

**THE WORLD HAS ALWAYS
BEEN AN INTERNET OF
THINGS.**



**INTRODUCING A MINDSET
FOR DESIGNERS IN THE
ANTHROPOCENE.**

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DESIGNERS IN THE ANTHROPOCENE.**

William Fairbrother
MA Information Experience Design
2014
8,352 words

Abstract

In a world increasingly obsessed with virtual connections, this study considers how we have always related to things in an analogue way. Recognising the success of postdisciplinary approaches to research, it mobilises theory from a mixture of disciplines. Four separate — but connected — frameworks are introduced with which to view human-thing relations (technological, metaphorical, biographical, and processual) and it is shown that a mindset founded on a meshwork analogy can be mobilised by artists and designers to address issues of sustainability in conjunction with the Anthropocene thesis.

Keywords: Anthropocene, postdisciplinary, mindset, things, mesh.

Acknowledgments

I would like to acknowledge the support of Monika Parrinder who supervised this investigation; for her patience and stimulating conversation. I would also like to acknowledge the efforts of Kevin Walker in establishing a course that continues to question the relationship between design and research. He has built the house where this text lives.

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**WHAT MAKES US
HUMAN IS MAKING
THINGS, AND THEN
COMING TO DEPEND
ON THINGS.**

NEIL MACGREGOR
DIRECTOR OF BRITISH MUSEUM

1 Introduction

Modern life is far different to that of early hominins 2.4 million years ago in the Palaeolithic. We spend most of our days interfacing with content on flat touch screens whereas our ancestors would have interfaced with vast distances of land to forage for food. This shift in behaviour can be explained by considering how we came to make things and become reliant on them. Invisible to us, the things we use everyday rely on a support network of many other things to function properly. The touchscreen we interface with is far removed through a chain of many things from the natural fossil fuels that power the electricity turbines allowing the data centres to function. This complexity also exists within the things themselves. Unlike the chopping tool from Olduvai Gorge, Tanzania (see cover photo), a singular lump of basalt, the things we own now are assemblages of things in their own right. A mobile phone consists of (among other things) a processor, camera lens, and touch screen, each of which were created through many complex processes from their natural materials. While the so-called "Internet of Things" is still in its infancy, the world has always been an internet of things. Instead of fascinating with future developments, why not take time to realise how we are enmeshed with the world in a messy and analogue way.

We have carved out a *technosphere* that interfaces, or rather defaces, the *biosphere*. Observing this, researcher Eugene F. Stoermer in the 1980s coined the term Anthropocene to define a new geological epoch, one where humans are considered a geological force on the planet¹. Although it is generally accepted that the Anthropocene is dated from the Industrial Revolution², the behaviour that caused processes of mass production and consumption began when we started making things some 2.4 million years ago. Post-processual archaeologist Ian Hodder has recently popularised a framework

¹ Term later popularised with Paul Crutzen in 2000 in IGBP Newsletter 41.

² Paul J. Crutzen, "Geology of Mankind," Nature 415, no. 6867 (2002).

called *entanglements*³ which recognises the relations between humans and things in this way. It can be used to validate a thesis of the Anthropocene and it is obvious that through our increasingly complex entanglements with things, we have distanced ourselves from the natural world and consequently behaved ignorantly towards it. There now exist such complex entanglements between things that no simple or easy solution to the problems of the Anthropocene presents itself. Due to its changeability, searching for a finite solution is foolish. Altering our relationship with the world is necessarily a gradual and ongoing process which must start with a change of mindset. Just as studying celestial bodies decentred humanity from the exclusive position it deemed itself to occupy at the heart of the universe, and a study of our relations with non-human entities will establish a new reflexive⁴ world view that takes account of the causal properties of things.

Although we see rudimentary tool use across the animal kingdom, man's ability to develop things, processes and actions as means to conscious ends is unique. Prehistoric archaeologist Robert Bednarik⁵ suggests we learnt to do this during the Palaeolithic by breaking apart from normal evolutionary progression to an alternative teleological one. We became able to construct our own ecological niches to fill to a greater extent than any other creature on earth⁶. In simpler terms, this is the period in human history when man became a designer. Designing and making things has caused humans to get into the trouble they are in and I posit that designers may also be at

³ Ian Hodder, *Entangled: An Archaeology of the Relationships between Humans and Things* (John Wiley & Sons, 2012).

⁴ The principle of reflexivity was established by the sociologist William Thomas in 1923 as the Thomas theorem: that 'the situations that men define as true, become true for them.'

⁵ Robert G. Bednarik, "Exograms," *Rock Art Research* 31, no. 1 (2014).

⁶ Jeremy Kendal, Jamshid J Tehrani, and John Odling-Smee, "Human Niche Construction in Interdisciplinary Focus," *Philosophical Transactions of the Royal Society B: Biological Sciences* 366, no. 1566 (2011).

the forefront to help get us out of it. The same relational theory that explains how we became entangled with things will be used by artists and designers to address issues in the Anthropocene. Science communicator Carl Sagan believed the increasing awareness of non-human things and our relation to them in the scientific world represents an increasing pressure on us to become integrated into more biodiverse, energetically stable ecosystems. By implementing this new mindset within critical art and design practices, practitioners should be more environmentally aware and create products or experiences to bring attention to the Anthropocene thesis. This endeavour is a reflexive one. By scrutinising the origins of our behaviour we can engage with the subtleties of it and make informed decisions to affect it in the future.

One key problem in this mission is that of scale. The Anthropocene is typified by *hyperobjects*⁷ that exist encompassing the globe: massive, sprawling and intangible. These things are massively distributed in time and space relative to humans so as to be almost invisible to us. These include global warming, the Internet, Styrofoam. We can only get a picture of them through measurements and approximation and only encounter parts of them: we can see rain but not global warming, a blog but not the Internet. Considering emergence in complex systems science, we recognise that complexity arises from basic interactions⁸. Therefore, understanding the ways we fundamentally relate to things enables an understanding of the basic elements that give rise to the complexity we experience. Also, due to the rule of reciprocity, the human can interact directly only with systems his own size⁹. Therefore, this is a human-scale study recognising relations at the intimate level of man and thing. It

⁷ Timothy Morton, *Hyperobjects: Philosophy and Ecology after the End of the World*, Posthumanities Series (University of Minnesota Press, 2013).

