Design Away

Cameron Tonkinwise
School of Design, CMU

> "My field? Um, 'Design Studies,' with a 'Sustainability' bent, you could say.
> …
> Well, what I mean is, I don't teach students how to design; my job is to get them to think about what they are going to design – and why.
> …
> Yes, I suppose that's right. My colleagues teach the students to design stuff, and I teach them not to."

Having had this conversation more times than I care to, I think I might now have something to add. The way this exchange runs, it looks like we in 'Design Studies' are doing the opposite of teaching students to design, as if questioning and rethinking were not ever part of the practice of designing. But I want to suggest that not-designing is also a kind of designing; it can be proactive, a deliberate strategy to undesign, to make existing designs disappear. The opposite of the vita activa of making, of designing things into existence, is not merely the privatively passive vita contemplativa, but rather the very active act of unmaking aspects of our locked-in world; the designing of things out of existence.

In a seminal article, "Prometheus of the Everyday: The Ecology of the Artificial and The Designer's Responsibility,"[1] Ezio Manzini asks: if a primary driver of human being is 'doing,' as in, accomplishing, effecting, achieving, what does this driver look like in an era of material limits? Prior to any widespread ecological awareness of finite resources and the damageable sustainability of ecosystems, 'to do' meant 'to make,' to make things better by making better things, many more better things. Environmental constraints, Manzini argues, necessitate a shift in objective, from the quantitative to the qualitative, from a culture of producing to a culture of reproducing – designers as caretakers of "a garden of objects."

But, to strain the metaphor, gardening also requires weeding, pruning, composting. To do more with less also means getting to less, getting rid of more. Can there be a practice of undesigning, of what Tony Fry has called 'elimination design'?[2] Should there not be such a practice, given the imperatives for enhancing the sustainability of our societies? And could such a practice qualify as a satisfier for a new generation of designers? Would not designers as hunters, cullers, eradicators, or less violently, designers as waste managers, cleaners, problem dissolvers, be an importantly 'productive' contribution to the project of transitioning our societies to less stuffed futures?

Usually the act of design seems to us to be a beautifully creative and intelligent craft. By contrast, destruction seems stupidly simple, a brutish, quick act. I will try to point out that, in fact, eliminating some aspect of our everyday material existence, removing it from our

society, is a complex and difficult task, something requiring very skillful strategies. But before doing so, I want to make clear that in fact undesigning is already an act practiced by every designer, when designing.

Creation = Destruction

Tony Fry has pointed out that the essence of design ethics lies in the fact that no act of creation can avoid also being an act of destruction. The most straightforward version of this equation is the fact that to manufacture any thing, some 'natural' resources must be destroyed. A tree must die for it to be the material cause of a wooden table.[3] For all the warmth that timber appears to exude in our built environments, each plank is in fact an autopsical slice, as dead as it is unnatural.

And this is obviously never a one-to-one relation. The timber that goes into a table is never derived from the roots or leaves or branches or bark of a tree, and in fact only ever from the straighter sections of its trunk, the ones not so close to the heart of the log, or its edge. The majority of the tree is simply wasted.[4] Other, ancient trees, now concentrated into oil, have been combusted to run the saw, or transport the timber, or form the glues and lacquer, etc. Frederick Schmidt-Bleek's notion of an 'ecological rucksack' captures all this well; for any weight of final useful product – a gold ring for example – there is a vast array of materials that have been combusted or contaminated or dispersed – in the case of gold, 250,000 times the weight of the ring.[5]

The idea of an ecological rucksack as a measure of all that gets destroyed in acts of material creation need to be understood in the cosmic context. Fry's ethical foundation for design is really a version of the second law of thermodynamics. It takes a vast amount of time for natural systems to negentropically concentrate matter into more ordered forms. To date, humans have hastened this ordering – building metropolises in only a few hundred years – almost entirely by borrowing time from the energy stored by billions of life-forms over millions of years as coal and oil and now natural gas. All those transactions generate significant losses, disorderings lost into an expanding universe as waste heat. Even the ordering that is accomplished by manufacturing using those energy resources, the compounding done to elements to create materials of high performance quality, can in fact be considered acts of futural destruction, since it will take even more energy to recover those elements from those compounds and products.

