

How does ‘transdisciplinarity’ affect the fields of art and science with regards to ecological awareness?

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Image sourced from the internet Shown in “An inconvenient Truth”

In this essay, I will address the question, “How does ‘transdisciplinarity’ affect the fields of art and science with regards to ecological awareness?” In the first part of this essay, I will explore the etymology and plurality of the term ecological. In the second part, I will consider the historical shift in critical theory and thinking about environmentalism, the idea of the collective and deep ecology towards a contemporary idea of ecological thought and dark ecology. In the last part of this essay, I will present contemporary examples from visual culture, where science and art meet to understand the ecological relevance of exploring the space between these fields in a contemporary context.

In a recent article in the Guardian newspaper, George Monbiot writes that “Ecology and economy are both derived from the Greek word oikos - a house or dwelling. Our survival

depends on the rational management of this home: the space in which life can be sustained.”¹

Continuing this link through Ancient Greek to the idea of dwelling, from *économe* and its prefix ‘eco’ we can extrapolate the nuance between ecology and ecological. Ecology is defined as “The science of the relationships between organisms and their environments”,² whereas, expanding from the etymology of ‘logic’,³ as the philosophy of reasoning, takes us towards the thinking of ecology. Or further, towards the socio-political context in which the organism exists. The thinker Felix Guattari introduced the neologism of “ecosophy” in *The Three Ecologies*,⁴ which is described as being “...between the three ecological registers (the environment, social relations and human subjectivity)”,⁵ which he believed could be clarified through ethical and political discussions. This further introduces the plurality of the ecological.

In the book *Ecology*⁶ the author Carolyn Merchant discusses the historical shift from the environmentalism movement towards a movement of deep ecology. Merchant describes how this historical shift in thinking resulted from a need of “...overcoming the deeply engrained anthropocentrism at the root of the domination of nature which requires a new philosophy and ethics.”⁷ The idea of deep ecology that developed in the early 1970s regarded human life as one of many that coexist on the Earth. Between the 1980s and 1990s, deep ecology largely became about recognising ‘interconnectedness’, which deconstructed the idea of anthropocentrism. Deep ecology recognised the need to shift from a theory based philosophy that was rooted in narrow

¹ Munbiot, George, “This stock collapse is petty when compared to the nature crunch: The financial crisis at least affords us an opportunity to now rethink our catastrophic ecological trajectory.”, *The Guardian*, October 14, 2014, accessed November 07, 2014, <http://www.theguardian.com/commentisfree/2008/oct/14/climatechange-marketturmoil>. This resonates with Derrida’s essay “Hostipitality”. Derrida presents the term “oikonomic”, which he defines in ancient Greek as law of the household, domestic, lineage and family. Derrida draws on Heidegger, Plato and ancient Greek tragedy to discuss word origin. Derrida writes, “[...] Aeschylus who notes that *despotes* means “master of the house,” and to Plato’s *Laws* or *Republic* in which *despotes* means “master of the house,” a synonym of *oikonomos* (the steward [économe] is the one who makes the law in the *oikos*, the household or the family, the master of the family also being the master of the slaves; we are here in the transition between the family and the state)”.

² Online dictionary, accessed February 16, 2015, <http://www.thefreedictionary.com/Ecology>.

³ Online dictionary, accessed February 16, 2015, <http://www.thefreedictionary.com/Ecological>.

⁴ Guattari, Felix, *The Three Ecologies*, (London: Bloomsbury Academic, 2000).

⁵ Ibid, 18.

⁶ Merchant, Carolyn, *Key Concepts in Critical Theory*, (New Jersey: Humanities Press International Inc., 1994).

⁷ Merchant, *Ecology*, 8.

Western centric views, which thinkers at that time believed needed to be overturned and replaced with a "...a new metaphysics, psychology, ethics, and science."⁸

In the book *The Ecological Thought*, Timothy Morton writes,

For the philosopher Martin Heidegger, thinking itself was an environmental presence, as the word "dwelling" suggests. When we dwell on something, we inhabit it.

Originally, for Heidegger, thinking dwelt upon the Earth.⁹

Heidegger highlighted the plurality of dwelling and emphasised the link between dwelling and thinking, Morton expands on Heidegger's concerns to discuss that, "Ecology shows us that all beings are connected. *The ecological thought* is the rethinking of interconnectedness."¹⁰ Heidegger highlights that to dwell is not limited to the ideals of home. Likewise, Morton describes how the ecological thought is not just "in the mind", but requires a practice by humans to rethink the gap that anthropocentric theory creates where man exists separately to his environment, towards thinking about how "... human beings are connected with other beings — animal, vegetable, or mineral."¹¹ Morton expands to include the notion of a 'dark ecology'. Unlike earlier critical theorists, who might be contextualised as having lived through various atrocities of war or civil unrest that impacted the theories they wrote, for Morton, the darkness experienced is that the end has already happened, which places everything cohabiting on earth —animal, vegetable, or mineral— into a present state of real crisis of collective concern.

⁸ Merchant, *Ecology*, 8.

⁹ Morton, Timothy, *The Ecological Thought*, (USA: Harvard University Press, 2010), 27.