⁸ Vlieg, "Complexity from Simplicity," *Nature* 340, no. 6134 (2013).

⁹ Peter Haff, "Humans and Technology in the Anthropocene: Six Rules," *The Anthropocene Review*, (2014).

recognises too that designers, generally, are looking to create things or experiences that work at this scale. Since small perturbations can have great, unforeseen and indirect consequences throughout a complex system, it is hoped that through the creation of meaningful experiences, the artist or designer may be successful in the task of raising awareness of the Anthropocene.

2 Methodology

A number of academic theories have been mobilised here and it is hoped that a superposition of these will be where this post disciplinary mindset will be located. It may seem like a messy or nonspecific approach to a dissertation, especially considering the different opposing ontologies, vocabularies and traditions between disciplines, but this deliberate. A general approach places disciplines close to one another in hope that there may be a reaction between them, a new product or idea. He who works in the space in between subjects acts like a catalyst to encourage new practices. It is experimental in this way and a bit like alchemy, which is the old science of struggling with materials and not quite understanding what is happening¹⁰. This serendipitous methodology is important.

In the age of specialism, we must acknowledge the benefits of generalists. They ask unasked questions, connect dots and understand humanity and life's many interrelationships¹¹. Indeed it is only with a general and postdisciplinary approach that we can study topics like complex systems and our entanglements with things. Nobel prize winner of physics, Murray Gell-Mann says that the network of relationships linking the human race to itself and to the rest of the biosphere is so complex that all aspects affect all others to an extraordinary degree. He says that someone should be studying the whole system, however crudely that has to be done, because no gluing together of partial studies of a complex nonlinear system can give a good idea of the behaviour of the whole.

Peter F. Drucker warned many years ago that the most dangerous thing in times of turbulence and change is not the change itself, but to operate with yesterday's logic. Therefore, the mindset here is

¹⁰ James Elkins, *What Painting Is* (London: Routledge, 2000).

¹¹ Steve Hardy, "What Specifically Do Generalists Do?," in *Creative Generalist* (2008).

product of recent research in the most part: postcognitivism, complex systems science, nonanthropocentric approaches to social sciences; object-oriented philosophies and bio-ecological thinking. It will also be shown however that although these research areas are topical, they have roots at the fringes of other established disciplines.

It is interesting that the theories being employed here are particularly related to the disciplines of psychology and ecology; the relation between man, his mind and the physical world around him. Sociologist Michel Callon¹² studied the relation between scallops and fisherman (nature and man) which fed into the development of Actor-Network Theory, J.J. Gibson took an ecological approach when devising his theory of *affordances*¹³, and Dewey¹⁴ had interests in biology and psychology when he wrote about *Art as Experience*. Indeed most cyberneticians looked to biological processes to devise their ideas about complex systems. For example, Maturana and Varela's study of autopoietic systems¹⁵. These individuals were not ecologists in their own right, but were interested in man's relation to the ecological environment. In relation to hyperobjects and the Anthropocene, these topics have once again come to fruition and are to be integrated within the mindset promoted here.

In using a postdisciplinary methodology, it is hoped that long-standing dialectics will be dissolved. In the content of the discussion,

¹² Michel Callon, "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay," in *Power, Action and Belief: A New Sociology of Knowledge*, ed. John Law (London: Routledge & Kegan Paul, 1986).

¹³ James J. Gibson, "The Theory of Affordances," in *Perceiving, Acting, and Knowing*, ed. Robert Shaw and John Bransford (1977).

¹⁴ John Dewey, *Art as Experience* (New York: Minton, Balch & Company, 1934).

¹⁵ Humberto Maturana and Francisco Varela, *Autopoiesis and Cognition: The Realisation of the Living*, Boston Studies in the Philosophy and History of Science (Springer, 1980).

these include nature/culture, mind/body, subject/object, internalisation/externalisation. But in the general approach to the study, we hope to excavate underneath the divides between science/art, academia/design, and expose their commonalities. They both interface with the same world and in most cases material things are given primacy in their practices. In recent years there has been the emergence of new art/design courses that offer students a theoretical underpinning centred on philosophical or critical standpoints rather than education in a specified medium or craft such as furniture design. The Information Experience Design course at the Royal College of Art and the Design course at Goldsmiths in London are outstanding examples of this that interface design with research and critical thinking. Conversely, in the study of material culture by traditional academics, there is evidence of artistic practices being used alongside text-based research. For example, connections with the vibrant art and cultural milieu of New York City allowed social scientists such as Ruth Benedict, Gregory Bateson, Margaret Mead, Mary Douglas and Colin Turnbull to experiment with film and photography and partake in museum curation projects and research collaborations. These sorts of behaviour are promoted by this mindset.

The following text is broken up into four sections each considering a mechanism by which we are related to things from a range of theoretical positions. First, our relation with **technology**, how it is inherently part of being human and how it is an extension of the self. Second, the role of things in manipulating our mindset in association with **metaphor**. Third, how constructing **biographies** of things can be a way to study humans and things in similar terms. Fourth, a conception of the world as a complex of **processes** rather than of discrete readymade things. Within each part is stressed how theory can be utilised by designers in the Anthropocene to raise awareness of it and establish more sustainable practices. A final conclusion chapter will rearticulate the mindset.

**EVERYTHING IS
BASED ON
COMPUTERS - OUR
WHOLE ECONOMY,
AND MOST OF OUR
CREATIVE PURSUITS
AS WELL. WE'RE NOT
PHYSICALLY
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BUT THAT DOESN'T
MEAN THEY'RE NOT
PART OF OUR BRAINS.**

APHEX TWIN
MUSICIAN

3 Technology

Developing technology is quintessentially human. Like a prosthesis, it becomes an extension of our self giving us abilities beyond our biological limits. In the words of media critic Marshall McLuhan¹⁶, “any invention or technology is an extension or self-amputation of our physical bodies”. Creating tools has allowed us to manipulate our environments in complex ways, to construct our own ecological niches to fill. This is the behaviour that characterises the Anthropocene, it has enabled us to become a geological force outright. Using a theory of extended mind, this chapter will demonstrate how the human is deeply integrated with his environment through technology and that using it sensibly will reengage him with environmental concerns rather than distancing him from them.

