LET THE PANDAS DIE

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A contemporary account of our view of conservational ecology and its stranglehold on radical new ideas for homo-natural interactions.

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Introduction

We live in an age where one of our biggest fears is ecological and environmental demise. The once-welcomed advantages of the industrial revolution are being reconsidered due to its menacing consequences. Technology is growing at such an unprecedented rate that even stable, concrete growth prediction models such as Moore's law are being disobeyed.[1] Climate change is threatening our coastal survival, species are in the brink of extinction, and weather phenomena are getting more and more unpredictable.[2] In addition, human population is booming because of advances in medicine and longer life spans. This cripples our resources and makes us wonder when and how this climax will manifest itself.

Of course the world is too complex for one singular, universal, holistic plan of survival to be ratified. Green politics and international agreements have been unsuccessful in delivering results and making a meaningful impact.[3] Some critics and scientists believe that we should cut carbon emissions, and others believe that we should focus on saving animals from extinction. Constant moral, scientific and political insecurity are slowing down decision-making, trying to find the rightest, most moral path. More importantly, new science that could deliver results is instantly rejected because it is not natural, but is man-made.[4]

This dissertation discusses the validity of our modern ecological thinking that enables us to make decisions about our species' future. Our idealisation, understanding, and perception of nature will be analysed in relation to how we make decisions about our actions towards conserving and preserving the environment. In addition, the possibilities of new, more artificial ways of living will be juxtaposed to our arguably traditionalist decision-making. A key question is whether the way we perceive nature presently stops

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1 Thompson, S. E. and Parthasarathy, S., 2006. Moore's law: the future of Si microelectronics. *Materials Today*, **9** (6), p. 21.

2 Laverty, A. (Series editor), 2012. *Global Weirding*. [Television] Horizon, BBC Two, 16, May.

3 Jha, A., 2009. *Why do we still disagree about climate change?*. [Podcast]. London: Guardian. (http://www.guardian.co.uk/science/audio/2009/may/11/science-weekly-podcast-climate-change)

4 Connor, S., 2010. *Environmentalists try to ban release of synthetic life forms into the wild*. [Online article]. Available from: http://www.independent.co.uk/news/science/environmentalists--try-to-ban-release--of-synthetic-life--forms-into-the-wild-1981120.html
[accessed 28 September 2012]

us from making more daring decisions and experiments in our conservation, interaction, and relationship with our planet.

The first chapter is used as a brief introduction to the history of ecology and conservation. Key concepts such as creationism and darwinism will be introduced to illustrate how ecology shifted from an atomic focus to a more networked view. This will be supported by examples of concepts that influenced the science of ecology, such as cybernetics, psychophysiology, and the Gaia hypothesis.

In chapter two, the concept that nature is an ideology created by humans will be analysed. Firstly, the human's role in nature will be discussed. The view of nature as a complex system which can be modeled and predicted accurately will be compared with the chaotic nature of ecosystems, as well as the controversial methodology of ceteris paribus. Finally, the meaning of the "perfect nature" will be analysed to shed some light on how humans imagine the perfect symbiosis between man and nature.

The third chapter will focus on nature's ever-changing, unpredictable behaviour. The topic of chaotic determinism will be introduced in relation to the previous chapter's discussion about the human machine-view of nature. The fact that catalysis and change in nature happens through disaster will be illustrated through examples and explanations of historical natural phenomena. Together with evolution, this premise will be compared with the aims of human-led conservation.

Finally, the last chapter will discuss whether conservation is a traditionalist theory. More importantly, this chapter will be used as a way to introduce the idea that natural conservation could be holding our species back from being more daring in our scientific, cultural, economic and social experimentation. Alternative thinking in ecology and conservation will be shown, as well as critiqued on its success to break through environmental policy and traditionalist ecologist critics.

Because of the vast nature of this argument, a distinction must be made. Firstly, there are two different kinds of conservation that have been identified through literary research: conservation of the human species and conservation of our environment. This is an important distinction to keep in mind throughout this discussion. For example, saving a certain species from extinction could be seen as conservation of our environment because even though the endangered species could be linked to humans through ecological feedback loops, it is not directly related to our survival. By contrast, rising sea levels caused by climate change are directly related to our survival. A decrease in human population could be expected because of floods, extreme weather phenomena and diminishing agricultural conditions.

A delimitation of research that must be declared relates to the cause of natural phenomena and ecological change. There is simply too big a controversy for example to try to discuss whether humans caused climate change through carbon emissions or whether it is the cause of the end of our current ice age period. Human attitude towards these responsibilities will be part of this dissertation (such as guilt-driven action, discussions amongst scientists and policy makers) but the cause of these disasters is not part of this discussion.

A brief history of ecological thinking.

