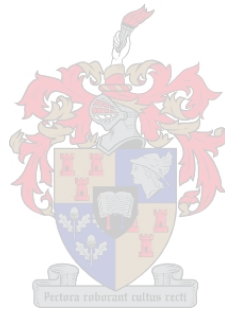


A CASE OF EMERGENCE: AUTONOMY AND SELF-ORGANISATION IN CONCEPTUAL ART PRACTICE.

by Neil le Roux



Thesis presented in partial fulfillment for the degree of Master of Visual Arts in the Faculty of Visual Arts at Stellenbosch University.

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5dfj`2014

DECLARATION

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ABSTRACT

This thesis entails a practice-led theoretical discussion on generative art production within an ecological framework. It is based on my work in *Eyemvelo Kosbos* (2010-), an interdisciplinary collaborative project geared toward food production within ecologically sound parameters. Acting in my capacity as live-in curator of this agroecological space, I have subsequently formulated a series of biological generative artworks known as *Ecological Concept Objects* (2011-), which serve as the main practical component of this research. By establishing philosophical realism as the main theoretical premise, I formulate an understanding of my art practice as a *collaboration with the world*. Core philosophical sources such as Graham Harman, Bruno Latour and Manuel DeLanda are cited to elucidate the theoretical underpinnings of my work. A case is made for aesthetics to be understood in its classical sense – as a discourse of *sense perception*, as opposed to visual taste or beauty. By discussing relevant examples from contemporary generative art, along with the theoretical insights of many practicing artists, key concepts such as *emergence* and *self-organisation* are identified as pivotal to generative practice. A definitive understanding of generative art is fomented whereby the artist willingly relinquishes creative agency and decision-making to impersonal forces. An historical context is provided which shows a precedent for similar art practices. The world is accordingly posited to be a vast interdependent network of real autonomous entities coming into relations with other real autonomous entities. This conception furthermore challenges a mutually-exclusive dichotomy of ‘Nature’ and culture, by suggesting that these two supposed binaries are so entangled that any separation thereof is a blatant form of *idealism*, if indeed ‘Nature’ can even be said to exist at all. An integrated ecological practice is nonetheless encouraged throughout as a central theme or primary conceptual parameter for both this dissertation and its accompanying practical body of work. Permaculture, a systems-based design science geared towards sustainability, is identified and adopted as a working example of an ecological practice which consolidates ‘human care’ with ‘earth care’, as the latter naturally encompasses the former. The goal of this research is then to investigate a practice where the artist, despite being restricted to linear action in the world, works in such a way as to allow the non-linear dynamics of emergent potential to reveal itself on its own terms. Such a methodology stands in stark contrast to an anthropocentric mastery of predictable matter, where little provision is made for anomalies, accidents or emergent forms. Generative art, on the other hand, is shown to make such provisions as it affords self-organisation to its medium, as entities are given time and space to express themselves in unique assemblages.

OPSOMMING

Hierdie tesis behels 'n praktyk-geleide teoretiese bespreking oor generatiewe kunstuoduksie binne 'n wyer ekologiese raamwerk. Dit is gebaseer op my werk in *Eyemvelo Kosbos* (2010 -), 'n interdisiplinêre gesamentlike projek wat daarop gemik is om voedsel binne ekologies verantwoordelike perke te produseer. In my hoedanigheid as inwonende kurator van hierdie agri-ekologiese projek, het ek 'n reeks biologiese generatiewe kunswerke geformuleer wat bekend staan as *Ecological Concept Objects* (2011-), wat dien as die primêre praktiese komponent van hierdie navorsing. Met die vestiging van filosofiese realisme as die kern teoretiese uitgangspunt, formuleer ek 'n begrip van my kunstuoduktiek as 'n 'samerwerking met die wêreld.' Die teoretiese fondasies van my werk word uitgelig deur verwysing te maak na kern filosofiese bronne soos Graham Harman, Bruno Latour en Manuel DeLanda, onder andere. 'n Argument word geformuleer waarvolgens die term *estetika* in sy klassieke sin verstaan moet word - as 'n diskoers oor sintuiglike persepsie, in teenstelling tot 'n bespreking oor visuele smaak of skoonheid. Sleutelkonsepte soos opkoms (*emergence*) en self-organisasie word geïdentifiseer as deurslaggewend vir 'n sinvolle bespreking van generatiewe praktyke. By die bespreking van relevante voorbeelde van kontemporêre generatiewe kuns, saam met die teoretiese insigte van verskeie praktiserende kunstenaars, word 'n werkende begrip van generatiewe kuns ontwikkel waarvolgens die kunstenaar kreatiewe agentskap en besluitneming vrywillig afstaan aan onpersoonlike kragte. 'n Historiese konteks word verder verskaf wat 'n presedent aandui vir soortgelyke kunstuoduktiek. Die wêreld word dan daarvolgens geposisioneer as 'n groot netwerk van werklike outonome entiteite wat verhoudings met ander werklike outonome entiteite aanknoop. Hierdie opvatting daag verder 'n wedersyds-eksklusiewe dualisme van 'Natuur' en kultuur uit, deur voor te stel dat hierdie twee veronderstelde binêre teenstrydighede sô verstrengel is dat enige skeiding daarvan inderdaad voorkom as 'n blatante vorm van idealisme. 'n Geïntegreerde ekologiese praktyk word egter aangemoedig om deurgaans as 'n sentrale tema of primêre konseptuele riglyn vir beide hierdie tesis en die gepaardgaande praktiese werk te dien. *Permaculture*, 'n stelselsgeoriënteerde ontwerpwetenskap gerig op volhoubaarheid, word geïdentifiseer en aanvaar as 'n werkende voorbeeld van 'n ekologiese praktyk wat 'sorg van mense' met 'sorg van die planeet' vereenselwig, aangesien laasgenoemde daarvolgens die eersgenoemde insluit . Derhalwe, is die doel van hierdie navorsing om ondersoek in te stel tot 'n praktyk waar die kunstenaar, ten spyte daarvan dat sy beperk is tot lineêre aksie, in so 'n manier te werk gaan dat die nie-lineêre dinamika van ontluikende potensiaal geopenbaar kan word. So 'n metode staan in kontras met 'n eenrigting antroposentriese bemeestering van voorspelbare materie -