Moreover extending our selves per se, the ability to distribute our cognition in and with the world has been instrumental in bringing about the Information Age in which we now live. Artefacts that store information external to our bodies are referred to as *exograms*¹⁷ by prehistoric archaeologist Robert Bednarik¹⁸. An example may be a map, working like a cognitive prosthesis in the hands of the map user. By distributing information throughout the world, externalising information to be shared between individuals, we massively increased the collective cognitive resources available to humanity. Early examples include the cave art that populates the world and

¹⁶ Marshall McLuhan, *Understanding Media: The Extensions of Man* (1964).

¹⁷ An engram is a physical alteration in the brain to store a memory. An exogram is a physical alteration in an external artefact to store a memory.

¹⁸ Bednarik, "Exograms."

continues to be a curious phenomenon¹⁹. Whether these marks deliberately recorded information or are self-expression, these artefacts vividly depict the relation between the early human's mind and the outside world through his body and its involvement with its environment. Entoptic phenomena have been described on these artefacts, forms that exist only in the mind. Here the human is not visually recording things in the real world, but abstract, internal experiences that are symptomatic of an expanding brain. These things demonstrate that there is a flow of cognitive and physical operation from the brain, through the body, into the world.

This topic raises debate about the internalisation/externalisation dichotomy. In answer to the question "Where is the mind located?", the most common reply would suggest that a process is mental or 'internal' when it takes place inside the head of an individual, and a process is physical or external when it is realised in the outside material world. But to maintain this dichotomy is to ignore cognitive scientists suggesting that the line between internal and external cognition is not so clean cut. With a theory of distributed cognition or extended mind as advocated in the seminal work of Andy Clark and David Chalmers in 1998²⁰, we can describe cognition not as a process that is limited by the bounds of skull and skin, but as a fluid process distributed through a chain of relations between the brain, the body and worldly things. It recognises that humans do not operate or unfold in a vacuum, but are promoted and directed by the world in which we live. Adopting this view and contributing it to the overall mindset for the Anthropocene, we understand the human not as something isolated from the ecological world but actively integrated with it just as the things he creates are.

¹⁹ British Museum are engaged in an ongoing research project cataloguing rock art from around the world: <http://www.britishmuseum.org/research/research_projects/all_current_projects/african_rock_art_image_project.aspx>

²⁰ Andy Clark and David Chalmers, "The Extended Mind," analysis, (1998).

Archaeologists Lambros Malafouris and Colin Renfrew²¹ are advocates of this framework and give the example of the stone in a knapper's hand. It is not simply a blank surface upon which the knapper imposes a pre-existing mental plan but tightly coupled with and an intrinsic part of his cognition. The force and angles of knapping are parts of a continuous web of interactions that involve complex feedback between limbs, objects, the visual sub-system, and the acoustic sub-system. If there is a mental template active during the process it is located in the interactive space between the affordances²² of the raw materials and sensorimotor properties of the hand; not some fixed 'idea' stored in the knapper's head. Here intention no longer comes before action. It is in the action where agency is located, at the interface between human and thing. The boundary between the mental and physical collapses. The line between intention and material affordance²³ becomes all the more difficult to draw. Here the stone is extension of the knapper and the knapper that of the stone through a combination of forces that ripple backwards and forwards between brains, bodies, and beyond. We are quite good at understanding what a brain is, but a mind is more complicated to describe. Malafouris describes them as small, but infinite abstract spaces in which imagination is seen to be possible.

This theory of material engagement is directly applicable to artists and designers in reminding them that alongside the content of information, the way it is stored or embodied in a thing is just as important. Air-traffic controllers coordinate their activity using flight

²¹ Lambros Malafouris and Colin Renfrew, "The Cognitive Life of Things: Archaeology, Material Engagement and the Extended Mind," in *The Cognitive Life of Things: Recasting the Boundaries of the Mind*, ed. Lambros Malafouris and Colin Renfrew (Cambridge: McDonald Institute for Archaeological Research, 2010).

²² Gibson.

²³ Carl Knappett, "The Affordances of Things: A Post-Gibsonian Perspective on the Relationality of Mind and Matter," in *Rethinking Materiality: The Engagement of Mind with the Material World*, ed. E. DeMarrais, C. Gosden, and C. Renfrew (Cambridge: McDonald Institute Monographs, 2004).

strips.²⁴ Information for flights (airline name flight number, and type of aircraft, plus the speed, level and route of their flight plan, both requested and as authorised) is written on strips of paper that can be physically manipulated, moved around in space and shared by a collection of individuals. The physical embodiment of the trips supports a number of strategies employed by the controllers. They can be held as reminders to perform an operation, or slide them to the left or right to indicate certain conditions; for example, two planes in a conflict situation. Testimonial evidence suggests that a number of previous attempts to introduce new computer technology into air traffic control may ultimately have been rejected by the controllers because the proposed replacement systems attempted to reproduce the information aspects of the flight strips while ignoring the extra factors. Recent research conducted by MA students from Information Experience Design at the Royal College of Art for Imperial College London drew similar conclusions in response to a proposal to introduce an electronic lab book to replace or accompany the traditional paper one²⁵.

The biggest implication of an extended mind theory for artists and designers is that by extending our minds across an infrastructure of things we can leave the storing of information to the digital mind so that the biological mind and body can focus on the things that technology cannot do: feel and create. This is indeed the philosophy shared by the creators of a new multi-platform application called Extended Mind²⁶, "Extended Mind is a productivity app that helps

²⁴ Michael Wheeler, "Minds, Things and Materiality," in *The Cognitive Life of Things: Recasting the Boundaries of the Mind*, ed. Lambros Malafouris and Colin Renfrew (Cambridge: McDonald Institute for Archaeological Research, 2010).

²⁵ Kevin Walker, *Labspace* (Royal College of Art, 2014).