At this point, we are still only approaching matters materialistically. It is not just a solitary tree that gets destroyed to become a table, but a home, to birds and mammals perhaps, to insects and fungi and other plant species for sure. If these are not killed in the tree's felling and processing, they are stressed by being displaced. And the tree is also part of a wider home, an ecology, such that it's removal (and it is rarely just that one solitary tree is cut down) will impact all that is interdependent within that ecology; neighboring species thriving in certain light and soil conditions; all species functioning within current climatic conditions; etc. Life Cycle Assessment of ecological impacts, actual and risked, have taught

us that designers can be considered the source of widespread destruction in the name of creating better communications and products and built environments.

What is destroyed even extends to humans. Invariably the process of reordering materials into higher performance qualities involves the creation of concentrations, in products and byproducts, that are dangerous to those who produce those materials or live near the environmental release of those byproducts, and sometimes even to those that use the final products (e.g., lead paints on metal toys or synthetic oestrogens in plastic containers). Indirectly, wider ecosystem damage can also result in epidemiological scale human health problems.

We know all this, don't we? Again and again, lists of planetary systems in distress as a result of all that designers do to make and sustain our built environments. But do we know it in any forceful way? Do designers graduate from design schools fully aware that a successful career will involve vast amounts of natural material and ecosystem destruction, and even health risks to fellow humans? Do they graduate thinking of themselves as one of the most dangerous modern professions, as Victor Margolin pointedly made clear?[6] Or do they instead just internalize being celebrated as newly minted members of the creative class?

Creative Destruction

To some extent what I have talked about so far is the inevitable and yet mostly unwitting acts of destruction involved in designing. But it worth underscoring that innovation is itself a deliberate act of destroying some aspect of current existence. To make a better product is to have the intention of rendering the existing version of the product redundant. As Karrie Jacobs once pointed out, when you hire a communication designer to do a corporate rebrand, get your waste receptacles ready: all existing articulations of the now-previous brand will have to be dumped – a phenomenon that is even more extensive if, ironically, that client is good corporate citizen engaged in logo-bearing sponsorship of a range of community and arts initiatives.[7]

It could be argued that 'breakthrough innovations' are cases of new products that do not involve replacement of existing products. The warrant here is that humans do not have a fixed set of needs but rather an expandable set. Great design happens when I find myself realizing that a particular product represents a solution to a problem I did not know I was suffering, something that after adoption makes me think, 'how did I survive before this new category of designed object existed?' If this is the case, we all know that nevertheless our budgets – more our time budgets than our fiscal ones – are constrained. Productivity-enhancing tools tend to only create the fiction of multi-tasking, so in the end every new innovation causes other products perhaps in different product categories to fall into dis-use.[8]

In this way, we are starting to see that designing something into existence, something that people do think is valuable enough to adopt, adjusting their (time) budgets to incorporate into their habit(at)s, is itself a way of designing something already in the world out of existence. This is not really what Schumpeter famously called 'creative destruction.' That notion refers more to the innovation opportunities that come from moments of widespread

destruction. In the original Marxist formulation, the economic system appears to inevitably go through moments of destructive crisis from which capitalists always stand to benefit, despite initial appearances of wealth devaluation. In the neoliberal reformulation, companies should occasionally welcome if not initiate moments of destructive chaos in order to stimulate innovation. But what I am talking about here is the reverse: the situation in which (prior) innovation is (then) destructive.

To understand this point, it must be remembered that no product is an island. Every product exists within artificial ecosystems.[9] There are the infrastructures with which any product must connect (e.g., electricity outlets; water faucets and drains, etc); there are the contiguous products required for most products to function (e.g., a toaster needs bread, and butter and jam, and knives and plates; a printer needs paper and toner and a computer, etc); and then there are the other products that make up the environment in which that product makes sense (e.g., a refrigerator, filled with food, exists in kitchen, a place with the kinds of products and décor that orient us toward it as appropriate for meal preparation).

When a new product is designed, it must negotiate that ecosystem. It could just try to find a way of being one more thing in its designated ecosystem, or perhaps something that can seamlessly replace just one of the things in that ecosystem. But if the design is of any significant value it will alter that ecosystem and/or the practices involved in that ecosystem. Work on 'value constellations,' from handles-and-razorblade systems to digital-mobile product-service-systems, indicates that design innovation can involve interventions into whole networks of products. These appear often to be merely attempted monopolistic extensions, but from the designers' perspective they are justified as ways of ensuring the kinds of interaction experience the designer intends, a total design of the product-in-its-ecosystem which then includes streamlined habits-of-its-user. The point here is that designers engage in creation by destroying whole systems of existing products when they can, in order to limit the possibility for unanticipated product contexts and uses.