waar daar min voorsiening vir ongerymdhede, ongelukke of ontluikende vorms gemaak word. Daar word egter bevind dat generatiewe kunspraktyk wel hierdie voorsienings maak, aangesien dit self-organisasie aan die medium toe staan, sodat entiteite tyd en ruimte verskaf kan word om hulself uit te druk in unieke samestellings.

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ACRONYMS AND ABBREVIATIONS:

ANT: Actor-Network-Theory

OOO: Object-Oriented Ontology

E.C.O. Ecological Concept Object

D.C.D. Deterministic Chaos Drawing

PART ONE:

INTRODUCTION

1.1 DISCLAIMER

None of what is stated here should be seen as any kind of final or absolute philosophical position on my part. I am still young and have yet much to learn, with an additional fondness for often changing my mind. The contents of the following thesis are thus *tentative* speculative insights regarding my *art practice* and some of the wider theoretical discourses which relate to it.

1.2 CONCERNS OF THIS THESIS

The following dissertation is a practice-led theoretical discussion of my art production over the last three years. It is primarily concerned with the emergent processes¹ involved in the realisation of significant objects by means of generative art practice. The discussion is rooted in a realist² philosophical context and is presented alongside an ongoing practically functioning site-specific artwork / space, *Openpolynations / Eyemvelo Kosbos*³ (see fig. 1), and subsequent developments emerging out of these projects. The *Kosbos* (2010-) is an agroecological⁴ space that serves as both my creative hub⁵ and primary conceptual parameter for the ensuing experimental research.

The central argument of this thesis is that through the employment of art as a generative practice, we can come to understand the world as a giant crisscrossing network of complex self-organising systems that dynamically display emergent properties. I propose that generative art practice supplies us with a conception of reality as an unpredictable, rather than deterministic setup. This experience furthermore encourages a lived ontology where existence is thought of more as a verb (*becoming*) than as a noun (*being*).

¹ In *Emergence: Contemporary Readings in Philosophy and Science* (2008), Mark Bedau and Paul Humphreys suggest that, “(e)mergence relates to phenomena that arise from and depend on some more basic phenomena yet are simultaneously autonomous from that base.” (2008:1).

² The references made to *realism* in this thesis refer exclusively to philosophical realism throughout, and should not be confused with realism in art – which denotes the accurate representation of real objects in artworks.

³ Due to the complex non-categorical nature of this collaborative venture I will refer throughout to the physical collaborative space as the *Kosbos* (2010-) and the relational generative art series, which is housed within the space, as *Openpolynations* (2011-).

⁴ An agroecological space would typically be those agricultural lands where a concern for ecological well-being is at the heart of the farmer’s concerns.

⁵ For the past three years I have been living in a house next to the site of the *Kosbos* – this is also where my studio is also located.



Figure 1: *Eyemvelo Kosbos* (2010)



Figure 2: *Eyemvelo Kosbos* (2014)

However, such a one-sided ‘process philosophy’⁶ conception is tempered by realist ontological commitments on my part, which roots the ensuing discussion with a clear focus on beings, entities, objects and things as *autonomous*⁷ *singularities*. To use the terminology of key philosophical source, Graham Harman, we can thus concisely summarise this study as an *object-oriented* approach to a systems-based art practice.

The most wonderful and amazing aspect about life as I have come to know it, is the deeper mysterious qualities underlying all things and the astounding coherence that so many differentiable autonomous entities can seemingly maintain with each other. For the purposes of this document we can thus say that there are complex autonomous processes of interacting things, or *objects*, in reality. When I speak of ‘objects’ here I am not referring to one half of a ‘subject/object’ duality. As the concerns of this essay are largely ontological of nature, I refer to *object* interchangeably with *entities* and *things*, and it denotes any type of thing whether it is human, non-human, inanimate, or incorporeal. It positions this art discussion within a general theory of objects, where the physical *and* conceptual are considered as equally *real*, but not necessarily equally strong, effective or persistent.