²⁶ < <http://ext.md/> >

you manage your tasks and thoughts as easily as if it was an extension to your biological mind.”²⁷

If we use our extended mind to store and process information it frees our body and mind to be creative and invest emotionally in causes like raising awareness of the Anthropocene thesis. The human body as a plastic and sensing thing. Humans are good at being affected emotionally, and are good at affecting others’ emotions. It is through a creative and emotionally-engaged approach by artists and designers that we can tackle current ecological crises. Johanna Kieniewicz is a self-professed ‘bridge-crosser’ between art and science²⁸ and recognises the necessity for scientists to win hearts as well as minds in relation to climate change and that this is does not necessarily come naturally to them. She recognises the opportunity for artists and designers to collaborate with science²⁹.

²⁷ This project is an example of research-driven design as research papers were used throughout the design process to validate decisions.

²⁸ She holds a PhD in Earth and Planetary Science as well as a foundation degree in fine art.

²⁹ Examples of the sort of experiences created for this purpose can be found in chapter 6.

**A GOOD METAPHOR IS
SOMETHING EVEN THE
POLICE SHOULD KEEP
AN EYE ON.**

G.C. LICHTENBERG
PHYSICIST

4 Metaphor

Metaphor is not just about language, it's really about thought. We conceive of things in terms of other things. When new things, or synergies between things, are constructed our mindset is altered. In this way there is a recursive relationship between the things we make and the mindset we occupy. In reversal of the conventional subject-object relations of hylomorphism³⁰ whereby mind imposes its form on material things, it can be said that the latter gives shape to forms of thought³¹. *Anthropogenesis* is simultaneously *technogenesis*. Cognitive scientists and archaeologists have been exploring the relationship between technology and our mindset, and here it will be shown that an awareness of metaphor is of paramount importance for the designer in the Anthropocene. Depending how it is used, metaphor is both a constructive and destructive device.

Psychologist Michael Tomasello uses the metaphor of a ratchet to describe how technological innovation builds on pre-existing artefacts and structures in the world³². They serve as cognitive anchors for human concepts and the introduction of new artefacts and structures can help to explain cultural change around the world since the Upper Palaeolithic. But archaeologist Niels Johannsen notes that without experience of what a ratchet is, Tomasello would have struggled to conceptualise the cumulative historical invention of the ratchet³³.

³⁰ See chapter 6.

³¹ Chris Gosden, "What Do Objects Want?," *Journal of Archaeological Method and Theory* 12, no. 3 (2005).

³² Michael Tomasello, *The Cultural Origins of Human Cognition* (Cambridge (MA): Harvard University Press, 1999).

³³ Niels Johannsen, "Technological Conceptualization: Cognition on the Shoulders of History," in *The Cognitive Life of Things: Recasting the Boundaries of the Mind*, ed. Lambros Malafouris and Colin Renfrew (Cambridge: McDonald Institute for Archaeological Research, 2010).

In a similar way, the human brain could only be metaphorically described in computational terms after the computer had been invented. The cognitive revolution of the 1950s gave rise to the cognitive sciences in which artificial intelligence and computer science helped to construct an understanding of the brain. Due to its emphasis on information processing this approach has been criticised by post-cognitivists who favour models that integrate the brain with the body and the wider world³⁴. Although the general analogy between electronic information processors and the brain as a human processor has been used quite successfully by cognitive scientists, there are a few important distinctions. For example, the rules and operations involved in the processing of information by a computer are all imposed by the designer of the machine. In the case of the human processor, these rules and operations are not known a priori.

More generally, to promote a metaphorical understanding of the brain as an information processor is to reduce the human to a machine. Unlike computers, humans are emotional beings often functioning in illogical and unpredictable ways. They learn about the world through sensory, bodily life experiences, and being biological organisms are far more integrated with the life cycles of the ecological world. At a time when humans are increasingly resembling machines that simply process information, this is a particularly dangerous metaphor to perpetuate. As we begin to resemble cyborgs, it is the role of the designer to remind us what it means to be human. To reintegrate the human with his ecological context and inspire him to act creatively to motivate world change.

The integration of computational metaphor in cognitive science didn't rely on the invention of a computer per se, but on people's understanding of how a computer works. As technology becomes increasingly complex, although more people are able to use it, few understand how it really functions. Consumers rely on digital

³⁴ see chapter 3.

metaphors, words whose meanings have been mutated by technology companies and computer scientists: web, page, net. Although this has helped the public to become at ease with technology, as a substitute for proper understanding we can foresee it having damaging consequences. It reinforces a culture of shortcuts, sacrificing wisdom for knowledge. This is symptomatic of a wider problem salient in the Anthropocene. People conveniently interface with the world but are ignorant of its invisible, complex workings. They can buy a banana from the corner shop without realising the long chain of operations and the amount of unnecessary energy spent in bringing it there.

Redefining words and using them in new contexts can cause them to become more readily associated with their computational meanings than their original ones. Over time, these words' mutated definitions can reenter discussions of the physical world. For example, Graham Harman admits that his object-oriented philosophy, which is used to talk about the realism and relations between human and non-human things, is founded on object-oriented programming from computer science³⁵ where terms like object, events, and classes were redefined. Colloquial words are impregnated by computational terminology and our understanding of the world becomes tainted by the digital so that we begin talking about the real world in virtual terms. This is to separate ourselves further from the *biosphere* and become increasingly comfortable in the *technosphere*. Metaphor must be kept in check if we are to stop neglecting the *biosphere*.

Recognising how popular conception of the brain was tainted by the invention of the computer, I fear that conception of how things relate to one another in the real world may be tainted by the emerging Internet of Things. Actor-Network Theory became popular as the world wide web was emerging and Bruno Latour was conscious that use of terms like network may cause misunderstanding of the true

³⁵ Graham Harman, *Towards Speculative Realism* (Winchester: Zero Books, 2011).

nature of relations in the world he was trying to promote³⁶. The misconception he refutes is supported by some forms of data visualisation. Spider-web-like diagrams of discrete connected nodes may be latched onto by a public trying to understand the nature of human-thing relations. A veil of computational metaphor obscures the world making it difficult for us to access the ecological world underneath. This is particularly unhelpful in an effort to raise awareness of the Anthropocene thesis.

