path that he pursues initially takes him ever farther from the original commodity, to a new paradigm which shares much with that of eco effectiveness. But this provides him with a way to track back and return to the commodity, with an eco-design brief that reconceptualises the commodity. Stahel sees it as a 'service delivery platform', made with standardised components, designed to meet performance based standards, to be durable, recyclable, and remanufacturable. The commodity would be supplied as part of a service package on lease through long term contracts. Its performance and liabilities would be the responsibility of the producers. The redesigned commodity crystallises within it the technical requirements of sustainability. The contrast with mass production is summarised in Appendix 1.

Productive systems.

43. If, following Stahel, outcomes become the object of inquiry, it is only a short step to asking whether production of this service, using those commodities, is necessary at all. In Stahel's terms we move into an era of sufficiency rather than efficiency. We consider how production can be designed away by meeting needs (and desires) in other ways. In such cases the commodity disappears.

¹⁹ Product Life Institute (2000) and Stahel (1997), and (2001)

²⁰ For the relatively slow developments in consumer 'servicising' see Behrendt et al (2003).

44. What replaces it is the productive system. These systems refer to outcomes that any economy has to deliver, usually reflected in sectoral economic organisation. Some of the most interesting work in eco-design is that which reconfigures productive systems. Food is one example. The environmental and health effects of particular products such as eggs, beef, chicken nuggets, and farmed salmon - around each of which there have been food scandals- has led to a re-assessment of the food system as a whole and its re-design around environmental and health requirements.²¹
45. The work on transport at the Rocky Mountain Institute is another. Amory Lovins and colleagues at the Institute designed a hypercar which was three times lighter than the norm, used a hybrid electric drive and increased efficiency 4-6 times to approximately 110-190 mpg and later to several hundred mpg. But of course they couldn't stop at the car. They were forced to think of transportation, how to reduce its need (sufficiency), meet what remains in different ways, re-allocating road space (as in Curitiba) transforming nodes and switching points.²²
46. Similarly in energy. Amory Lovins was not content with a solution that introduced environmentally benign technology into an existing energy infrastructure - in the UK it would be offshore wind fed into the national grid. Instead he shows how the falling price of micro generation provides the building blocks of an entirely new system of distributed energy production, linked by local distribution lines, with heat and cooling piped to neighbourhoods.²³
47. In all these ways the introduction of the environment into the design brief serves to free design 'from the concept of the object'. It stretches it into the origin and characteristics of materials, and forwards into use and ownership, to reverse logistics, disassembly and re-engineering. And before long it extends out into wider systems which revises the role of the original commodity or may displace it altogether.
48. The environment therefore opens up design. It raises question after question which draw design away from a primary focus on single objects towards interventions in the architecture of systems. "Design will be generated by a more complex system which will involve an understanding of situations and a permanent freedom of movement". The Bouroullecs wrote this in relation to personal eco-systems. It applies to wider productive eco-systems as well.

The return to consumption

49. Designers have often described themselves as intermediaries between technology and the consumer. Part of their role is that of an editor, between materials, technical disciplines and ideas on the one hand, and their understanding of the consumer's 'architecture of desire', of what will work in the market, on the other. Taking ecology on board greatly extends the range of intermediation. Now the designer is called to

²¹ see Lang, 2001 and 2003.

²² von Weizsackjer, Lovins and Lovins (1997) pp 4-10, 71-76, 121-131

²³ Lovins, (2003)

act as an intermediary between the environment and world of materials, as well as between the environment and consumers. And in doing so he or she provides a bridge to the world of consumption that is critical if the contradiction between consumerism and the environment is to be overcome.

50. I earlier suggested that more headway had been made towards a resolution through the ecological redesign of production than through the transformation of consumption. The rejection of consumerism, branding and materialism and the development of an environmentally sensitive mode of consumption that Jane Atfield forecasts, is still marginal. Design can act as a guide that leads it from the margin to the mainstream. Designers know well the nature of consumer profiles, the delicate territory that connects objects and the psyche, and the links that bind the inner and outer worlds. This knowledge is what has too often been missing from the environmental discussion of consumption.
51. The current starting point is a modest one. In the UK there are a small number, 1-2%, of pioneer consumers of environmental and ethical products, who are well informed and committed, and will pay significant premiums even for less attractive goods. There is then a much larger cohort of potential sympathisers, 25-30%, the majority women, particularly those between 25 and 45, who will buy goods for their environmental or ethical content if the quality is good, and the price not too divergent from the norm. A further 30-40% will respond if the price matches the norm, while a final 30% are rejectors.
52. There has been a remarkable growth of green consumption in Britain over the past 20 years, and more recently of socially ethical consumption. Lessons can be learnt from both to inform strategies of expansion into the cohort of potential sympathisers. The three key factors for those environmental and ethical goods that have been successful are first the achievement of quality and appearance of the goods, second the price, and third the quality of the narrative.
53. It is the narrative on which so much depends. For what distinguishes an ecologically designed or socially ethical product lies beneath the surface. An organic fairly traded coffee bean looks much the same as a conventional one. In some products there is a difference - in food in particular, but these differences have to be explained, and an alternative aesthetic presented to the consumer. This aesthetic is distinguished by the environmental and/or social content of the product, that may in some cases may be reflected in the difference in appearance. The narrative tells a story and offers an interpretation. The capacity of environmental and socially ethical goods to expand in the mainstream depends critically on the content of the story itself, the way it is reflected in the appearance of the object, and the skill of the story teller. Designers have a central role in all three.
54. The story itself is that developed by ecological designers. The Lovins hypercar, McDonough's River Rouge building, Braungart's furniture fabric, or Stahel's 30 year old commodity service platform maintained by a regional network of labour intensive