Given the extent of all this destruction involved in designing, you could argue that sustainable design regulations do not yet go far enough. In European contexts, it has become acceptable to require that designers design for the end-of-life of what they design. Extended Producer Responsibility names the reverse logistic schemes that manufacturers must put in place to take-back their products from consumers at the conclusion of their use-lives to avoid those products ending up in landfill. With the prospect of all that they produce and sell returning to them, manufacturers are 'designing for disassembly' to allow component and material recovery, ensuring that what they create is not merely destroyed once its utility has been exhausted. These 'closed loop' economies originate from waste prevention imperatives. But in that case, this same 'future perfect tense' logic should apply prospectively to all that designers will – 'simple future tense' – turn into waste through their innovations. It is not just their own product's future that designers should be made responsible for, but also for all the present products that be will displaced into trash cans by that product's entry into households or workplaces.

Enabling Value

So designers do a lot of material destroying on their way to being creative. But there is obviously another side to this equation, the value of what is created out of this sacrificial destruction. Tony Fry's design ethic becomes: is what you make worth what you will have destroyed to make it and have it taken up in the world?

Designers, as opposed to, say, artists, aim not at creating artifacts as ends unto themselves, but instead artifacts-as-means. Judging the value of a design means judging the value of what it enables more than the artifact itself, what is done with the thing rather than the thing itself.

This asymmetry, between destroyed materials and created activities, makes the equation very difficult to apply. Is a 100 year old tree, and all the associated flora and fauna impacted by the creation of a table from that tree, worth all the family meals that are less easy to have without that table (and therefore perhaps less likely to happen over time)? Should it be that that table must enable at least 100 years' worth of meals (which makes it an heirloom that must pass between generations)?

But before getting to these calcuations, it must be acknowledged that there is further destruction even on this creative value side of the equation. Designs, as opposed to the inventions of technologists perhaps, are not neutral instruments. Artifacts are given designs, designed forms and functions, to make use of those instruments (or communications or built environments) easier, more productive or more enjoyable. By achieving these qualities, the resulting affordances make use more likely.[10] As mentioned above, this 'orienting-toward' that good design achieves will always be at the price of whatever else is, by comparison, no longer so easy, or productive or enjoyable.

Design then not only gets users to attend-away-from (in Michael Polanyi's sense[11]) the present-at-hand (in Martin Heidegger's sense[12]) features of the thing that has been created, but also focus the attention of the user toward certain kinds of experiences or activities, before which the design withdraws into ready-to-handedness. Don Ihde's formulation is most appropriate in relation to our dialectic of creation and destruction: designs mediate our engagements with the world, in each case amplifying certain aspects of the world, but only ever by reducing the world we are then experiencing at that time to those activities. Ihde's example is quite pointed: the periodontal probe which channels all the dentist's perceptual world into the tip of the hooked needle with which he or she feels for cavities in teeth.[13] In this sense, designs create the possibility of certain ways of being in the world, but only by destroying, or, less dramatically, backgrounding, other experiences of the world. Designs free us to do things by freeing us from other worldly noise or burdens.

In this way, the value of designs lie in the new habits they create. And having been habituated to the freed-up, or well-disposed world that a design in one domain enables, invariably those now ratcheded-up expectations get transferred to other domains. Norms of convenience made possible by the destructive creation of one design, are transposed to other contexts as a driver of more destructively creative designing: why is this phone slower than

my laptop; my clothes washing is a one-button-press system, so should my car be; I can multi-task at the café so why is there no wifi in this theater?

This orienting power, this capacity of designs to dispose us toward certain activities and qualities of experience, and thereby dispose of – i.e., get rid of, at least temporarily – other activities and experiences, is the source of longstanding fights about design and the politics of artifacts. Plato will worry that writing disables our memory; puritans will insist that labor-saving devices do away with the suffering that a god intended for our worldly existence; educators claim television deforms the brains of the young; designers lose their capacity to craft when using only digital tools; etc.