"The Lord God took the man and put him in the Garden of Eden to work it and take care of it." (Genesis 2:15)

Ideas of conservation and ecology can be found in many historical instances, such as the Old Testament. The awareness of natural resource limits has been a tough realisation for many civilisations. Mostly driven by fear of starvation, humans had to respect their land, at least on a hyperlocal scale, and those who didn't, led their civilisation into collapse. Diamond states that the process of societal collapse caused of environmental damage can be pinned down to eight categories: deforestation, soil problems, water management, overhunting, overfishing, alien species, human population growth, and increased per capita impact of people.[5] Of course, just one of these could trigger more destructive events. For example, increased per capita impact of people could cause agriculturally marginal lands, which could in turn trigger a hunger period. This could lead to political instability, starvation, disease, ending with a loss in political, economic and cultural complexity.

Before the industrial revolution, most families lived in agricultural societies, where their primary concern was to produce food for their families. The industrial revolution was a radical shift in ecological thinking. Large amounts of population dropped their rural lives in exchange for a more aspirational, more urbanised one. Ophuls describes this historical period as the moment in which the human exploitation of nature changed. He suggests that before this period, humans exploited nature with the lingering concern of self-destruction. However, the ideologies of the industrial revolution brought the idea that we can "bend the so called external world to its will."[6] Instead of preserving nature and respecting it, man started thinking that he should tame nature and control its menacing power.

Another significant turning point in the way we perceive nature that coincidentally happened during the industrial revolution was Darwin's Theory of Evolution. In his theory's heart was natural selection, a process in which certain traits in species become

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[5] Diamond, J. M., 2005. Collapse : How Societies Choose to Fail or Survive. London: Allen Lane, p. 6.

[6] Ophuls, W., 2011. Plato's revenge: politics in the age of ecology. Cambridge,Mass.: MIT Press.

universally more or less frequent. This was based on three derived facts. Firstly, individuals in populations have different varying characteristics (phenotypic variation). Secondly, some individuals have certain traits that give them the ability to survive and reproduce much more easily than others (differential fitness). Lastly, parents can pass on these traits to their offspring and future generations (fitness is heritable).[7] Even though his ideas were radical at the time, Darwin was the first to postulate a theory opposing to that of Creation. His theory described an ever-changing system of selection and survival of the fittest that departed from the idea that nature is constant.

In 1935, Arthur Tansley used the term *ecosystem* to describe nature as a system of interconnected individuals who pass on energy from one part of the network to another.[8] Tansley believed that previous "biome" hypotheses focused on living animals and plants, whereas his ecosystem perfectly encapsulated the interactions between all living things, as well as physical factors such as resources and spatial, geological and geographical entities. Moving away from considering animals and plants as the most important entities to study in ecology, he focused on identifying traits in ecosystems. For example, he studied degrees of isolation, diversity, population growth, as well as unique geographical constraints. Tansley's unique hypothesis on natural analysis formed the foundation of modern ecology and provided the first step to a grander view of nature that does not diminish the empirical ways in which scientists study it.

After Tansley's systemic view of nature, ecology was influenced by the field of cybernetics. The field of cybernetics has been describe as a "crossroads of the sciences", where parts of sociology, neurology, economics, and other concrete sciences are examined under the lens of more contemporary theories relating to computer theory, electronics, in the hope to provide new useful applications for the world.[9] This machinist way of thinking eventually shifted its attention towards the science of ecology. Tansley's ideas of the ecosystem, which had primed ecology with models to describe natural entities, helped create a new strand of ecology in which everything can be explained in empirical models.

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[7] Lewontin, R. C., 1970. The Units of Selection. Ecology and Systematics, 1 p. 1.

[8] Tansley, A. G., 1935. The use and abuse of vegetational concepts and terms. Ecology, 16 (3), p. 299-300.

[9] Guilbaud, G.T., 1959. What is cybernetics?. English translation ed. London: Heinemann, p. 3-4.

Jay Forrester was one of the most pertinent scientists in the application of computer models to nature in order to predict future events. He believed that nature could be modeled accurately through computer programs by feeding real-world data into them. Forrester described models in which individuals' actions influence the actions of others through feedback loops.[10] In 1973, he helped the Club of Rome, an independent think tank for identifying issues that threaten human society, by building a computer model to describe the world. This included complex subsystems that described environmental resources, pollution rates, population growth and others, all linked with non-linear connections otherwise known as feedback loops. When ran through a computer, Forrester's model predicted that if we continued to live the way we did at the time of the research, our exploitation of natural materials, pollution, population, and many other socio-economic factors would overshoot past the planet's capacity to provide our demands *by 2100*. This would in turn lead to hunger, disease, wars, political instability, and an overall devaluation in living standards.[11] Even though Forrester's methodology was debated heavily, it was the first time that systems dynamics were used so confidently and daringly. It could be argued that even modern science uses prediction systems similar to Forrester's. We try to predict the weather, climate change, shifts in population, and most ecological events through computer models and simulations.