Morton is referring here to Heidegger's text, "Building, Dwelling, Thinking" in *Poetry, Language, Thought*, (New York: Harper and Row, 2001).

¹⁰ Morton, *The Ecological Thought*, 7.

¹¹ Ibid, 7. This uses the language from Guattari's *The Three Ecologies*.

Morton discusses how art makes us question our reality.¹² He proposes that art can provide a threshold for exchange and engagement in different ways than what is traditionally available to us. Morton writes, “Art’s ambiguous, vague qualities will help us think things that remain difficult to put into words... art can allow us to glimpse beings that exist beyond or between our normal categories.”¹³ Morton expands on deep ecology’s concern with Western centric pedagogy to include the field of art and visual culture in the ecological debate, as it enables a space to be opened where we can look beyond our normative categories, into which the precursors of ‘environmental’ and ‘ecology’ have already been absorbed.

Morton further introduces the idea of the “... mesh of interconnected things...”¹⁴ which resonates with the Deleuze and Guattari’s theory of rhizomatics. Rhizomatic theory emphasised the notion of constant change and fluctuation, key in both theorist’s work. A contemporary critique of earlier ecologies was that they acted more as a neutral platform on which to theorise, whereas for Morton, the idea of the mesh gives the reader an alternative image of infinite possibilities of which she¹⁵ is a part of.

This is why for Morton it is necessary to transcend the idea of the apocalypse because the apocalypse is something yet to arrive, which creates a distance and reinforces the idea of ‘other’. *The Ecological Thought* thus presents proximity to the reader of their own interconnectedness.

The ecological thought permits no distance. Thinking interdependence involves dissolving the barrier between “over here” and “over there”, and more fundamentally,

¹² Morton, *The Ecological Thought*, 8.

¹³ Morton, *The Ecological Thought*, 60.

¹⁴ Morton, *The Ecological Thought*, 15.

¹⁵ Morton refers to ‘she’ in his book, which subverts the established order where ‘one’ is typically referred to as ‘he’. This language makes the reader question the hierarchy of gender implicit in language and theory. I have chosen to continue this in this essay.

the metaphysical illusion of the rigid, narrow boundaries between inside and outside.

This means confronting the fact that all beings are related to each other negatively and differently, in an open system without centre or edge.¹⁶

This proximity presents a paradox. On one hand, a dark ecology seeks to deconstruct the idea of the ‘other’ and considers the interconnectedness of things, which resonates with the discourse of a deep ecology. In Guattari’s ‘ecosophy’, there is the notion of transcending the ‘other’ to create a unity. The theorist Jane Bennett describes how Guattari’s idea to think “transversally” is to learn to think the three ecological registers into one¹⁷, and the “... impossible fact that humans are both “in” and “of” nature, both are and are not the outside.”¹⁸

On the other hand, Morton further questions, “How deep? Is it deep? Will we know when we are near the bottom?”¹⁹, which opens the infinite possibilities that come from the uncertainties within a dark ecology. He writes, “Dark Ecology makes the world safe for ecological thought. “The only way out is down.”²⁰ Introducing the idea of the “strange stranger” enables Morton to further explore the complexity of a dark ecology. He writes, “The strange stranger is not just the “other” — the “self” is this other. Since there is no (solid, lasting, independent, single) self, we are the strange stranger: “I is another.”²¹

Questioning boundaries can be seen to exemplify a dark ecology, which can never be complete because there is no certainty, no known destination and therefore no whole to create. Morton’s

¹⁶ Morton, *The Ecological Thought*, 39.

¹⁷ Bennett, Jane, *Vibrant Matter: A Political Ecology of Things*, (USA: Duke University Press, 2000), 114.

¹⁸ *Ibid*, 114.

¹⁹ Morton, *The Ecological Thought*, 59.

²⁰ *Ibid*.

²¹ Morton, *The Ecological Thought*, 87.

‘strange stranger’ resonates with Derrida’s essay *Hostipitality*.²² For Derrida, there is an implicit hostility that exists between the host and the guest that maintains a power relation. Derrida sees this tension as a threshold and a potential place for exchange. There is a tension of infinite uncertainty between strange strangers that comes from knowing more about interconnectedness and questioning what we think we know.

Morton writes, “The stranger is infinity. Since the strange stranger is not a mirror, there is no way of knowing whether he or she or it is a person.”²³ This also resonates with an Object Orientated Ontology, which Morton has also written about.²⁴ In a recent interview,²⁵ the theorist Graham Harman summarises the propositions of Object Orientated Philosophy. Referring to his book *The Quadruple Project*,²⁶ Harman challenges how we define the idea of the object and introduces the tension between them in space and time. In doing so, Harman brings into question other philosophies that try to collapse distinctions between the real and phenomenal or between objects and qualities. He says “...we’re trying to say that you can never collapse them. You should insist on the tension.”²⁷

Harman differentiates between philosophy and science, saying “If scientists are not amassing

²² Derrida, Jacques, “Hostipitality.” *Routledge Angelaki Journal for Theoretical Humanities* Volume 5 Number 3 (2000): 03-17, translated by Barry Stocker with Forbes Morlock, accessed November 02, 2014, <http://busyreadywhat.org/Authors/Derrida,%20Jacques/Derrida%20-%20Hostipitality%20-%20Journal%20for%20the%20Theoretical%20Human.pdf>.