Obviously one can and should argue about the extent to which, in each of these cases, actual destruction is occurring. Good designs are persuasive, but as we hopefully learned from the failure of modernism, they are not determining. Even for more closed use-scripts, there are still work-arounds and hacks. And if skills, or activities, or approaches to the world are designed away from, that does not mean that they are then unrecoverable. People can, for socio-political reasons voluntaristically de-ratchet expectations and re-skill – consider the Transition Town movement for instance.[14] Nevertheless, the point here is that at the very heart of the value that designers create with their designs, enabling people to accomplish any number of things, there is a destructiveness, a decision to promote through materialized supports certain kinds of being-in-the-world. As Tony Fry has again usefully identified, design futures; it makes certain futures materially possible and likely. But in so doing it can defuture, limiting the number of futures we have now, and limiting the quality and quantity of the futures of those futures.[15]

I hope it is now clear the extent to which all design involves destruction – material and cultural. Designers seem insufficiently aware of this aspect of their practice. In many ways it is shocking that the extent to which they have not to date seen this as the very source of their power as value creators. It is therefore no wonder that the value of using this aspect of their practice more directly, to deliberately eliminate some products, and so the practices they sustain/enable/promote, is not widely sensed.

What to Destroy

But if not done as part of a larger project of creating, why seek to just destroy? I indicated at the outset, that a general reason concerns the fact that at the moment design has habituated us to living with too much stuff. Most of that stuff continues to destroy other stuff by being energy consuming, if not literally requiring other resources – toner and paper for a printer, fertilizer and pesticide for lawns, deodorizer and stain remover for the carpet. Often, previous products are considerably less efficient than more current models. In these cases there is a straightforward calculation that can be made as to when there are net reductions in resource destruction associated with replacing in-use models with newly created more-efficient-to-use

ones: always-on household items like refrigerators for example should, on current efficiency improvement trends, be replaced at least every 8 years (well before their functional use-life ends)[16] – hence government schemes that offer encouraging rebates ('cash for clunkers'). 'As soon as possible' is the feeling on getting rid of incandescent light bulbs in place of compact fluorescents or now LEDs.

In some cases, products have been made parts of artificial ecosystems without sufficient analysis of their ongoing ecological impacts: carpets for instance, are not only in almost all cases toxic to produce and dispose of, but off-gas chemicals that cause sick-building syndrome at room temperature (especially in buildings sealed to create more efficient HVAC systems), and further, become traps for walked-in toxins, such as the pesticide on the lawns we just mentioned. Carpets make houses soft and warm to walk on,[17] but there is much under-acknowledged cost to this perhaps relatively small gain. Carpets then (as opposed to rugs) could be targets for elimination design.

The general point is that just because something exists does not mean that there has been a well-thought-through evaluation of whether the value it creates is worth what it destroys. Leaf blowers, for example – a good instance of what Umair Haque calls an unnovation.[18] Of course, one would have to argue each case.

If blanket annihilation is too much, James Pierce points out that the decision could merely be about restricted use, deploying the design of affordances in reverse, to make use more effortful (what Pierce calls displacement) or restricted to certain times and places (inhibition).[19] To some extent, promoting these sorts of conversations – about what deserves to exist or not in our societies, and if so, when and where, and for who and how easily, as opposed to what the market system is able to just make available to our societies – is exactly the point of contemplating elimination design.

Ways to Kill a Design in Use

So, let us say that a consensus has been reached to remove some particular design from being used. If a designer decides to use deliberately and explicitly the destructive side of her/his creative process to that end, how easy is it to accomplish? I will run through 4 design discipline specific strategies for undertaking elimination design.

Vilify (Communication Design)

Communication Design ordinarily tries to promote ideas by making
a) what is invisible about that idea more visible (e.g., illustration),
b) those ideas more readily understandable (e.g., information design), or
c) by associating them with other ideas that a target group values (e.g., branding)
Each of these strategies can be used negatively: to expose the hidden ecological destruction involved in a particular design; to make the value creation deficit behind that destruction immediately apparent; and to associate the design and its ecosystem or use with things that a target group disapproves. The overall intention would be to encourage a target group to want to dissociate themselves from a particular product. The designing in this case is not directly

doing the eliminating, but instead creating the conditions in which elimination would be tolerated, or even assisted.

Interestingly, communication design in relation to sustainability is often challenged by specifying what it is that is that it is advocating: what a sustainable future would look like is difficult to decide, but without such a vision, sustainability remains abstract and no clear immediate action is able to be promoted. In the elimination version of the sustainable design brief, the messaging is allowed to remain purely negative. The focus can remain merely on what should not be. Obviously, in line with the creation/destruction dialectic I have been presenting, persuasive presentations of desirably sustainable ways of living and working without the presence of certain targeted products could also act as elimination design strategies. The point however is that 'negative advertising' would also be productive (or 'reproductive' to recall Manzini's point cited at the outset of this chapter).