The fields of ecology and conservation have shifted monumentally since the beginning of the field's account. From creationism to the theory of evolution, we realised that nature is an ever-changing, morphing environment, and over time it adapts to new actors and conditions. Also, Tansley's ideas of ecosystems and the systemic approach in trying to understand the interactions between species and their environment, shifted scientific ecological attitude towards a more networked, machinist analogy. This, in turn, set the stage for system dynamics, in which nature becomes a predictable set of interactions that can be modeled by humans and run through computer programs to predict its telos. Our theories of nature have followed the same trend that describes the way we grow as a species: they have been transformed from fearful attempts to grasp

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[10] Forrester, J.W., 1995. Counterintuitive behavior of social systems. [Online article]. Available from: http://clexchange.org/ftp/documents/system-dynamics/SD1993-01CounterintuitiveBe.pdf
[accessed 29 September 2012]

[11] The Club of Rome, 2012. 40 years Limits to Growth. [Webpage]. Available from: http://www.clubofrome.org/?p=326
[accessed 30 September 2012]

nature's power to conceited (and sometimes hubristic) strategies that try to bend nature to our will, analyse it empirically, or even predict its course.

Idealising nature

Idealism is defined in the Cambridge dictionaries as *"the belief that your ideals can be achieved, often when this does not seem likely to others."* [12] Idealism in ecology and conservation is a very striking, perhaps controversial remark about the way humans interact with and act on nature. Man's attitude towards, definitions, beliefs, and models of nature could be seen as an idealisation of nature itself. This hypothesis will be discussed further in this section through three examples: the human role in nature, man's description of nature as a self-organising system, and the idea of a perfect nature. Because of the nature of this discussion, it is important to stress that this is a hypothesis. The mere proposition of a hypothesis comes with the necessity for discussion and systematic analysis, but welcomes opposing discussion, juxtaposition and further debate.

Humanity's role in nature is of upmost importance in this discussion. Creationism demands that man must take care of his environment, Adam and Eve playing a key part in the allegorical telling of the importance of conservation. Even though the Old Testament cannot be considered as factual evidence for the need to protect nature, it is tightly weaved into our social and moral fabric. According to the Old Testament, God placed man above all natural creatures to govern them.[13] This responsibility has continued through Christianity's didactic efforts and could be considered as the foundation of Western natural conservation.

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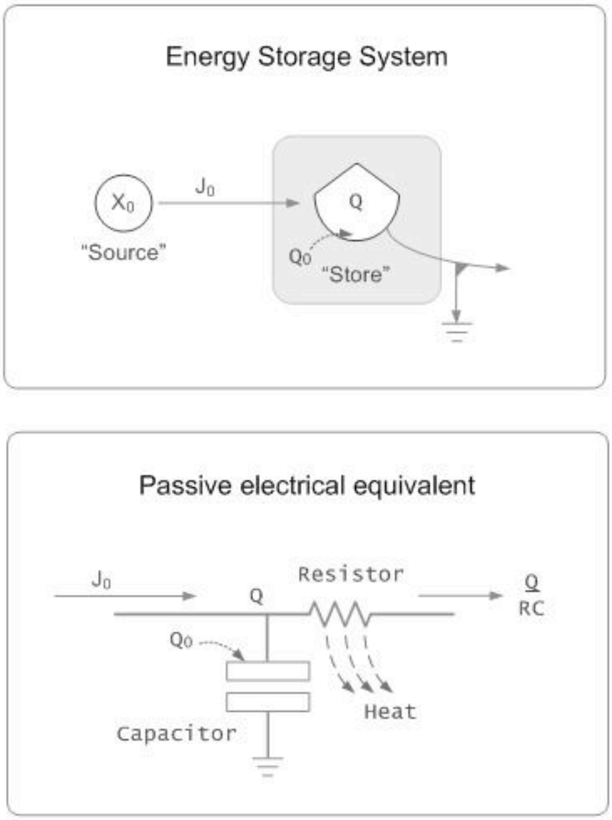
[12] Cambridge University Press, 2011. Cambridge Dictionary Online. [Webpage]. Available from: http://dictionary.cambridge.org/dictionary/british/idealism [accessed 30 September 2012]

[13] Barr, J., 1972. Man and nature - the ecological controversy and the Old Testament. Bulletin of the John Rylands Library, 55 (1), p. 10.



Adapted from H.T.Odum (1994) Fig. 3-8, p. 35

Figure 1. H.T. Odum's electrical diagram of ecosystems

The first idealistic element in our perception of nature is our study of nature itself. Tansley's proposition of ecosystems and Forrester's systems to model them suggest a nature which we can understand empirically, through population statistics and behavioural patterns. H.T. Odum described nature as an electrical system, in which energy flowed from one environmental agent to the other. In fact, he stretched this metaphor to a level which enabled him to use electrical diagrams to describe the exchange and conversion of energy between individuals in an ecosystem. Odum cherry-picked data to fit his diagrams and models of ecosystems. Curtis describes this as the point when this method *"stopped being a metaphor and became what seemed to be a scientific description of reality."* [14] The way Odum described nature is strikingly close to ideological thinking, since it translated real-world interactions into a fantasy of order and grander purpose.