I explored the guest and host relationship in further detail in my previous essay for *Inhabitations*. I explained that for Derrida, the idea of pure hospitality must remain impossible because without conditional hospitality and the idea of polarity, there cannot exist the threshold.

²³ Morton, *The Ecological Thought*, 80-81.

²⁴ An example is *Realist Magic: Objects, Ontology, Causality* that Morton wrote in 2013.

²⁵ Harman, Graham, “Propositions, Objects, Questions: Graham Harman in conversation with Joe Roffe,” *Paresis: A Journal of Critical Philosophy*, Number 21, (2014): 29, accessed April 19, 2105. http://www.parrhesiajournal.org/parrhesia21/parrhesia21_harman.pdf.

²⁶ Harman, Graham, *The Quadruple Project*, (Alresford: Zero Books, 2011).

²⁷ “We” refers to thinkers that are Object Orientated Ontologists

Harman, Graham, “Propositions, Objects, Questions: Graham Harman in conversation with Joe Roffe,” *Paresis: A Journal of Critical Philosophy*, Number 21, (2014): 29, accessed April 19, 2105. http://www.parrhesiajournal.org/parrhesia21/parrhesia21_harman.pdf.

knowledge, they're failing. Whereas philosophy is failing if it's trying to get knowledge."²⁸ In one sense, this delineates philosophy and science and reinforces the idea of 'other'. However, this questioning also creates a rupture that challenges established boundaries. It creates uncertainty from within the established field of critical theory, revealing the irony that thinkers are themselves bound by language. Can Harman's destabilising logic be used to question the boundaries between art and science? Can the infinite uncertainty of dark ecology make room for new definitions within these two fields?

Morton's emphasis on thinking in terms of the mesh and its interconnectedness is to shift away from the anthropocentric thinking that has historically dominated the socio-political structure of the status quo. "Really thinking the mesh means letting go of the idea that it has a centre. There is no being in the "middle"— what would "middle" mean anyway? The most important? How can one being be more important than another?"²⁹ What Morton implicitly makes the reader question throughout the book, is that if we do not have the Earth, then what cultural, political and social structures can exist? Morton makes us question the hierarchy of anthropological thought that places human beings above other entities of the Earth, which opens an ethical question of who is in charge of making decisions that affect the status quo of the Earth?

On the website TED TV, Hans Rosling,³⁰ the founder of Médecins Sans Frontières,³¹ presented two short films about world population in 2010 and 2012. He proposes that population growth can plateau at 10 billion³² by 2050. Rosling presents an entertaining and easy to digest statistical

²⁸ Ibid 38.

²⁹ Morton, *The Ecological Thought*, 38.

³⁰ "Religions and Babies April 2012," *Ted TV*, May 22, 2012, accessed March 27, 2015. http://www.ted.com/talks/hans_rosling_religions_and_babies#t-769425.

And "Global Population Box by Box," *Ted TV*, June 2010, accessed March 27, 2015, http://www.ted.com/talks/hans_rosling_on_global_population_growth.

³¹ Commonly referred to in English as 'Doctors Without Borders'.

³² This is 1 billion more than estimated in 2006 as presented in *The Inconvenient Truth*. Also, Rosling's presentations

analysis, yet remains earnest in his endeavours. The short films are an example of how the space between the disciplines of art, science and technology can be interwoven to provide new thresholds for exchange and open fresh discourse.

Rosling's use of boxes in a visual sense resonates with the work of Minimalist artist Sol Le Witt.³³ Is it possible to see these films as a performance by Rosling, where he takes the abstract qualities of Minimalist art to present scientific data to engage with ecological concerns today? Where LeWitt and his peers in the 1960s sought to blur boundaries between the two and three dimensional categories of painting and sculpture, is there a possibility to expand this resonance to blur boundaries between art and science? Rosling transitions from presenting the statistics in a normative mathematical two dimensional manner, embellished by slick graphical representation and visual technology, towards placing the statistics within the frame of sculptural forms, where each form represents one billion people. In an immediate physical way, Rosling changes the proximity of the viewer. The statistics materialise and are present in the viewers own time and space, which has an obvious affect on Rosling's live studio audience. This action makes us question normative pedagogical structures, which resonates with Morton's idea of the mesh.

Ted TV and the internet enable Rosling to create multiplicities of his presentations to reach a wider, non-technocratic, audience. To date, these short films collectively count in excess of 3.5 million viewers.³⁴ Rosling crosses disciplines to bring to our attention the marginal issue of infant mortality rates of the world's poorest population, with a clear message of the collective impact this has on the Earth. Rosling proclaims, "I am a 'possibilist'." He believes in the possibility that a population

between 2010 and 2012 also increased the forecast growth for 2050 from 9 billion to 10 billion.

³³ Double Wall Piece, 1962 and Five Cubes on Twenty-five Squares 1977 In *Beyond Preconceptions: The Sixties Experiment*, (Independent Curators International (ICI), 2000,) 66-67.

³⁴ "Religions and Babies April 2012," *Ted TV*, May 22, 2012, accessed March 27, 2015, http://www.ted.com/talks/hans_rosling_religions_and_babies#t-769425.