It should be noted that what I am suggesting goes to the heart of the matter with which I began: that design presents itself as a creative practice. Even though the process of design is essentially structured around criticism – the constant micro-critique of reflection-in-action – designers are not satisfied with being merely critical. This perhaps explains why, ironically, design criticism remains, relative to the academic and popular criticism of other creative industries, immature and marginal.

Consequently, eliminative communication design is not merely a formal activity. It is inseparable from content generation – namely, being critical of existing designs. Or to put it the other way around, eliminative communication design is a form of activist design criticism. Not content with merely pointing out verbally the flaws of this or that design, eliminative design criticism takes up the tools of communication design to give its criticism force, visualizing in affective ways why this or that product is not only deserving of strong critique, but even deserving of elimination.

An intriguing version of this is what Tony Fry and Anne-Marie Willis once called 'Prefigurative Criticism.'[20] In this practice, the intention is not to eliminate an existing product, but instead to eliminate a coming product. If successful, this intervention would eliminate future destruction caused by the arrival of that product. Because it is futural, it can only be a communication design project. Prefigurative Criticism happens by taking sketches and prototypes of what the product would be and situating them in an undesirable context. Done well, the product becomes associated with those negative values before those producing the product have had the chance to positively brand it. As I write, Apple is promoting its new "Mac Pro" desktop computer. The product will only be available later this year, so only images of its black cylindrical form exist at the moment. This affords a prefigurative design opportunity to associate this new product form with the ecological destructiveness of its manufacture, and so eliminate some of the scale of subsequent runs of this product.

Replace (Product Design)

It may seem nonsensical to contemplate eliminating products by designing products, but I

argued earlier that the introduction of new products leads to the destruction of existing products. Sustainable Design has to date been the strategy of replacing existing toxic or inefficient products with 'greener' alternatives. Of course, much of the problem there was that apart from being 'greener,' the products rarely showed other, more significant, 'comparative advantages,' as Rogers famously specified is required for The Diffusion of Innovations,[21] and consequently failed to displace existing products.

Ideally, elimination by design involves a net reduction in materials intensity by one new product eliminating two or more existing products. This requires 'convergent design,' a notoriously difficult thing to accomplish. Donald Norman famously illustrates unusable design with a concept for a multimedia unit,[22] the principle in interaction design at the time being that every new function a device can accomplish requires either yet another unique button or another click in a complex menu tree.

Since Norman gave that example, there have been a series of quantum shifts in digital design. Processing speeds and memory sizes, as well as the associated quality of hardware, such as screens and speakers have increased exponentially. This has allowed the nature of interaction with digital devices to draw on a more diverse palette than dedicated buttons, multiple clicks or keyboards. Tangible interactions plus the capacity of devices to be more situationally-aware, as well as just the maturation of the practice of interaction design, have made negotiating function convergence much easier. Digital devices can now accomplish a wide variety of activities, each done with levels of quality that were previously only possible through dedicated devices. There is therefore, in most cases, no loss of 'comparative advantage' in listening to music and reading e-books on the same device on which I do my emailing and phoning, for instance. Finally, as was noted above with respect to the ratchet effect, being able to do many things on one device becomes a normative expectation, not least so that less needs to be carried when living a harriedly mobile life.

There is an interesting limit to convergence though. Recent work on 'social practice theory' suggests that we humans tend to chunk activities into discrete 'practices,' which comprise constellations of devices, skills and meanings.[23] Laundering and commuting and preparing a meal and doing some exercise are able to be done in only ever semiconscious ways because of the distributed intelligence possible when they are handled through distinct work environments with a distinctly regulatable rhythms – what Theodore Schatzki calls the 'timespace' of a practice.[24] This suggests that humans still cope with everyday life by having one set of things per each major activity. Convergent digital design recognizes this when devices allow apps for particular actions to take over the whole interface, orienting the use to that appropriately focused virtual environment.

Another aspect of digital devices that facilitates elimination is the decouplability of the service the device provides from any particular device. The immaterial quality of information and communication and the pervasiveness of cloud-based data mean that what is 'me' about a device does not reside in the physical qualities of a device. I can drop my iphone in the toilet and get a replacement one with a seamless transition because 'I' can be quickly re-

installed. On the one hand, this allows a certain class of physical products to be eliminated via convergence, again with out comparative advantange loss; but on the other hand, this also clearly allows the proliferation of things – whether diversifying 'me' onto a range of screen-sized devices, or cycling rapidly through one season's devices to the next.