Although metaphors can be misleading, you don't throw away a tool because it is dangerous. You use it more carefully. Establishing a new metaphorical understanding of the world as a meshwork of analogue, mutable, fluid, relationships that grow and decay in significance to one another will help explain the way that we are integrated with the world. This is the chosen metaphor of anthropologist Tim Ingold³⁷ and is promoted by this mindset.

Recognising that technology influences our mindset, it may be through introducing future ecologically sustainable technologies that the public conception of the world is reoriented toward the *biosphere*. Designers have a key role in developing such technologies; consider the role of Anlexandra Daisy Ginsberg in the field of synthetic biology. Such technologies ought to be transparent so that the public understand how they really function. They should be integrated with ecology so as to relate to the environment instead of further separating us from it. There are many examples where new technology has been developed with these considerations in mind. The Processing language by Casey Reas and Ben Fry was constructed in a simple and transparent way so that humans understood how to manipulate it at a relatively fundamental level.

³⁶ Bruno Latour, "On Actor-Network Theory. A Few Clarifications Plus More Than a Few Complications.," *Soziale Welt* 47, (1996).

³⁷ See chapter 6.

In summation, designers must therefore be careful with the metaphors they choose to promote. Conscious use of metaphor is at the core of most art and design and used to communicate efficiently, and inject emotion. In ecological art, works like Pierre Huyghe's *Zoodram 5 (after sleeping muse by Constantin Brancusi)*³⁸, a glass tank that provided living quarters for different species of crabs that cannibalise each other, is a none-too-subtle metaphor for human rapaciousness. It is the unpreventable, subconscious role of metaphor (intrinsic to technological progression) that deserves close surveillance.



Figure 2 Zoodram 5 (after 'Sleeping Muse' by Constantin Brancusi)

³⁸ Pierre Huyghe, *Zoodram 5 (after 'Sleeping Muse' by Constantin Brancusi)*, 2011, MoMA PS1.

**BIOGRAPHIES OF
THINGS CAN MAKE
SALIENT WHAT MIGHT
OTHERWISE REMAIN
OBSCURE.**

IGOR KOPYTOFF
ANTHROPOLOGIST

5 Biography

The human body is a complex thing comprised of many other things: head, chin, cells. Throughout its life it is constantly changing. Specific events have life-changing consequences on an individual: amputation of a leg, witnessing a murder, getting a tattoo. Non-human things are much the same. Like us, they are assemblages of other things and they are born and live a life before returning to the earth. In this way, a biographical approach to the study of human and non-human things can be used as a means of discussing them under similar terms. This chapter will encourage designers to adopt such an approach so long they do not use it to anthropomorphise things.

Anthropologist Igor Kopytoff³⁹ was influential in establishing this idea in a chapter of the seminal text, *The Social Life of Things*⁴⁰. The central idea is that as humans and things gather time, movement and change, they are constantly transformed, and these transformations of human and thing are tied up with each other. We are interwoven with things to the extent that they genuinely make up who we are as people, comprising our *distributed personhood*⁴¹. From a human perspective, things often appear static. This framework reveals their dynamic qualities by exposing the processes by which they are shaped⁴².

Curators and museologists have mobilised this methodology to reveal stories behind artefacts in their collections, offering the public

³⁹ Igor Kopytoff, "The Cultural Biography of Things: Commoditization as Process," in *The Social Life of Things: Commodities in Cultural Perspective*, ed. Arjun Appadurai (Cambridge: Cambridge University Press, 1986).

⁴⁰ An interdisciplinary project between historians and anthropologists.

⁴¹ Alfred Gell, *Art and Agency: An Anthropological Theory* (Oxford University Press, 1998).

⁴² See chapter 6.

a new way to engage with the intangible aspects of things. *A History of the World in 100 Objects*⁴³, must be the most successful public engagement project of this type. Its reception indicates that this approach is useful in drawing public attention to non-human things and may be transferrable to resolving Anthropocenic problems by discussing the meshwork through encounters with artefacts whose biographies inhabit both the *biosphere* and *technosphere*.

Another important outcome of a biographical approach to things is reminding us that their lifespans can differ greatly from our own. From a human perspective they can seem incredibly short or impossibly long. By shifting attention from the use-life of things (i.e. the length of time that we personally spend with a thing) to their complete lifespan from earth to earth we become more aware of the fragility of natural resources, and the stubborn resilience of some manmade products. For example, radioactive waste, a byproduct of nuclear fission, will be salient in the world for longer in the future than we have been human, some 250,000 years. Making people aware that things they use often existed before their ownership and after their disposal, or after the owner dies, is important for engendering sustainable design practices⁴⁴.

Difficulty comes not in presenting this information, but in helping people understand these immense periods of time⁴⁵. We can only ever comprehend a lifespan similar to our own, therefore communicating this concept is very challenging. Creating an experience by which the human's perception of time is warped may help in this endeavour; juxtaposing them from the hectic pace of modern, urban living. Slower and more ambient or passive technologies may be employed to do so.

⁴³ A collaborative project between Radio 4 and the British Museum.

⁴⁴ See chapter 6.

⁴⁵ Stewart Brand, *Clock of the Long Now: Time and Responsibility: The Ideas Behind the World's Slowest Computer* (Basic Books, 1999).

Things can have seductive qualities. We stare at a thing, but it stares back at us, so that our vision is caught in a 'cat's cradle of crossing lines of sight'⁴⁶. Sherry Turkle recognises the emotional and intellectual relations between humans and things in *Evocative Objects: Things we Think With*⁴⁷. Jane Bennett considers hoarding behaviour in *Vibrant Matter* to study how we can become fixated with things for illogical reasons⁴⁸. Things can even become companions in our daily lives: a coffee mug, a pen, a breakfast cereal⁴⁹. The human is a sensory and unpredictable organism that latches onto things; a predisposition that consumer culture thrives off.