And "Global Population Box by Box," *Ted TV*, June 2010, accessed March 27, 2015, http://www.ted.com/talks/hans_rosling_on_global_population_growth. Viewer numbers noted as 2,133,389 and 1,603,290 respectively.

plateau of 10 billion can be achieved by 2050 and that ‘green’ technology can become the status quo, but only with deliberate intervention that targets changing the status of wealth, education and health of the poorest 2 billion people on earth. Although initially this sounds anthropocentric and may appear to contradict the idea of a dark ecology, it is conversely through the idea of the mesh and interconnectedness that Rosling’s argument comes into focus. The monumental population growth over the past 65 years has placed considerable strain on the resources of the Earth and a rise in population will continue to exacerbate this. As Guattari wrote, “We are all prey to environmental degradation, we are all stranded on Spaceship Earth.”³⁵ Thinking ecologically enables us to recognise that reducing population growth requires an understanding of the interconnected impact population has on the fragility of the Earth and moreover, provokes us to question the entrenched social, political and economic structures that depend on growth and perpetuating the population.

In a recent lecture, the late scholar Tony Judt³⁶ introduced the neologism “econoism”. Judt noted that over the past 30 years, mainly in the West,³⁷ we have lost the capacity to think of public affairs except in economic terms. He proposed that rather than asking whether something is good or bad, society dwells on whether something is economically efficient.

Is it productive, will it benefit GDP and contribute to growth? Judt says, “We ask economic questions as a language of public policy.”³⁸ and he asks, “How should we imagine a sort of society with a different set of collective arrangements to mutual advantage?”³⁹ As I write this essay, the 2015 UK election campaign is currently underway. The pledges for the major parties’ “key priorities”

³⁵ Guattari, *The Three Ecologies*, 11.

³⁶ Judt, Tony, “What is living and what is dead in social democracy?,” *Big Ideas ABC*, May 12, 2010, Accessed April 19, 2015. <http://www.abc.net.au/radionational/programs/bigideas/2010-05-02/3105138>.

³⁷ Judt qualifies this as the UK and English speaking nations, less so in continental Europe.

³⁸ Judt, Tony, “What is living and what is dead in social democracy?,” *Big Ideas ABC*, May 12, 2010, accessed April 19, 2015. <http://www.abc.net.au/radionational/programs/bigideas/2010-05-02/3105138>.

³⁹ Judt, Tony, “What is living and what is dead in social democracy?,” *Big Ideas ABC*, May 12, 2010, accessed April 19, 2015. <http://www.abc.net.au/radionational/programs/bigideas/2010-05-02/3105138>.

remain embedded in cornucopian ideals and economic ‘solutions’.⁴⁰ How can we begin to think beyond the ‘econoism’ that Judt is talking about? What can an environmental policy consist of beyond economic measure and where in the hierarchy of key priorities should it fit? Morton suggests that the ecological thought includes thinking past capitalism because it opens the possibility to imagine a different order of things. Can ecological awareness enable a way to generate a new discourse from within an entrenched political structure? In the translators' introduction to Guattari's *The Three Ecologies*, Pinder and Sutton reinforce that Guattari's approach to social ecology required a “... collective production of ... untamed ‘dissident subjectivities’ rather than a mass movement of like minded people.”⁴¹ It is a shift to an ecological thinking that can bring about the intervention in the first place, but this point is to illustrate the difference between collective inhabitants of the Earth and a dominant status quo lead by particular ideals.

During the 1960s, Le Witt and his contemporaries existed within a context that had begun to question modernist ideologies. Artists sought to challenge the existing order and ‘Minimalism’, as it is now known, which was met with a mixed response. In the book *Movements in Modern Art: Minimalism* written in 2002, the artist and author David Batchelor writes that critics such as Clement Greenberg at that time, believed the artworks were “... at odds with the achievements of high modernism”,⁴² as it challenged the emphatic distinction placed between art and non-art⁴³. Batchelor notes that Minimalist art is historically important “... because it substantially changed what art could look like, how it could be made and what it could be made from.”⁴⁴ David Batchelor writes that Minimalism was in contrast with the “... ‘humanism’ of European painting ...”⁴⁵ He

⁴⁰ BBC, “Policy Guide: Where the Parties stand”, BBC, accessed April 16, 2015, <http://www.bbc.co.uk/news/election/2015/manifesto-guide>.

⁴¹ Pinder and Sutton, Introduction to *The Three Ecologies*, by Felix Guattari, (London: Bloomsbury Academic, 2000 [1989]), 4.

⁴² Batchelor, *Minimalism*, 7-8.

⁴³ Batchelor, *Minimalism*, 64.

⁴⁴ Batchelor, *Minimalism*, 7.