Nevertheless, this substitutability as affording elimination goes in the opposite direction to the other dominant form of sustainable design – product use life extension. Designing products so that they last longer is another indirect form of elimination design, in this case eliminating the need for subsequent replacements. 'Heirlooming' is also difficult because it combines an engineering expertise (in terms of design for reliability, maintainability, repairability, upgradability) and a sociopsychological expertise (understanding 'product attachment' – how and why people value a product enough to sustain its use).[25] There are also economic issues – understanding the upfront capital costs compared with whole-of-life-operating costs.

Finally – and somewhat picking up on this economic issue – a product can be eliminated by another product within that product. What I mean is when the component and/or material within a product becomes more valuable than the original product. People will eliminate a ring from their life for the cash value of the gold that can be resold to become someone else's more valuable ring. This becomes a product design strategy when products are designed in ways that facilitates post-use-life component and materials recovery.

Restructure (Built Environment Design)
Ursula Tischner, sustainable design researcher and practitioner, once collaborated with Friedrich Schmidt-Bleek, founder of the Factor 10 Club which advocated for a 90% reduction in the developed nation materials intensity, to develop a concept for a refrigerator with one tenth the lifetime material usage of a conventional refrigerator.[26] To accomplish what is essentially an elimination design challenge, Tischner proposed what was in essence a return of the cool room. This space, built into a building's internal structure, would be already cool as a result of the building's thermal mass, and therefore do away with a refrigerator's need for insulated sides and doors. An occupant would need only have some lightweight removable shelving and a small portable refrigerant-compressor to lower the temperature of some shelf units more than others. With this example, it becomes possible to see that products can be eliminated by 'built-ins.' A city can eliminate the need for umbrellas with covered sidewalks, or winter coats with underground passageways between buildings. Public transport systems eliminate cars.

A rich example is Dolores Hayden's history of what she calls 'material feminists' at the end of the 19th century in North America.[27] These activists envisioned emerging urban density coupled with steam-powered industrialization as affording the socialization of women's domestic labor. As Hayden documents, these women recognized that capitalizing on these opportunities required architectural innovations: new kinds of kitchenless apartments with access to shared dining, laundering and childcare services. Women could be liberated from atomized domesticity, and all the products associated with that oppression eliminated, by

structuring into our urban landscapes collective domestic economies. Apart from some socialist, and sometimes religious, experiments, these designs were not realized – though a legacy of these times persists in the form of serviced apartments. Cities that developed before more suburban single-family forms were instituted into the design of highrises continue to do a kind of elimination designing – a majority of apartments in New York City to this day do not have the room or infrastructure for in-apartment laundering, effectively eliminating domestic washing machines from many areas of the metropolis. But as this example indicates, eliminating one kind of product institutes another, in this case commercial laundry facilities (though this equipment tends to be more efficient and longer lasting). As Jan Gehl famously quipped, small refrigerators – in apartments that eliminate the possibility of large refrigerators – make for walkable citie, because people must shop more often, driving the demand for closer-by fresh food provisioning. But the latter will require more pop-up stall facilities for farmers markets and an increased number of trucks rattling into the city each day.

Architectural scale design might have significant elimination potential, but it has limited practicability. Buildings are expensive to build, especially in cramped cities; and the people who live in existing buildings must be displaced while rebuilding occurs. Consider for example trying to eliminate inefficient window box air conditioners that are pervasive in New York City. The architectural strategy would be an HVAC system with opportunities for significantly increased efficiencies. However, retrofitting the number of buildings in New York City that are without building-scale cooling services would involve effectively depopulating for a period whole boroughs. As Hommels has noted, cities are obdurate when it comes to 'unbuilding,' not just in terms of their materiality, but also socially.[28]

Disown (Service Design)

Elimination design can aim to be absolute – a whole category of thing is eradicated from our societies – or it can be relative – reducing the overall number of those things in our societies significantly. The most straightforward example is sharing: in theory there should be as many less of a product that is shared as the number of people making shared use of it.