Models of nature like Odum, Tansley and Forrester's, derived from systems dynamics, are based on a surprisingly small amount of observation and data. Instead, they rely on a human-made model that is run through computers that provide a *simulation* of this model. Therefore, the interpretation of reality is composed of systems created from the

[14] Curtis, A., 2011. All watched over by machines of loving grace. [Television broadcast]. London: BBC.

author's perspective. Odum, Tansley and Forrester's systems embody this methodology and only separate from each other through slight variations, some focusing more on human activity, others focusing on the energy transfer within the animal kingdom. Nordhaus describes this as *"measurement without data. ... Not a single relationship or variable is drawn from actual data or empirical studies."* [15]

The most idealistic element in the coupling of ecology and systems dynamics is the conclusion that we can model nature so accurately that we can predict it. Returning to Forrester's system of the world created for the Club of Rome's cautionary report, one senses an inherent absolution in his conclusions. Limits to Growth, the text that Forrester's model and predictions were published in along with the Club of Rome's suggestions for avoiding global collapse, has been a topic of controversy within the academic community. The models that create these predictions heavily aggregate social, economic and natural interactions, adopting a ceteris paribus attitude towards modeling and predicting. This attitude of "all other things being equal" is precisely the idealisation of nature as a stable, tightly predictable, deterministic system.

Another aspect of the human idealisation of nature is man's view of the 'perfect nature'. Zizek argues that the nature we consider as perfect is in fact the *present* nature.[16] Humans do not fantasize about a future nature, but they try to preserve nature as they know it. This is at the core of the Green movement, as well as our environmental policies. The romanticism that we expierience with natural components that we have in our lives drives us to preserve them. For example, we treat endangered species with respect and care because we cannot bear to leave behind part of our natural existence.

Our mere definition of nature has become less concrete. On the surface of nature's definition lies a predominance of purity. What we consider as nature must be untouched by humans, isolated from our artificial activity and monumental influence. Paradoxically, a visit to the countryside makes us proclaim how great it is to be around nature, although 77% of the countryside in the United Kingdom is dominated by agricultural

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[15] Nordhaus, W. D., 1973. World Dynamics: Mesurement without data. The Economic Journal, 83 (332), p. 1157.

[16] Taylor, A., 2008. Examined life. [Documentary]. Canada: Sphinx Productions.

land.[17] Farms are man-made infrastructures in which one species is planted in patterned rows in perfect equidistance, then discarded once its precious fruit is extracted for human use.

Furthermore, our separation of the natural and artificial is hindered by our technological, moral and social progression. By defining what is natural based on our recent experience, we forget what we did not consider part of nature many years ago. There seems to be an enrollment process in the inclusion of visual and sensory interactions to what we consider as natural. Since we have moved to cities, we have enlisted the countryside to our list of natural landscapes. However, it is possible that agricultural landscapes were not considered as nature before the industrial revolution, since there was not a stronger human artifice to contrast it against. Now that we live in grey, shady, urban environments, we see farms as a more natural visual/sensory picture than the metropolis we are used to living in.

Our mechanical view of nature, as well as our hazy separation between nature and artifice encourages our illusionary ecological thinking. There are many aspects of our lives that are difficult to define, but it could be argued that our idealisation of nature drives us to unrealistic expectations as well as paradoxical beliefs about conservation. Understanding our natural world is a very difficult, optimistic requirement for humanity full of battling perspectives and approaches. It is therefore understandable that the topics discussed are unresolved and debatable. This is only problematic when our hypotheses drive our decisions, because what was once a rational objective becomes ideological thinking.

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[17] Angus, A., Burgess, P.J. et al, 2009. Agriculture and land use: Demand for and supply of agricultural commodities, characteristics of the farming and food industries, and implications for land use in the UK. Land Use Policy, 26 (1), p. 230.

Nature in a constant flux

In order to fully discuss the way we make decisions in ecological conservation, it is important to compare our aim to preserve ecosystems against our understanding of nature's dynamic, evolving disposition. Some of the most important aspects of nature are its inherent chaos, its capacity to evolve, and its reincarnation through disasters. It is pertinent to analyse these qualities in relation to human idealisations of nature discussed in the former section. The dynamic nature of our planet is of momentous significance to our understanding of ecology, as well as our rationale behind our environmental decisions as a collective.