⁴⁵ Batchelor, *Minimalism*, 17.

continues, “The progressive de-centring, de-humanising and liberalising of the painting surface was a hallmark of a wide range of art and critical writing at that time.”⁴⁶ In a Guattarian sense, Minimalism could be considered to have created an ‘a-signifying rupture’ to the status quo of the time, the artists and artwork acting as ‘dissident vectors’.⁴⁷

Batchelor further writes that female artists such as Eva Hesse and authors such as Rosalind Krauss and Lucy Lippard, conversely to Greenberg, offered “... more sympathetic, insightful and interesting accounts of Minimal Art ...”⁴⁸ Rosalind Krauss wrote about Le Witt’s work “... To get inside the systems of this work... is precisely to enter a world without a centre, a world of substations and translations nowhere legitimated by the revelations of a transcendental subject.”⁴⁹ This historical shift in critical reflection offers an example of a trajectory from within Minimalism, which facilitated marginal female theorists and artists to begin to transgress the established male dominated order at that time.⁵⁰

The idea of attaining a unified whole is highlighted by the academic Peter Singer in his book *One World: The Ethics of Globalisation*, written in 2002. Through his academic profile, Singer questions the status quo and asks, “What will happen if we continue to emit increasing amounts of greenhouse

⁴⁶ Batchelor *Minimalism*, 17.

⁴⁷ Guattari writes in *The Three Ecologies*, “Ecological praxes strives to scout out the potential vectors of subjectification and singularization at each partial existential locus. They generally seek something that runs counter to the ‘normal’ order of things, a counter-repetition, an intensive given which invokes other intensities to form new existential configurations. These dissident vectors have become relatively detached from their denotative and significative functions and operate as decorporealized existential materials. [...] At the heart of all ecological praxes there is an a-signifying rupture, in which the catalysts of existential change are close at hand, but lack expressive support from the assemblage of enunciation.”

Guattari, *The Three Ecologies*, 30.

⁴⁸ Batchelor, *Minimalism*, 13.

⁴⁹ Krauss, Rosalind, “Le Witt in Progres,” *October* Volume 6 (1978): 60, accessed May 03, 2015, doi: 10.2307/778617.

⁵⁰ This resonates with Guattari’s theory of transversality, which exemplifies a post modern theory, which uses past theory and practices to construct new trajectories in a contemporary context.

gases ...”⁵¹ In the second chapter, “One Atmosphere”,⁵² Singer presents scientific and statistical analysis to establish the environmental crisis of the status quo.⁵³ On one hand, Singer advocates the need for world leaders to act collectively regarding the global issues such as “... trade, climate change, justice, and poverty.”⁵⁴ On the other hand, Singer’s supposed ‘ethical’ argument and pragmatism is overshadowed by an anthropocentric focus, placing emphasis on economical ‘solutions’, which remains within a cornucopian ideology of environmental discourse. This is illustrated in the idea of countries being able to purchase ‘carbon credits’. Singer writes,

“... the point is not to punish nations with high emissions, but to produce the best outcome for the atmosphere. Permitting emissions trading gives us better hope of doing this than prohibiting emissions trading does.”⁵⁵

What is absent from Singer’s argument is questioning who gets to decide that the atmosphere is for sale? I think this book reinforces technocratic hierarchies that are rooted in enlightenment values and capitalist structures, which are conversely the ideologies that a dark ecology seeks to rupture.

The work by Amy Balkin, *Public Smog (2006-11)*,⁵⁶ also uses a Minimalist ‘white cube’ to visualise a park located in the atmosphere. In this subversive project, carbon credits are purchased by a collective to buy ‘cubes’ of atmosphere, which are then ‘retired’, closing the opportunity for them to be polluted by industry. In a similar, though inverted, position to Rosling, Balkin’s interaction with the mode of purchasing carbon credits is an example of an artist inhabiting a space usually reserved for scientific, economical and political disciplines. By seeping between art and science, the artist

⁵¹ Singer, *One World*, (London: Yale University Press, 2004 [2002]), 16.

⁵² Singer, Peter, “One Atmosphere,” in *One World*, (London: Yale University Press, 2004 [2002]), 14-50.

⁵³ Statistics and status quo referring to 2002 when the book was published.

⁵⁴ Singer, *One World*, ix.

⁵⁵ Singer, Singer, *One World*, 46.

⁵⁶ <http://www.publicsmog.org>, accessed April 15, 2015.

brings awareness to the absurdity of public environmental protocols and questions the manmade construct between public and private spaces. Working at this threshold creates the opportunity for Balkin to generate fresh discourse, extending the question from how or why the atmosphere is for sale, towards questioning where lies the boundary of the atmosphere? Is there a limit on carbon and what happens after all the carbon credits are used? The website, which forms an extension of the artwork, creates a multiplicity of both the artwork and the artist, which can reach a much wider audience than if the image was presented as an autonomous object in a traditional gallery. *Public Smog* exemplifies an engaged aesthetic that is enabled through blurring the boundaries between art and science. I think Balkin's oeuvre successfully demonstrates how a creative practice can critically engage with issues of concrete concern today and bring marginal issues to the forefront of contemporary debate.

Morton writes, "Once you start thinking the ecological thought, you can't unthink it: it's a sphincter — once it opens, there's no closing it."⁵⁷ If the 'ecological' opens a multi-scalar definition of dwelling, is it possible that the socio-political structure and fields of art and science are not as stable as we are led to believe? 'Transdisciplinarity' practices, together with an ecological awareness, can destabilise the fields of art and science but these practices also value and utilise the difference between the fields, as a productive and interchangeable space, which can open an opportunity to create fresh discourse and engage with critical issues that affect the status quo of the Earth today. If it is possible to rethink the boundaries between art and science, can other boundaries also be blurred? If so, what affect might this have on ideas of democracy and ethics?