When European Union pursued dematerialization as a sustainable research topic, case studies were done of 'functional sales,' where businesses sell the use of a product (leasing (rented washing machine) or pooled resources (laundromat)), or better, the results of expert use of a product (laundry services).[29] One of the findings of this kind of work was that whilst there are some product design aspects to transitioning to such business models – it is comparatively rare that products have been designed for use by multiple users; the standard use case is the single owner-operator – the focus should instead be on the relatively new practice of 'service design.' Being prepared to eliminate (the need for) ownership of product, at least with respect to the 'no comparative disadvantage' innovation diffusion measure I have been using, means that access to the appropriate product when needed must be the focused-on outcome of the system. Often in the promotion of 'collaborative consumption' or 'product-service systems,' there is talk of functional equivalency: "you don't need a car, you need mobility; 95% of the time your car is idle." Whilst it may be idle, it is not doing

nothing; it is being-available-for-you. Consequently, the functional equivalent of owning a car is not mobility, but 'wheels when you want them' (the registered tagline of Zipcar), both regularly, but also occasionally at short notice. The latter requires a sophisticated infrastructure and a flexible system, things that are most effectively (if not cost efficiently) provided by people – i.e., service workers in a well service-designed system.

Importantly, this observation draws attention to the historical fact that the rise of consumer capitalism over the 20th century was driven by households switching their modes of resourcing from people to things. Appliances eliminated servants; video recorders eliminated theater ticket collectors and popcorn vendors; microwave ovens eliminate late night sittings at restaurants; etc. To engage in elimination-oriented service design is to try to reverse this trend, returning customers to people-based systems of need provision.

Again, the challenge, in terms of ecological but also economic sustainability, is to deliver a system of access to a product that does not drive up the need for other kinds of products to sustain that access – smart phones, databases on servers, a well-distributed and maintained fleet. Obviously, as with Borges' map, the most convenient service system for a product would have the same distribution scale as owned products. So product elimination by service design always requires a modification to expectations, or rather new kinds of benefits that cannot be disadvantageously compared to the benefits provided by an owned product. It's not just car share mobility is cheaper than the operating costs associated with an owned vehicle, but rather that the service design of car share allows you to go places, meet people and/or have experiences you just couldn't or wouldn't otherwise.

I began with what I hoped was a shocking proposition, that designers (under instruction from their Design Studies mentors) can and should engage in destruction rather than creation. As we have proceeded however, I suspect that this has transformed into a very mundane proposition. Far from an act of terrorism, eliminative destruction lies at the very heart of the design process, though under-acknowledged. When it is foregrounded and undertaken as the prime objective of designing, it looks like only a minor variation on communication, product, built environment and service design.

There is much more to say about what designs the elimination of designs – policies and demographics for example. But for all its prosaicness it should not be forgotten what is stake. Not just at the global level of unsustainable materials intensity, but even just at the personal level. It is one thing to know or feel the need to throw something away. It is another to do it – as all the devices and trinkets sitting in unopened draws in every household attest.

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[1] Republished in Richard Buchanan & Victor Margolin eds *Discovering Design*, Chicago: University of Chicago Press, 1995.

[2] *Design Futuring* Berg, 2010

[3] According to Aristotle, despite the fact that materials have agency enough to be considered one of the four causes of any product of *techne*, the key difference between a tree and table is that the tree can (re)produce itself and so keeps becoming what it is, whereas a table must be produced by some thing (the efficient cause, the human) other than itself, and stops becoming once the final form has been 'finished.' In other words, killing natural resources is essential to making things that stay as we designers intend them to (which of course they do not, because being dead is still an entropic process of decay and dispersement).

[4] This is somewhat exaggerated. In the case of lumber, branches and leaves can be composted to assist the growing of other plants; sawdust from mills is often combusted to generate the heat used to season timber.

[5] "MIPS and Ecological Rucksacks in Designing the Future" *Environmentally Conscious Design and Inverse Manufacturing, 2001. Proceedings EcoDesign 2001: Second International Symposium*.

[6] This is the famous claim in the opening paragraph of *Design for the Real World* New York, Pantheon, 1971.

[7] "Disposability, Graphic Design, Waste and Style" in Michael Bierut ed *Looking Closer: Critical Writings on Graphic Design – Volume 1*, New York, Skyhorse, 1994

[8] Though Mika Pantzar's account of 'The Ecology of Goods' describes 'predator-prey' relations between products, where one requires the continued existence of the other with which it is competing, for symbolic differentiation for example. Like a Veblenian Good. "Do Commodities Reproduce themselves through Human Beings? Toward an Ecology of Goods" *World Futures* Vol.38, No.4, 1993.

[9] This point is also made by Pantzar cited in the previous note, but related is Jodi Forlizzi's notion of a "product ecology" (see "Product Ecology: Understanding Social Product Use and Supporting Design Culture" *Interaction Institute Paper 35* (2007) – http://repository.cmu.edu/hcii/35), and Erik Stolterman and colleagues' notion of a "device landscape" (see Erik Stolterman, Heekyoung Jung, Will Ryan & Marty Siegel "Device Landscapes: A New Challenge to Interaction Design and HCI Research" *Journal of Korean Society of Design Research* Vol.26 No.2 (2013)).