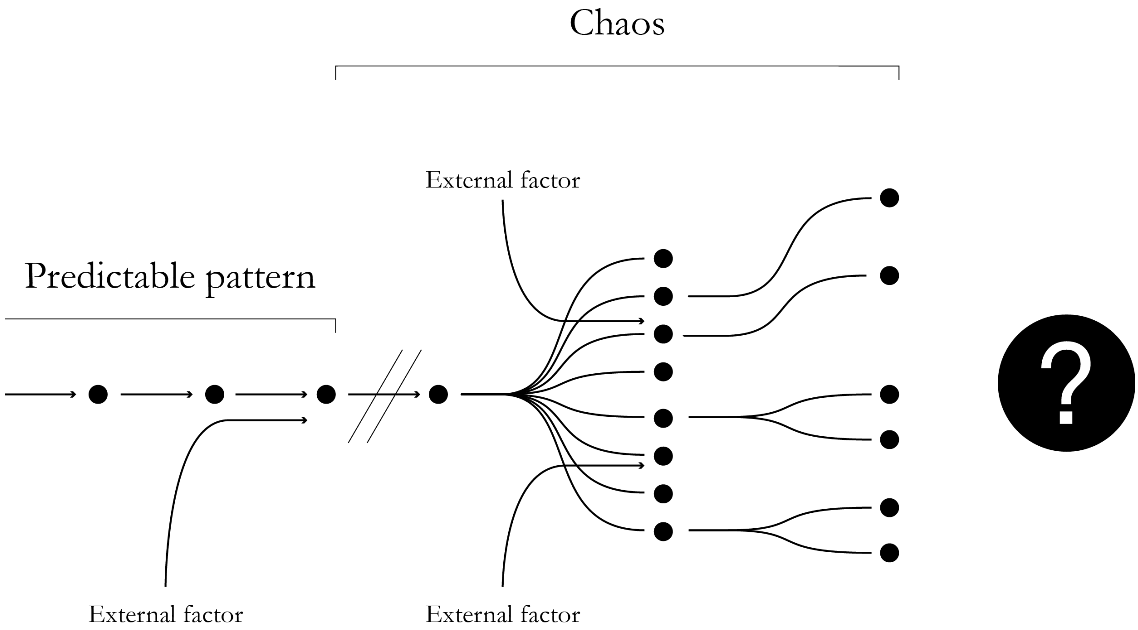

Figure 2. Prediction becomes impossible in the long run.

"We tend to think science has explained everything when it has explained how the moon goes around the earth. But this idea of a clocklike universe has nothing to do with the real world." [18] The scientific method of inquiry entails that we find a topic of discussion, analyse it systematically, model it mathematically, and test the resulting model. The model of a physical phenomenon can be used to accurately predict the outcome of a group of actions. However, this is rarely orthodox in larger ecological systems. This is because natural reality is deterministic, but has an overarching element of chaos. The chaotic behaviour of nature is exactly what has provided the abundant variety in our environment. For example, we build systems to predict our weather by analysing pressure changes and

[18] Briggs, J., 1992. Fractals: The Patterns of Chaos - Discovering a New Aesthetic of Art, Science and Nature. London: Thames & Hudson Ltd, p. 12.

wind vectors. Yet there is always a lingering element of randomness.[19] The diagram above demonstrates the duality between predictability and chaos in nature. An appropriate example here is our prediction of growth in an organism. The immediate future of the organism can be predicted easily through mathematical models and formulas. However, as time passes, more and more external factors start influencing the way the organism grows. These are factors that we cannot predict. In reality, there are just too many chaotic factors that make the more long-term predictions difficult, often impossible. For example the growth of the organism could be affected by magnetic fields, soil quality, gravity, wind, and countless other factors.

In order to empirically study nature, science has to simplify the conditions under which a particular environmental agent is studied. Returning to the Odum brothers' "Fundamentals of Nature" and their proposed ecosystem approach, the logic underlying their models might have been concrete. However, in order for the empirical evidence to match their machine-like diagrams, they simplified the input data, ignoring agitations caused by randomness. This is also known as "publication bias", a notorious academic faux pas in which overly excited scientists cherry-pick their data to make it fit with their hypothesis (consciously or subconsciously).[20] The act of simplifying the chaotic side of nature is not rare.

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[19] Laverty, A. (Series editor), 2012. Global Weirding. [Television] Horizon, BBC Two, 16, May.

[20] Ben Goldacre, 2012. What doctors don't know about the drugs they prescribe. [Online talk]. Available from: http://www.ted.com/talks/lang/en/ben_goldacre_what_doctors_don_t_know_about_the_drugs_they_prescribe.html [accessed 4 October 2012]

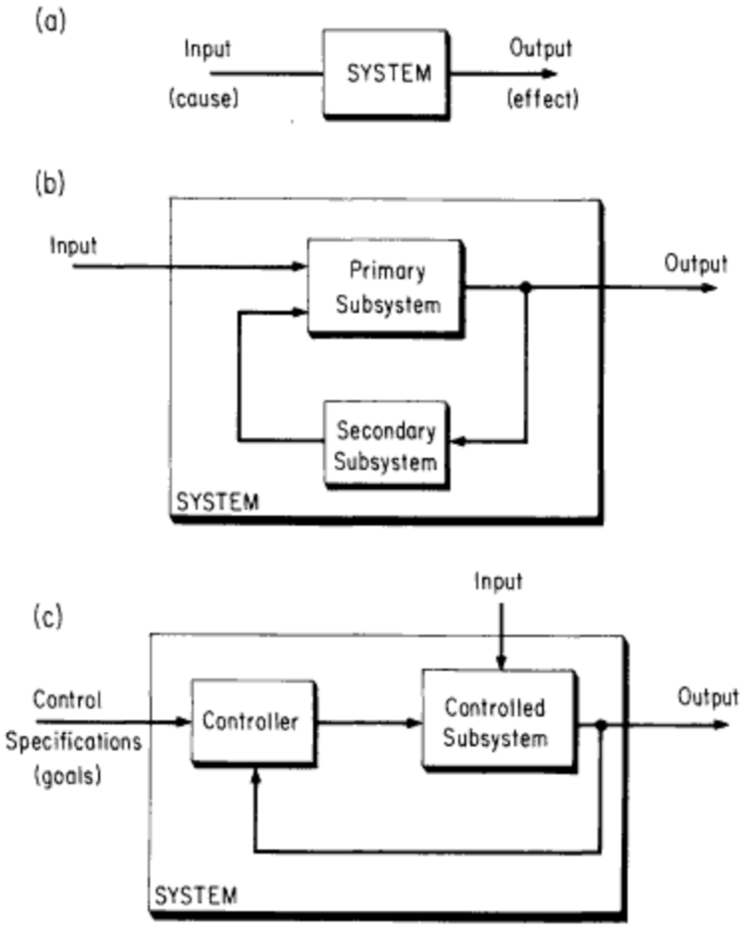

Figure 3. Stability control
in cybernetic ecosystems.
(Odum, 1981)