⁵⁷ Morton, *The Ecological Thought*, 4

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Bibliography

1. BBC. "Policy Guide: Where the Parties stand." *BBC*. Accessed April 16, 2015. <http://www.bbc.co.uk/news/election/2015/manifesto-guide>.
2. BBC. "Can banking ever be ethical?." *Thoughts for the Day*. <http://www.bbc.co.uk/guides/zq6c4wx#z2h9kqt>. Accessed March 29, 2015.

3. BBC. "Curbing Mobile phone Waste." *The Science Hour*, March 1, 2015. Accessed March 29, 2015. <http://www.bbc.co.uk/programmes/p02kkygk>.
4. BBC. "Desalination: Can desalination solve water shortages?." *The Science Hour*, March 1, 2015. Accessed March 29, 2015. <http://www.bbc.co.uk/programmes/p02kkygk>.
5. BBC. "Anthropocene Start Date." *The Science Hour*, March, 15, 2015. Accessed March 29, 2015. <http://www.bbc.co.uk/programmes/p02ljc1j>.
6. BBC. "Panorama: Global Warming." *BBC*, 2006. (DVD).
7. BBC. "Climate Conspiracy or Global Catastrophe." *BBC*, 2006. (DVD).
8. BBC. "The Secret Life of Waves." *BBC*, 2011. (DVD).
9. BBC. "Panorama: What's up with the Weather?." *BBC*, 2010. (DVD).
10. BBC. "Horizon: What is One Degree?." *BBC*, 2011. (DVD).
11. BBC. "Climate Conspiracy or Global Catastrophe." *BBC*, 2006. (DVD).
12. BBC. "Panorama: Global Warming." *BBC*, 2006. (DVD).
13. Batchelor, David. *Minimalism: Movements in Modern Art*. Cambridge: University of Cambridge, 1997.
14. Bergson, Henri. *An Introduction to Metaphysics*. Translated by T.E. Hulme. Indianapolis: Hackett, Publications, 1999.
15. Bennett, Jane. *The Enchantment of Modern Life: Attachments, Crossings and Ethics*. New Jersey: Princeton University Press, 2001.
16. Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham: Duke University Press, 2010.
17. Bennett, Jane. "Artistry and Agency in a World of Vibrant Matter," *The New School*. September 27, 2011. Accessed April 26, 2015. <https://www.youtube.com/watch?v=q607Ni23QjA>.
18. Braun, Bruce and Noel Caster, Ed. *Remaking Reality: Nature at the Millennium*. London: Routledge, 1998.
19. Bryant, Levi and Nick Srnicek and Graham Harman. *The Speculative Turn: Continental Materialism and Realism*. Melbourne: re.press, 2011.
20. Coole, Diana and Samantha Frost, ed. *New Materialisms: Ontology, Agency, and Politics*. Durham & London: Duke University Press, 2010.

21. Crickmay, Chris and Miranda Tufnell. *A Widening Field; Journeys in Body and Imagination*. Binsted : Dance Books Ltd, 2004.
22. Critchley, Simon. *The Ethics of Deconstruction: Derrida & Levinas (Second Edition)*. Edinburgh: Edinburgh University Press, 1999 (1992).
23. Dee, Johnny. "The Joy of Stats: Is BBC4 the best teacher I never had?," *The Guardian*, December 08, 2010. Accessed February 19, 2015. <http://www.theguardian.com/tv-and-radio/tvandradioblog/2010/dec/08/bbc4-the-joy-of-stats>.
24. Deleuze, Gilles. *Pure Immanence*. Cambridge, Massachusetts: MIT Press, 2001.
25. Deleuze, Gilles and Felix Guattari. *A Thousand Plateaus*. Translated by Brian Massumi. New York: Continuum, 2002 [1987].
26. Derrida, Jacques . "Hostipitality." *Routledge Angelaki Journal for Theoretical Humanities* Volume 5 Number 3 (2000): 03-17. Translated by Barry Stocker with Forbes Morlock. Accessed November 02, 2014. <http://busyreadywhat.org/Authors/Derrida,%20Jacques/Derrida%20-%20Hostipitality%20-%20Journal%20for%20the%20Theoretical%20Human.pdf>.
27. Descola, Phillippe. *The Ecology of Others*. Translated by Genevieve Gadabout and Benjamin P. Luley. Chicago: Prickly Paradigm Press and University of Chicago Press, 2013.
28. Dickinson Janis. L et al. "The current state of citizen science as a tool for ecological research and public engagement." *Frontiers in Ecology and the Environment* 10(6) (2012): 291–297. Accessed March 29, 2015. doi:10.1890/110236.
29. Dolphijn, Rick and Iris van der Tuin. *New Materialism: Maps and Cartographies*. Ann Arbor: Open Humanities Press, 2012. Accessed February 16, 2015. <http://quod.lib.umich.edu/cgi/p/pod/dod-idx/new-materialism-interviews-cartographies.pdf?c=ohp;idno=11515701.0001.001>.
30. Ehrlich Paul R., Anne H. Ehrlich and John P. Holdren. *Human Ecology: Problems and Solutions*. San Francisco: W.H. Freeman and Company, 1973.
31. Fraser, Mariam, Sarah Kember and Celia Lury. *Inventive Life: Approaches to the New Vitalism*. London: SAGE Publications, 2006.
32. Genosko, Gary. *The Guattari Reader*. Oxford: Blackwell Publishers, 1996. Accessed March 26, 2015. http://monoskop.org/images/4/4b/Genosko_Gary_ed_The_Guattari_Reader.pdf
33. Goldstein, Ann. *A Minimal Future? Art as Object 1958-1968*. Cambridge, Massachusetts and London, England: MIT Press, 2004.