service centres are all stories as shocking and arresting as the paintings of the cubists and other historic avant gardes. Their books are written around the stories, weaving the general around the specific, linking the real to the potential, The connection in each case is through the object.

55. The distinctive appearance of the object is another matter. With ecological buildings or the hypercar the difference is clear enough, although it still needs its interpretation. But in other cases, products have had to rely on marks - of the Forestry Stewardship Council or the Soil Association - or on the semiotics of the brand. Can clothes made with organic, fairly traded cotton be distinguished in ways other than the attachment of a 'Dolby Stereo' type mark? Do they need to be? How are the marks to be funded, and their meaning communicated? Are star rating systems applicable? Will they come to depend on curators?
56. Appearance in short is one part of the economy of environmental information. Marks, brands, ratings, and curators/critics are all ways of economising on information and guiding the search. Each rests however on the substantive story itself, and how the story is told. Environmental products if they are to advance in the market have to compete through discourse. This is the home territory of designers. It is common for them to speak of the narrative of objects. As Stefano Giovannoni puts it "To communicate through objects means telling a story of something that relates to life through a warm, sensorial appeal connected with our memory and imaginary world."²⁴ Ecological design provides a different narrative, but requires the same skills of the story teller.

Conclusion

57. The argument of this paper is centred round the tension between environmental necessity and post modern consumerism. For historical and economic reasons design has been closely bound to the latter. If the tension is to be resolved design itself has to step back from its pre-occupation with the object, follow the paths opened up by ecological interrogation and reconstitute the object as part of environmentally positive systems. It is not a question of the abandonment of the object but its recontextualisation.
58. We are not moving into a virtual world, but to a world where there is a new relation between the material and the virtual. Within this the object remains a key point of connection to the consumer and citizen. This connection is what design offers the environmental movement. It provides a material basis for the expansion of an environmental sensibility.
59. If these connections can be made, if designers can extend their scope to meet the needs of eco-systems design, then both design and the environmental movement will be strengthened. Designers will no longer have to ask themselves why they are

²⁴ Fiell and Fiell (2003b) p.175

designing goods for which there is no need; or why their work has to be governed by the fictional architecture of unsatisfied desire. The ecological connection gives a new meaning to contemporary design. It provides the grounds for a new ethic of design, and a new aesthetic.

The Design Council

60. How to take this forward? What role can the Design Council play? Four avenues suggest themselves:

- On the side of demand, to initiate a small number of eco-effective design projects by persuading government or quasi public institutions to act as sponsors/patrons within the context of their procurement programmes. These could be schools, hospitals, urban transport or municipal waste operators, fire brigades, prisons, or public catering facilities.
 - To promote an equivalent number of demonstration projects through companies, focussing on commodities as 'service delivery platforms', and clean production for products in widespread daily use.
 - Introduce eco-effective materials and processes into major new capital projects, such as London's Olympic bid, housing developments in the Thames Gateway, and those financed through the Private Finance Initiative.
 - Work with two large commercial offices to introduce eco-effective services into their daily operation and maintenance
61. As a mean of identifying potential sponsors of these projects, a workshop should be organised, in conjunction with interested partners, in order to widen the knowledge of eco-effective approaches, and as a first screening of potential projects.

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April 2004

Appendix 1 Characteristics of the new commodity-service economy

Commodity-based economy	Service based economy
Efficiency	Sufficiency
Output	Outcome
Vertical integration of producer and supplier	Vertical integration of producer and customer
Doing things right	Doing the right thing
Labour productivity	Resource productivity: resource input per unit of outcome produced
River economy (cradle to grave)	Lake economy (cradle to cradle)
Cost reduction production management	Performance-based asset management
Flow process and assembly	Disassembly and reverse manufacturing
Global factories	Local workshops
Commodity as inflexible mechanised service package	Commodity as service delivery platform
One-off sale	Long-term service contracts and guarantees/take-back and buy-back
Purchase	Lease
Risk borne by consumer (caveat emptor)	Risk borne by producer (caveat factor)
Individual consumption	Shared consumption
Product specific components	Standardised components
Product-based standards	Performance-based standards
Private and public property	Rights of access and collective responsibility
Material and discard intensive	Zero Waste

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