The designer in the Anthropocene must be aware of this human tendency and "be careful not to force human feelings onto matter ... we are not interested in offering dramas of humanised matter."⁵⁰ (Tom McCarthy 2009). Although they can resemble humans, and even be designed with this in mind⁵¹, to anthropomorphise things is to slip back into anthropocentric inertia. Things hold social contracts, for example I need a passport to cross a border. In this way they become social scaffolding restricting and permitting certain behaviours, but it is incorrect to attribute them agency. Consider a sleeping policeman. It causes a driver to slow down. But this is not

⁴⁶ James Elkins, *The Object Stares Back: On the Nature of Seeing* (Simon & Schuster, 1996).

⁴⁷ Sherry Turkle, "How Computers Change the Way We Think," *The Chronicle of Higher Education* 50, no. 21 (2004).

⁴⁸ Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Duke University Press, 2010).

⁴⁹ Daniel Miller, *Stuff* (Polity Press, 2009).

⁵⁰ Pil and Galia Kollektiv, "Can Objects Perform?: Agency and Thingliness in Contemporary Sculpture and Installation," in *Sculpture and Performance* (Henry Moore Institute: 2014).

⁵¹ Donald A. Norman, *Emotional Design: Why We Love (or Hate) Everyday Things* (Basic Books, 2005).

due to some material agency, but because it was made by an agential human who delegated it with a secondary agency⁵². Being a force fuelled by intention, only humans have true agency. Although a few other species have begun show some agential tendencies, it is generally agreed to be a human trait. From a design point of view, if we imbue things with our agency, they have the potential to continue affecting others long after we die. Returning to *distributed personhood*, when we look at an artist's oeuvre it can be said that to an extent we are encountering the artist. The major implication for this in archaeology is that things we dig up are literally parts of (no longer functioning) minds⁵³. For design, that opinions expressed materially are not taken to the grave.

Although things do not have true agency, it is essential to realise their causal powers and internal logics. A bee causes a flower to be pollinated, black ice on the road causes a car to crash. The mindset here dissolves the distinction between agential humans and causal things, for they are tied up in the same complex systems. Indeed it is only through material engagement with things that we have means to exhibit our agency.⁵⁴ And more often than not, a thing is not the creation of a solo agent, but the product of a conglomerate of contributors (human or otherwise). The 2012 Olympic torch was not the product of Edward Barber and Jay Osgerby per se, but the result of a mesh of humans (Adolf Hitler), things (metal perforation machine) and processes (LOCOG selection process) reaching far across time and space⁵⁵. Consider global warming. It's also the product of a mixture of agencies and causalities that must be considered in relational terms. Like acupuncture, designers must

⁵² Gell.

⁵³ Wheeler.

⁵⁴ Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Duke University Press, 2007).

⁵⁵ William Fairbrother, "Relay: An Agentive Study of the 2012 Olympic Torch" (Durham University, 2013).

monitor this meshwork over time and make small adjustments to improve the situation. Although we are enmeshed in a thingly world, like an *etic*⁵⁶ anthropologist, our mindset must be positioned outside the *biosphere* and *technosphere*. Then we can consider the entanglements between human and non-human things without anthropocentric bias.

Bruno Latour is promoting such a mindset by considering the Earth in biographical terms of its *geostory*⁵⁷. It decentres the human, returning both object and subject to the earth, noting that the Earth is neither nature, nor machine (*biosphere/technosphere*). He observes that increasingly things have become de-animated, and humans over-animated. This balance must be readjusted. Not to puff some spiritual dimension into its stern and solid stuff (as so many romantic thinkers and nature philosophers have done) but that we should abstain from de-animating causal things. The point of living in the epoch of the Anthropocene is to reach a point whereby human and non-human things share the same destiny that cannot be followed, documented, told, or represented using old dichotomies. It is not so much about reconciling nature and society, but distributing causality throughout the meshwork until we have lost any relation between the concept of subject and object. What is the role for a designer in communicating this? To use communication devices exclusive to humans like language seems hypocritical. Experiential mediums common to both humans and things must be used. Giving primacy to the processes they share may be a way to achieve this.⁵⁸

Understanding that only humans have true agency, the designer is aware only he can alter the world, not inanimate things. Although

⁵⁶ Emic and etic refer to two kinds of field research done and viewpoints obtained; from within the social group (from the perspective of the subject) and from outside (from the perspective of the observer).

⁵⁷ Bruno Latour, "Agency at the Time of the Anthropocene," *New Literary History* 45, (2014).

⁵⁸ See chapter 6.

we gave birth to things and live with them, unlike a human they will not cause good by themselves, we must intend them to do so. We must understand the causal abilities of things and how they can be built upon or used by designers to assist in this. The formidable global problems we presently face require more agency, not less.

**THE WORLD IS NOT TO
BE COMPREHENDED
AS A COMPLEX OF
READY-MADE THINGS,
BUT AS A COMPLEX
OF PROCESSES.**

HEGEL
PHILOSOPHER

6 Process

The global, consumerist, modern man is very good at using things without understanding how they really work. He may be able take a photo on his smartphone but is blind to the complex processes within the phone that cause this operation to be executed so effortlessly. At a larger scale, like the smartphone, the world is a complex thing. People conveniently interact with it to perform simple tasks like flicking a switch to turn on a light without understanding the complex processes that enable it to be so simple. It hides the processes involved that cause harm to the planet. Giving processes primacy in the Anthropocene is a step to recognising the complex relations between things in the world and mobilising action to alter them.

Theoretically, this means rejecting the hylomorphic model of things in favour of an ontogenetic one. A hylomorphic model sees that a thing as the union between form and matter whereas an ontogenetic model sees form always in a process of emergence. This criticism of hylomorphism was promoted by Gilbert Simondon and later advocated by Tim Ingold. Simondon⁵⁹ uses the example of a brick to explain the distinction. Whereas the previous model considered that clay (matter) is forced into a mould (form), an ontogenetic approach understands that the clay was a product of a process of separating it from unwanted earth, also that the mould came from a lump of wood that had to be carved by a carpenter. The previous hylomorphic model is like a man who stands outside the works and sees what goes in and what comes out but nothing of what happens in between, of the actual processes wherein materials of diverse kinds come to take on the forms they do. The binary separation of form (from culture) and matter (from nature) is dissolved toward a conception more assimilated with life processes and ecology. If we

⁵⁹ Gilbert Simondon, *L'individuation à La Lumi`Ere Des Notions De Forme Et D'information*. (Grenoble: Ed. Jérôme Millon, 2005).

are to reconfigure ourselves and integrate with the ecosystem more fully in the future, this is a crucial step forward.