34. Guattari, Felix. *The Three Ecologies*. London: Bloomsbury Academic, 2000 [1989].
35. Guggenheim, Davis. "An Inconvenient Truth, Paramount Classics." *Paramount Home Entertainment*, 2006. (DVD).
36. Harman, Graham. "Propositions, Objects, Questions: Graham Harman in conversation with Joe Roffe." *Paresis: A Journal of Critical Philosophy*, Number 21, 2014: 23-52. Accessed April 19, 2105. http://www.parrhesiajournal.org/parrhesia21/parrhesia21_harman.pdf.
37. Harman, Graham. *Tool-Being: Heidegger and Metaphysics*. Peru, Illinois: Carus Publishing Company, 2002.
38. Harman, Graham. *The Quadruple Project*. Alresford: Zero Books, 2011.
39. Harman, Graham. *Prince of Networks: Bruno Latour and Metaphysics*. Melbourne: re.press, 2009.
40. Harman, Graham. "Objects and the Arts." *Lecture at ICA*. March 27, 2014. Accessed April 26, 2015. <https://www.youtube.com/watch?>
41. Harman, Graham. "Speculative Realism." *Lecture European Graduate School Video Lectures*. December 04, 2013. Accessed April 26, 2015. <https://www.youtube.com/watch?v=hK-5XOwraQo>.
42. Harman, Graham. "Greenberg, Heidegger, McLuhan, and the Arts." *Lecture at Pacific Northwest College of the Arts*, November 28, 2013. Accessed April 26, 2015. <https://www.youtube.com/watch?v=W93DtzHCcnM>.
43. Harman, Graham. "Propositions, "Objects, Questions: Graham Harman in conversation with Jon Roffe." *Parrhesia: A Journal of Critical Philosophy Number 21* (2014): 23-52. Accessed March 29, 2015. http://www.parrhesiajournal.org/parrhesia21/parrhesia21_harman.pdf.
44. Hallam, Elizabeth and Tim Ingold, Ed. *Creativity and Cultural Improvisation*. Oxford: Berg Publishers, 2007.
45. Ingold, Tim. *Making: Anthropology, Archaeology, Art and Architecture*. Oxon: Routledge, 2013.
46. Ingold, Tim. *The Perception of the Environment: Essays in Livelihood, Dwelling and Skill*. Oxon: Routledge, 2000.
47. Jamieson, Dale. *Ethics and the Environment: An Introduction*. Cambridge: Cambridge University Press, 2009 [2008].

48. Judt, Tony. "What is living and what is dead in social democracy?." *Big Ideas ABC*, May 12, 2010. Accessed April 19, 2015. <http://www.abc.net.au/radionational/programs/bigideas/2010-05-02/3105138>.
49. Kat Austen Website. Accessed March 29, 2015. <https://katausten.wordpress.com>.
50. Klein, Naomi. *This Changes Everything: Capitalism vs. The Climate*. St Ives: Penguin Books: 2014.
51. Krauss, Rosalind. "Sculpture in the Expanded Field." *October* Vol 8 Spring (1979): 30-44. Cambridge, Massachusetts: MIT Press. Accessed February 19, 2015. <http://isites.harvard.edu/fs/docs/icb.topic641765.files/4%20Krauss%20-%20Sculpture%20in%20the%20Expanded%20Field.pdf>.
52. Krauss, Rosalind. "Le Witt in Progres." *October* Volume 6 (1978): 46-60. Cambridge, Massachusetts: MIT Press. Accessed May 03, 2015. doi: 10.2307/778617.
53. Kalinovska, Milena, Cur. *Beyond Preconceptions: The Sixties Experiment*. New York: Independent Curators International (ICI), 2000.
54. Latour, Bruno. *Politics of Nature: How to Bring the Sciences into Democracy*. Translated by Catherine Porter. Cambridge, Massachusetts: Harvard University Press, 2004.
55. Latour, Bruno and Graham Harman and Peter Erdelyi. *The Prince and the Wolf: Latour and Harman at the LSE*. Alresford, Hampshire: Zero Books, 2011.
56. Singer, Peter. *How are we to Live?: Ethics in the Age of Self-Interest*. New York: Prometheus Books, 1995.
57. Lopez, Antonio. *The Media Ecosystem*. Berkeley: Evolve Editions, 2012.
58. Merchant, Carolyn. *The Death of Nature*. New York: First Harper Row Paperback Edition, 1983 (1980).
59. Merchant, Carolyn, Ed. *Ecology: Key Concepts in Critical Theory*. New Jersey: Humanities Press International, Inc., 1994.
60. Merchant, Carolyn. *Reinventing Eden: The Fate of Nature in Western Culture*. New York: Routledge, 2004.
61. Meyer, John M. *Political Nature: Environmentalism and the Interpretations of Western Thought*. Cambridge, Massachusetts: Massachusetts Institute of Technology, 2001.
62. Meyer, James. *Minimalism: Art and Polemic in the Sixties*. New Haven and London: Yale University Press, 2004 [2001].