[10] In fact, designing affordances is itself a matter of creative reinforcement or destructive innovation: should an interaction make use of existing conventions, whether habitual actions, symbol conventions, expected feedback or perceptual saliences; or can the designer boldly create new types of interactions – thereby destroying existing ones?

[11] This opposition, between attending-toward as always also an attending-from, is in Michael Polanyi's *The Tacit Dimension* London, Routledge, 1966.

[12] The opposition between ready-to-hand – the hammer withdrawn into the act of hammering – and present-at-hand – the broken hammer now manifest as wood and stone – is in Division of I of *Being and Time* (1927), but particularly see Graham Harman *Tool Being* Chicago, Open Court, 2002.

[13] The dental probe example is in Don Ihde *Technics and Praxis* Dordrecht: D. Reidel Publishing Company, 1979.

[14] See for example Rob Hopkins *The Transition Handbook: From Oil Dependence to Local Resilience* London, Chelsea Green Publishing, 2008

[15] In addition to *Design Futuring* cited in note 2, see also the earlier account of the way the history of 20th Century design as destruction of possible futures as result of what those modernist designs designed: *A New Design Philosophy: An Introduction to Defuturing* Sydney, UNSW Press, 1999.

[16] See for instance Nicola Morelli "Technical Innovation and Resource Efficiency: A Model for Australian Household Appliances" *Journal of Sustainable Product Design* Vol.1 (2001). However, Tim Cooper notes in his introduction to *Longer Lasting Products: Alternatives to the Throwaway Society* Burlington, Ashgate, 2010, that the latest appliances, while more energy efficient in core components, often are not overall more energy efficient due to increased features, size, etc; and in addition newer appliances, as we have discussed, tend to also require other newer products in their 'device landscape,' so the embodied energy involved is not just that of the product itself.

[17] Though, carpeting a well-oriented thermal mass can destroy its passive solar capacities.

[18] "Is your Innovation really an Unnovation?" *Harvard Business Review Blog Network* May 27, 2009 - http://blogs.hbr.org/haque/2009/05/unnovation.html.

[19] James Pierce "Undesigning Technology: Considering the Negation of Design by Design" *Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems* (CHI '12).

[20] The following is based on an unpublished paper on "Prefigurative Criticism" from the early 1990s by Tony Fry and Anne-Marie Willis. That paper extracted a generalizable method from a critical project entitled Towers of Torture in which a series of artists were commissioned to create sculptures that would associate models of a building an Australian multi-millionaire planned to build in Sydney with his investments in Argentinian telecommunications companies known at the time to be assisting the government with police state activities. When it was exposed that the multi-millionaire had asked the University of Sydney, where the exhibition was being held, to be shut down, the project received widespread media attention. The multi-millionaire never built that building and was later jailed for corruption.

[21] Everett Rogers *Diffusion of Innovations* 5th Edition, New York, Free Press, 2003.

[22] Donald Norman *The Design of Everyday Things* New York, Basic Books, 2002, p32.

[23] For a survey with some reference to sustainable design see Elizabeth Shove, Mika Pantzar and Matt Watson *The Dynamics of Social Practice* London: Sage, 2012.

[24] Theodore Schatzki *The Timespace of Human Activity: On Performance, Society and History as Indeterminate Teleological Events* New York, Rowman & Littlefield, 2010.

[25] See the publications associated with the 'Eternally Yours' project: *Time in Design: Product Value Sustenance* Rotterdam, 010 Publishers, 2004.

[26] See the account of the FRIA concept in Ursula Tischner and Martin Charter's chapter "Sustainable Product Design" in Martin Charter and Ursula Tischner eds *Sustainable Solutions: Developing Products and Services for the Future* Sheffield: Greenleaf, 2001.

[27] Dolores Hayden *The Grand Domestic Revolution: A History of Feminist Designs for Homes, Neighborhoods and Cities* Cambridge, MIT, 1982.

[28] Anique Hommels *Unbuilding Cities: Obduracy in Urban Sociotechnical Change* Cambridge, MIT, 2008.

[29] See for example Arnold Tukker & Ursula Tischner eds *New Business for Old Europe: Product-Service Development, Competitiveness and Sustainability* Sheffield, Greenleaf, 2006.