There seems to be an unhealthy obsession with preservation in the modern, globalised world. Museums are institutions that actively prevent processes of decay and deterioration. Our food is full of artificial preservatives or made non-perishable in tins. When our soles break we throw our shoes away when we could get them recobbled. Why are we scared of deterioration — because we are nervous of the ageing process and reminded of our imminent death? Because things are heavily branded and advertised as shiny new so that is the way we perceive things should be? Or because we live in an increasingly digital world where screen-based media doesn't decay?

Computers work using a logic whereby things are discretely one thing or the other; one or zero. Pixels genuinely sit aside one another as separate things with no blurring in between. In reality, there are no such boundaries, only transitional spaces. Consider where the sea meets the land. There is a transitional space called the beach. Man causes separation finding boundaries where there are none. Is it an attempt for him to order a world in which entropic forces cause chaos. Consider a stencil. We try to impose restraints, but the spray paint wants to dampen the stencil and distribute itself through the air. At a recent debate about the future of the British Museum⁶⁰ it was raised that the gates outside the front are psychological barriers that must be dissolved. It is through rejecting binaries, embracing analogue, and turning this gated area into a transitional space that the museum can be reintegrated in its environment. Likewise it is through an analogue appreciation of the world that we may become more integrated with the ecological world.

⁶⁰ "A Living Building: How Could the British Museum Best Deliver Its Constant Purpose for a Changing Public?," (British Museum: 2014).

Whatever reason for our obsession with preservation and the cult of the new, the maker movement is a means to changing this mindset. Although they often hack objects which are products of unsustainable consumer systems, through taking things apart and reconfiguring them, they engender a culture of discovery and understanding of processes. An excellent example that highlights the maker movement and sustainable design is the *Solar Sinter*⁶¹ which 3-D prints using the surplus of sand and sun rays in the desert (figure 3). The machine is not finished perfectly, its workings are exposed. It integrates technology in a way that it not damaging either environmentally or psychologically. Responding to Anthropocenic problems is not to reject technology, to do so would be to reject ourselves, but to use it efficiently, sensibly, and sustainably. A consciousness of processes can be implemented by a designer in enabling more sustainable manufacturing processes. Cradle-to-cradle design was established to do this⁶².

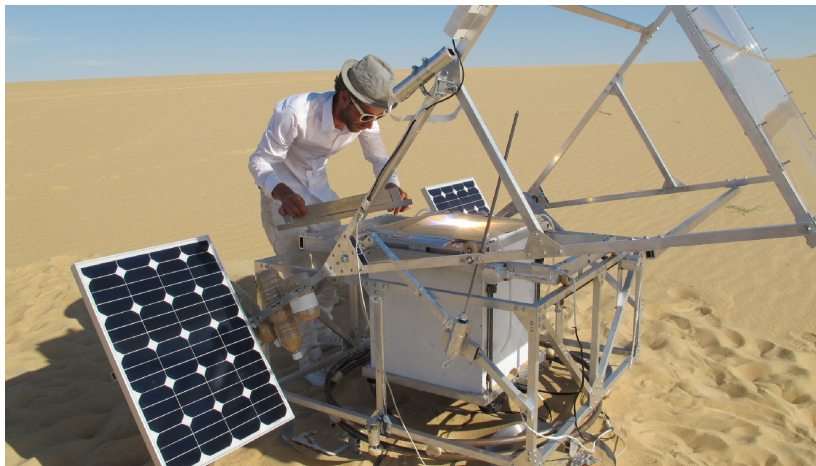


Figure 3 Solar Sinter

⁶¹ Markus Kayser, *Solar Sinter*, 2011, Siwa, Egypt.

⁶² Michael Braungart and William McDonough, *Cradle to Cradle. Remaking the Way We Make Things* (Vintage, 2009).

This mindset will have societal consequences beyond products. If more of us understand how systems of the world are constructed, from technology to government to ecology, we will be empowered to change them. This philosophy is inhibited by *metadesigners*⁶³ who conceive of the world through the synergies between things and look to identify opportunities for new synergies.

A shift from a thing to process, is similar to a shift in art from seeing it as an object, to something that is experienced. This idea was promoted by Brian Eno fairly recently⁶⁴, however, John Dewey established the conception of *Art as Experience* as early as 1934⁶⁵. The phrase experience design has been muddied with associations of user-experience design and some forms of new media art. However an experience doesn't necessarily have to include computational technology at all, indeed most of our most emotional and meaningful 'interactive' experiences are simple and analogue.

Since it is experiences that shape our true understanding of the world, in the era of the Anthropocene the artist/designer ought to create transformative experiences to educate people about it and empower them to alter their behaviour accordingly. An experience inherently involves the dimensions of time and space. A human experience is also multi-sensory. The designer must be aware of all these considerations to create a meaningful experience. Particularly for the Anthropocene it is important to consider time. Ecology operates at a much slower pace than us. Also, in taking time a human is able to meditate and understand. In a time when humans are busier and overwhelmed by so much information, moments for reflection in ambient environments are necessary. Making it a peripheral experience is also to resonate with the dynamic of

⁶³ metadesigners.org/Mission

⁶⁴ Brian Eno, "Miraculous Cures and the Canonization of Basquiat," in *A Year with Swollen Appendices*(Faber and Faber, 1996).

⁶⁵ Dewey.

problems in the Anthropocene.; they are ever-present but not the focus of our attention.