63. Meyer, James. *Minimalism*. London: Phaidon Press Limited, 2000.
64. Morelle, Rebecca. "Anthropocene: New dates proposed for the 'Age of Man'." *BBC*, March 11, 2015. Accessed March 29, 2015. <http://www.bbc.co.uk/news/science-environment-31836233>.
65. Morton, Timothy. "Nonlocality." In *Hyperobjects*, 38-54. London: University of Minnesota Press, 2013.
66. Morton, Timothy. "Thinking Ecology: The Mesh (1, 2 & 3)." Lecture on *YouTube*, May 21, 2009. Accessed April 26, 2015. <https://www.youtube.com/watch?v=viiA5s8DV7I>.
67. Morton, Timothy. *Realist Magic: Objects, Ontology, Causality*. Ann Arbor: Open Humanities Press, 2013.
68. Nkosi, Milton. "After Garissa Attack, Grief and Questions in Kenya." *BBC*, April 10, 2015. Accessed April 16, 2015. <http://www.bbc.co.uk/news/world-africa-32259581>.
69. Online dictionary. Accessed February 16, 2015. <http://dictionary.reference.com/browse/logic>.
70. Orlovski, Jeff. "Chasing Ice." Dogwoof, 2012. (DVD).
71. Preston, Alex. "The war against humanities at Britain universities." *The Guardian*, March 29, 2015. Accessed April 19, 2015. <http://www.theguardian.com/education/2015/mar/29/war-against-humanities-at-britains-universities>.
72. Public School website. Accessed May 03, 2015. <http://thepublicschool.org/node/27622>.
73. Rajchman, John. *The Deleuze Connections*. Cambridge, Massachusetts: MIT Press, 2000.
74. Reynolds, Jack. "Time Out of Joint: Between Phenomenology and Post-Structuralism", *Parrhesia: A Journal of Critical Philosophy* Number 9 (2010): 55-64. Accessed March 29, 2015. http://www.parrhesiajournal.org/parrhesia09/parrhesia09_reynolds.pdf.
75. Robinson, Dave and Bill Mayblin. *Introducing Empiricism*. Royston: Icon Books Ltd, 2004.
76. Robinson, Joshua , Oiliver Milman and Melissa Davey. "Cyclone Marcia causes widespread damage in mid-north Queensland – the day's events." *The Guardian*, February 20, 2015. Accessed December 15, 2014. <http://www.theguardian.com/world/live/2015/feb/20/tropical-cyclone-marcia-hits-queensland-as-category-five-and-lam-hits-nt-live>
77. Rosling, Hans. "Hans Rosling: Global Population Box by Box." *Ted TV*, June 2010. Accessed February 19, 2015. http://www.ted.com/talks/hans_rosling_on_global_population_growth.

78. Rosling, Hans. "Religions and Babies April 2012" *Ted TV*, May 22, 2012. Accessed March 27, 2015. http://www.ted.com/talks/hans_rosling_religions_and_babies#t-769425.
79. Rosling, Hans. "Hans Rosling and the magic washing machine 2010.", *You Tube*. October 11, 2011. Accessed February 19, 2015. <https://www.youtube.com/watch?v=6sqnptx1Ccw>.
80. Singer, Peter. *One World: The Ethics of Globalisation*. London: Yale University Press, 2004 [2002].
81. Smooth, Kevin. "The Carbon Neutral myth, Offset indulgences of your Climate Sins." *Carbon Trade Watch: Transitional Institute*, 2007. Accessed April 16, 2015. http://www.carbontradewatch.org/pubs/carbon_neutral_myth.pdf
82. "Still True, Still Inconvenient: What We've Learned Since 2006." *Take Part*, June 09, 2013. Accessed February 13, 2015. <http://www.takepart.com/article/2013/06/10/climate-change-what-we-know-now>.
83. "A Radical Manifesto." *The National Observer, and British Review of Politics, Economics, Literature, Science, and Art* Vol.18 455 (1897): 398-399. Accessed April 25, 2015. <http://search.proquest.com/docview/6094712?accountid=11149>.
84. "Science and Truth." *Saturday Review of Politics, Literature, Science and Art* 4318 (1938):19. Accessed April 25, 2015. <http://search.proquest.com/docview/9622605?accountid=11149>.
85. Varela, Francisco J. *Ethical Know-How: Action, Wisdom, And Cognition*. Stanford: Stanford University Press, 1999 [1992].
86. "Artist in Residence: Kat Austen." *UCL*, 2015. Accessed March 29, 2015. <http://www.ucl.ac.uk/mathematical-physical-sciences/about-the-faculty/artist-in-residence>.
87. Wheatcroft, Geoffrey. "Tony Judd Obituary." *The Guardian*, August 08, 2010. Accessed April 19, 2015. <http://www.theguardian.com/books/2010/aug/08/tony-judd-obituary>.