More importantly, the belief in an overarching balance in ecosystems is highly problematic. *"Negative feedback loops are goal directed and stabilize the cybernetic system. When the system is perturbed the feedbacks reduce the effect; this leads to regulation in which certain variables are held constant; such systems are stable. The stability is conferred by the information networks; goal-seeking and homeostatic behaviors are characteristics to be reserved for cybernetic systems."* [21] 20th century ecological thinking has been dominated by Odum's promise that ecosystems always work towards an equilibrium. through feedback loops and control systems embedded in subsystems. More contemporary ecologists such as Daniel Botkin have illustrated through empirical evidence that even ecosystems in which human influence is absent rarely balance themselves in a state of equilibrium.[22] Yet the cybernetic approach

[21] Patten, B.C. and Odum, E.P., 1981. The cybernetic nature of ecosystems. The American Naturalist, 118 (6), p. 887.

[22] Curtis, A., 2011. All watched over by machines of loving grace. [Television broadcast]. London: BBC.

of ecology seems much more tantalising and inviting to humans, whilst the more realistic nature dominated by chaos is incomprehensible to us.

Furthermore, disasters and periods of fluctuating conditions act as a catalyst for change. 4 billion years ago, Earth was populated by anaerobic bacteria known as cyanos. The bacteria overpopulated the planet, which in turn produced an abundance of oxygen. This oxygen wiped out most of the cyanos, marking this as one of the biggest extinctions of life in the history of our planet. However, bacteria then started borrowing DNA material from each other through digestion, resulting in new microorganisms that could aerobically respirate. These formed the basis of how animal cells can turn oxygen into carbon dioxide. They coexist symbiotically aside anaerobic microorganisms.[23] Another account of catalysis through disaster is the extinction of dinosaurs. Our most prominent theory explains that dinosaurs became extinct because of a monumental spatial impact.[24] The natural environment that came after this disaster was never the same as it was before. New species were born and dinosaurs were left behind. The conditions of the planet changed, which in turn made possible the next generation of species, environments and ecosystems.

Finally, evolution is one of the largest contributors to change in nature. As previously discussed in chapter 1, behavioural and physical traits change in organisms through the process of natural selection. This ubiquitous theory in nature explains how humans evolved from ape-like mammals as well as how other plants and animals acquired traits that aid them with survival. When environmental conditions change, species that cannot survive in them are left behind. This ever-changing state of flux in evolutionary survival is precisely what gives nature the ability to adapt to new universal conditions. In our modern technological, pollution-heavy way of inhabiting the planet, humans introduce new environmental factors that force natural selection upon indigenous species. A classic example of this process taking place is the population of darkly and lightly coloured black moth in the United Kingdom after the Industrial Revolution. Dark smoke emitted from factories during the Industrial Revolution affected the colour of bark in indigenous

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[23] Sissons, T.H., 2004. First Life. [Webpage].
Available from: http://www.alloftimeonline.com/First%20Life.htm
[accessed 4 October 2012]

[24] Rincon, P., 2012. Dinosaur extinction link to crater confirmed. [Website]. BBC News, 4, March.
Available from: http://news.bbc.co.uk/1/hi/8550504.stm
[accessed 4 October 2012].

trees. Light moths, which were the most common in the UK at the time, started to lose their ability to camouflage in the newly blackened bark. In turn, birds surveying around trees for prey were able to spot the lightly coloured moths against the black surface of the tree. The black moth, which was previously more popular prey because it stood out against the light surface of the tree, became better at hiding against the darkened bark. Therefore, the population of light moths plummeted and that of dark moths increased.[25] This might be a small change in the context of Britain's ecology, but it clearly illustrates that natural selection is one of the most instantaneous, impulsive ways for the planet to adapt to new conditions, even those brought by human artifice.

Catalysis through disaster, evolution, as well as nature's instability are the reality of ecology and how it should be studied. As previously discussed, our perception of nature has not been standardised. It is very ambitious to ask for such a universal agreement towards the acceptance of nature's ever-changing ways. It has always been one of the main objectives of ecology to try to model, understand and predict the chaotic, confusing, monumental change in nature. However, our idealisations of nature that disagree with its constant flux create paradoxes in our decisions, pulling us further from agreeing whether our actions upon it are right or wrong.