Figure 4 Your waste of time

John Dewey says that the ingredients of the world, “earth and its contents”, should be used to construct experiences. This is particularly salient advice for practitioners in the Anthropocene. This is embodied in two installations by Olafur Eliasson's design studio; *Your waste of time*⁶⁶ and *Riverbed*⁶⁷. *Your waste of time* is an installation in a room where parts of broken iceberg are displayed in a freezing room. Here the *biosphere* and *technosphere* confront one another with ice and air conditioning units becoming entangled with one another. The ice is indexical of the problem of global warming, not just symbolic of the cause. The presence of real bits of icebergs from Iceland's largest glacier, Vatnajökull, gives the human a sense of size scale and timescale. Although they are older than our lifespans - some 800 years old - we know that there is the potential they could melt quickly if the support system of the air conditioning was to

⁶⁶ Olafur Eliasson, *Your Waste of Time*, 2008, MoMA PS1.

⁶⁷ Olafur Eliasson, *Riverbed*, 2014, Louisiana Museum of Modern Art.

break. The room is also ice cold, disrupting the viewer's sense of temperature. The second installation is *Riverbed* which puts almost 180 tonnes of Icelandic rock in a wing of Louisiana Museum of Modern Art in Denmark. Due to it becoming your context, it is one of few artworks that encourages interaction. An artificial stream trickles through the space. The water is audible, you can reach down and touch it. It places a simulacrum of ecology inside a white cube so as to make it the centre of attention. It becomes an object for scrutiny. As time elapses when inside the installation, visitors become increasingly aware how it differs from real nature. Here we are aware not of the human, but the causality between things - the artificial stream and rocks, the air conditioning and the icebergs. To take these type of ecologically related installations further would be to create an experience where man is not in control, designing for entropy and perhaps use ecological or biological processes, like mould, in the formation of the work.



Figure 5 *Riverbed*

**ONLY A
TRANSFORMATIVE
APPROACH CAN PUT
THINGS RIGHT.**

JOHN WOOD
METADESIGNER

7 Conclusion

Throughout this text it has been emphasised that the world is a messy mesh of complex processes and entanglements between human and non-human things and that by understanding the mechanisms by which this mesh is constructed, post-disciplinary communicators conscious of the Anthropocene thesis may use this new mindset to develop more sustainable and ecologically-oriented art and design practices. This is not an appeal for joined up thinking. If the world were a perfectly structured network of connected nodes, there would be no room at all for life or imagination. It would suggest that the world can be entirely mapped out and therefore controlled. Although the growing internet of things relies on a dependable network of discrete and constant connections to function, the internet of things in which we live depends on a mutable meshwork of relations with room for movement. The postdisciplinary artist and designer who recognises his/her place in this meshwork will enable them to manipulate its threads like a weaver, tying new knots and altering the fabric of the world.

To embrace this new mindset is to embrace uncertainty, ambiguity, misinformation, and complexity. The world is infinitely complex: things (human or non-human) are nested within other things and the relationships they share are often a mixture of processes (cognitive, physical, social, etc.) motivated by shifting tangible and intangible forces. When information flows through these streams its form and meaning mutates. This is the fundamental problem of communication, "that of reproducing at one point exactly or approximately the message selected at another point."⁶⁸ Surrender to confusion for it is an opportunity to imagine; amongst the noise you may find new meaning. These are moments for self-discovery and reflection. This study has advocated reflective activities for they

⁶⁸ Claude Elwood Shannon, "A Mathematical Theory of Communication," The Bell System Technical Journal, (1948).

cause us to be critical of the origins of our behaviour and empower us to make better decisions in the future. Work serendipitously as an alchemist, embrace the art of not knowing what you are looking for. Don't feel forced to impose form on matter, but bring materials together and combine them or redirect their flows in anticipation of what might emerge. This is what sustainability truly means and it is a methodology applicable to both the arts and sciences.

What has been offered by this text is a mindset, not a solution. We know that speculation, fiction, and imagination are powerful future changing tools that humans are gifted with moreover any other animal. We can exploit the use of technology as part of our extended minds to store and calculate information so that we can focus our efforts on creative behaviours that require these human qualities.

The way we see the world is changing. The way we see ourselves is also changing. It has never been so important to remind ourselves what it means to be human, and to realise our place in the world. Artists and designers are driven by imagination that is yearning to reach the horizon; it wants to pull them away. But material reality and the materials they work with hold them back. The postdisciplinary designer can hold this forward moving momentum in check with the working of his materials; to look into the distance and see up close too; to understand the Anthropocene despite working at the human scale.

Metaphor has been used throughout to articulate this mindset, recognising that this cognitive device is fundamental to learning, communication and meaning making. But this is not to say that the world is not genuinely an internet of things. The meshwork image is always going to be a metaphor in our heads, we cannot fully comprehend the enormity and complexity of the world entirely, but to begin to explore or become familiar with what it is like at the human scale, is to encounter it indirectly.

Collaborative projects between different specialists are known to be fruitful. It is only through the cross-fertilisation of subjects that the Anthropocene thesis has been fleshed out in social, biological, cultural, physical ways. This shift is important. We learn that conceptual change occurs when a concept is reassigned from one category to another. The mingling of disciplines makes the probability of the repositioning of concepts all the more likely, just like placing chemicals close to one another. Those who sit between disciplines are catalysts for future things. But the nature and operation of relations between those of different professions must be adjusted.

Consider the relationship between art and science. It is unsustainable. Sustainability is not about reaching a solution or a steady state, but about keeping on going in reaction and in line with the flow of relations in the meshwork. In relation to technoscience policy, we are forced to study graphs and images that apparently inform us of the environment and about what is going wrong in the world. We are dazzled by information so that we cannot see what is happening right beneath our noses. It is like being in a darkened lecture there so that we can not see our environment, only projected images. In the context of ecological awareness, this information yields no wisdom. This is why we need some type of postdisciplinary communicator who is simultaneously an artist, a designer, and an academic. Scientists like art because it dresses up their findings and gives them a good face. But really we need art to challenge the foundations of technoscience. We need an art that doesn't capture what has already passed, but that moves forward in real time with the science movement and communicates with people in the real world where they live. Instead of answering to scientific predictions, artists should join scientists in their hopes and dreams and establish an ongoing dialogue between science and the real world.

In his proposal of natural selection, Charles Darwin challenged the norm — religion — but religion accommodated. Here, designers must promote an Anthropocenic agenda cutting through established norms — disciplines — to alter the relations between humans and things and cultivate a generation of gardeners from a field of consumers.

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