[25] Truth In Science, 2012. The peppered moth. [Webpage].
Available from: http://www.truthinscience.org.uk/tis2/index.php/component/content/article/127.html
[accessed 4 October 2012]

Conservation - A traditionalist theory

"Against that positivism which stops before phenomena, saying "there are only facts," I should say: no, it is precisely facts that do not exist, only interpretations…" [26]

Frederik Nietzsche

If ecology is the study of nature and its interactions between living species and environmental factors on Earth, then conservation is our effort to sustain the health of those ecological entities. The field of conservation is composed by our collective efforts to manage resource use, biological diversity, pollution levels and ecosystems through governmental policies, voluntary work, and social human behaviour. Conservation has always been driven by scientific input. Science is what provides the rationality in decisions we make about conservation, validating the way humans set targets to reduce their impact on nature. Nietzsche's statement about the importance of the interpretation on factual data is important in the context of biological conservation. This interpretation of empirical thought is exactly what makes conservation a set of principles, morals and attitudes towards man's influence on nature. It is therefore pertinent to compare the principles of conservation with our view of ecology and nature discussed in previous chapters. Through this discussion, paradoxes in conservational thinking arise. Furthermore, the human idealisation of nature restricts the possibility of new futures in which humans accept that they have become artificial. This acceptance could enable them to experiment with new, less orthodox ways of coexisting with nature.

Zizek argues that it is the *"implicit premise of ecology that the existing world is the best possible world."* [27] Although he states this about ecology, his argument is even more literal in the space of conservation. Our recent and current experience of nature is the best possible nature for us to sustain. Through our aim of trying to keep ecosystems and species from becoming extinct, we try to stop nature from changing. It could be (and has been) argued that saving giant pandas from extinction is a lost cause because they have

[26] Nietzsche, F., 1954. The Portable Nietzsche. 1 ed. New York: Penguin, p. 458.

[27] Taylor, A., 2008. Examined life. [Documentary]. Canada: Sphinx Productions.

reached an evolutionary dead end.[28] Their digestive system is one of a carnivore, but they mostly survive on 11 kilograms of bamboo per day. Because of their digestive track, they can absorb little protein and energy from their main food source. They are also known for their infamous difficulty with mating.[29] We could interpret the plummeting population of pandas as natural selection. Instead, we feel responsible for the wellbeing of these animals, which is in turn amplified by an element of guilt. Furthermore, we choose to pour funding on conserving pandas, whereas many endangered insects are surprisingly left to their own demise.[30] This is not to say that one species is more important than the other, but it does shed some light on the degree of rationality behind our conservational decisions.

Another example of the duality between conservation and nature's chaotic behaviour is our perception and attitude towards climate change. We accept that we are responsible for global warming and the melting ice caps so fully that year after year we set ambitious targets to reduce our carbon emissions. There is still ambiguity as to whether humans are causing a rise in temperatures or we are simply still at the end of an ice age. There is also a more complex possibility in which the planet's CO2 emissions are rising naturally, but our agricultural and technological activities are accelerating the effect.[31] Returning to the delimitations of research mentioned in the introductory section, debating around the cause of climate change is not part of this discussion. However, it is interesting that the stronger side of the argument is one which is fueled by guilt and a rejection of change. Similarly, it is also worrying to think about how publication bias may influence studies of CO2 level measurement, evidence of man-made disaster, and other scientific activities around large issues such as climate change.

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[28] Nelson, B., 2009. Reputable naturalist says we should let pandas die out. [Website]. Mother Nature Network, 25, September.
Available from: http://www.mnn.com/earth-matters/wilderness-resources/stories/reputable-naturalist-says-we-should-let-pandas-die-out
[accessed 4 October 2012].

[29] Pandas International, 2012. About the Giant Panda. [Webpage].
Available from: http://www.pandasinternational.org/giantpanda.html
[accessed 4 October 2012]

[30] Pickrell, J., 2005. Mass extinction of insects may be occurring undetected. [Website]. National Geographic, 20, September.
Available from: http://news.nationalgeographic.com/news/2005/09/0920_050920_extinct_insects.html
[accessed 4 October 2012].

[31] House of Lords, 2005. Letter from the Royal Society. [Webpage].
Available from: http://www.publications.parliament.uk/pa/ld200506/ldselect/ldeconaf/12/12we24.htm
[accessed 4 October 2012]

The purity of nature plays a monumental role in the decisions we make about conservation. Following from the conservational premise that nature should be preserved as it is now, naturalists believe that nature should be untouched by human influence. We have a desire for nature to stay pure and free from technological influence and human artifice. Yet we treat ourselves not as a natural species, but as a detached collective of organisms operating above nature. We treat ourselves with medicine, we live besides artificial machines, we even occasionally travel to space, outside the realms of our planet. On the other hand, we are part of nature. Through evolutionary paths, humans have evolved to intelligent beings who can shape resources from nature into technological artefacts. We treat ourselves as artifice. Conservation is specifically what stops us from thinking of nature as more artificial than it was before.

This purity has halted many innovations that could bring a radical perspective in how we coexist with nature. For example, geoengineering has been a taboo topic in the field of climate science since the 1960s. Geoenginnering is a collection of strategies to cool down the planet in order to preserve the ice caps from melting quickly in the short term. Politicians and activists have perceived this strategy as unnatural.[32] We seem to be afraid of the leverage that geoengineering will gives because we could get trapped in moral hazards. We could continue to rely on our environmental policies to reduce CO2 emissions, but the rate at which these policies are implemented cannot be guaranteed. Geoengineering on the other hand, could give us the immense power of being able to control the planet.

Similarly, the fields of synthetic biology and genetic engineering have been received with mixed responses and concerns. There is an overwhelming amount of evidence that by harnessing the power of genetic modification, we can create small biological machines to help us cure diseases, produce new plastic compounds, make stronger crops, or control insect populations.[33] In fact, a great quantity of the insulin that diabetics are prescribed is produced by E.Coli, simple bacteria that have been genetically modified to

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[32] Keith, D., 2007. David Keith's unusual climate change idea. [Online talk].
Available from: http://www.ted.com/talks/david_keith_s_surprising_ideas_on_climate_change.html
[accessed 5 October 2012]

[33] Science Museum Learning, 2012. Synthetic Biology. [Science Museum].
Available from: http://www.sciencemuseum.org.uk/educators/classroom_and_homework_resources/resources/~/media/E874773841DF492AA3D2B6A2EBF974DF.ashx
[accessed 5 October 2012]

produce the required substance. However, synthetic biology and genetic engineering have not been welcomed in the conservationist world. A prominent argument against synthetic biology is that humans are *"playing god"*.[34] While it is true that we cannot know the long-term consequences of genetically modifying life forms, we should at least consider the possibilities of controlling nature in this way. It could be argued that genetically modified organisms are similar to how accidental mutation happens in nature's evolutionary course. Taking synthetic biology outside the context of illusionary thinking in ecology could help us discover the real moral dilemmas of the practice.

New sciences constantly provide new ways of interacting with nature that we could harness to preserve what is important to us as humans. The discussion of these new sciences is often shadowed by conservative ideological thinking in ecology. This hinders the potential of a more liberal, more open discussion about which parts of nature are important to humans. Our illusionary targets set through conservational politics are clearly not working. We have seen many examples of this through missed CO2 emission targets, global disagreement, and heroic but futile attempts at stopping nature from changing. By leaving behind the ideology that has cocooned our understanding of nature, we could talk more openly about radical new ways of preserving important elements of nature through less purist, more synthetic, but arguably more effective strategies like synthetic biology, geoengineering, genetic modification and technological interventions.

[34] Caplan, A., 2011. The Wide Angle: Do synthetic biologists play god?. [Website]. Discovery, 1 August. Available from: http://dsc.discovery.com/technology/my-take/synthetic-biology-caplan.html [accessed 4 October 2012].

Conclusion

The aim of this discussion has been to analyse illusionary thinking in nature and understand how our traditionalist view of ecology and conservation can hinder new, more radical solutions for preserving parts of the environment that are important to us. The history of ecological thinking shows a shift from surveying individual species to big thinking, where nature is considered as a large interconnected system of subsystems which are connected through feedback loops. The influence of cybernetics in the field of ecology gave humans the belief that they could model nature so accurately that they could predict its course through computer simulation. Finally, an overarching belief of balance in nature has confused the way we perceive changes in ecosystems.

Nature is constantly in flux, rarely balancing around an equilibrium. However, we believe that the lack of absolute stability in nature is caused by human influence. Humans certainly contribute to the disturbance of ecosystems, but it is illusionary to think that without human influence nature would return to a constant, balanced state. Proof of nature's ever-changing principles can be found in the way disasters act as catalysts for change. From the protozoa which inhabited our planet being wiped out, to dinosaur extinction, we can see that nature progresses and adapts through disasters. No matter how big the disaster, a new ecosystem will arise. Furthermore, chaos in nature is of paramount importance in increasing biodiversity and enabling evolution to work. Through natural selection, the biosphere adapts to new conditions, whether they are inflicted by man or the planet itself.

Ecology has moved on from the systematic, stable, machine-like thinking influenced by cybernetics in the 1970s. However, we are still lured into a fantasy of continuing our technological life as well as coexisting with nature in a completely balanced symbiosis. This illusionary thinking is what makes us purists, stopping us from trying new ways of interacting with the environment. New scientific inventions and discoveries that are less orthodox could help us live in an ever-changing nature, which we can control to fit our human existence as we see fit. This might sound hubristic in the eyes of ecologists and conservationists, but it is a more realistic way of continuing our desired growth (both economically and technologically) as well as preserving important ecological entities.

Instead of trying to preserve nature in a purist notion, we should decide which parts of nature are important to us. Imagine a world in which we can speed up evolution to help endangered species, like pandas, that are essential to our spiritual and physical well-being and that we empathize with, survive. Imagine a world in which humans respond to unwelcome climate changes with quick, empowering solutions like geoengineering. This short-term approach to correcting unwanted environmental conditions could be more fitting for the realist's nature; the nature which is in constant flux. This more artificial but more realistic post-nature could truly be a turning leaf for humanity's interaction with and role in nature.

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