I make the argument that all variants of making objects (whether in the arts or applied sciences) are a form of ‘*collaboration with the world*’ – and furthermore that all objects are hybrid *assemblages*⁸ of other objects attracting and/or resisting each other. It is important to note here that ‘*the world*’ is not implied as a single thing, but a host of differentiable autonomous objects all somehow co-existing by coming into different relations with each other. I would like to advocate an art practice which openly embraces this *collaboration* between the maker and the things she (re)assembles in order to form art objects. Whether it be the emergent visual output of algorithmic code on a computer screen, the temperamental physical behaviour of water in a box, or even merely the unexpected discolouration of pigments drying on a gesso canvas – there are always at least two objects coming into relation with each other when art objects are made.

⁶ According to the *Stanford Encyclopedia of Philosophy*, “Process philosophy is based on the premise that being is dynamic and that the dynamic nature of being should be the primary focus of any comprehensive philosophical account of reality and our place within it” (Process Philosophy 2012).

⁷ Throughout this thesis, the notion of *autonomy* is presented as an appropriate adjective for things that are ontologically understood to exist independent from the sensual and/or mental reach of human experience, although it may also fall within its reach. In this specific study, it is often used to be indicative of processes and objects ‘left to their own devices’.

⁸ “The spirit of assemblage”, explain the editors of *The speculative turn: continental materialism and realism* (2011), is “letting a heterogeneous set of elements mutually resonate to become something entirely unpredictable” (Bryant et al (eds) 2011:6).

When these objects come together to form a new object, the newly manifested assemblage can often be said to display *emergent properties*.

Subsequently the artist can try – like German philosopher Martin Heidegger’s stereotype of an engineer (Harman 2009) – to control the interaction of all the constituent objects, resisting and combating the non-human entities’ potential for producing spontaneous anomalies. Or, to the contrary, the artist can *allow* for the autonomous potential of her collaborating allies to express itself on its own terms, resisting the urge for complete clinical control of what gets embodied, or *actualised*⁹ from the *virtual*¹⁰ plane of possibilities. The nature of my work falls within the reach of the latter option, where clinical control of all output is willingly relinquished.

An art practice is thus posited where things are placed in specific relations to one another in order to form or grow into unspecified unified assemblages. An overseeing ‘maintenance’ style art practice thus results with an emphasis on the relations between active components in a system, which often results in the emergence of a diverse array of unforeseeable qualities that remain alluring if not fascinating. Such a practice is *generative* in the sense that it focuses only on performing simple rule-based processing techniques as input, while unforeseen anomalous results are often some of the outputs from the complex interaction of a multitude of “impersonal processes” (Boden and Edmonds 2009:29-30). This phenomenon is called *synergy* and synergistic systems are said to exhibit *emergence*, when higher-order organisation is resultant from the complex non-linear interactions of chaotic subcomponents (DeLanda 2011).

The aim of this research is to explore a practice where the artist, although limited to linear action in the world, works in such a way as to allow the non-linear dynamics of earthly processes to reveal itself in an embodied aesthetic form. Such a practical premise stands in contradistinction to a creative process which is only successful if a pre-determined singular goal is attained by an engineered precision. Accordingly, instead of a mastery over an inert conglomerate of ‘just stuff’ (Lee 2008:presentation),¹¹ this kind of art practice is presented as a *collaboration with the*

⁹ ‘Actualised’ is herein used in the sense that Gilles Deleuze borrowed it from fellow French ‘process’ philosopher Henri Bergson - primarily to differentiate from the *virtual* component of objective reality (DeLanda 2004:30). For our context we can crudely delineate it as real objects in manifest form.

¹⁰ For Deleuze, *virtuality* is an immaterial ontological category that is equally real as *actual* objects.. It does not refer to virtual reality computer interfaces, but to the topological plane of *multiplicities*, which can affect actual objects (DeLanda 2004:30). If actual objects can be said to be ‘objects in manifest form’, then virtual objects must be *real objects in conceptual form*.

¹¹ At a Stellenbosch University visiting artist lecture I asked American sculptor, Billy Lee, how he viewed the materials used as medium for his monumental sculptures. Lee dismissively suggested that it is “just stuff”(2008:presentation).

world. It is an interaction with a living feedback system made up of real emergent objects with self-organisational capabilities that come into (and terminate) relations with each other.

The current conclusions that I elicit from my generative art practice all seemingly point to a conception of reality as an emergent phenomena-based experience. This subsequently encourages metaphysical commitments where the supposed opposing binaries of '*Nature*'¹² and *culture* are consolidated, instead of pushed apart as with the Cartesian tradition (Whiteside 2004:359-360). This also ties in neatly with Heidegger's ethical stance on *ecology*, which is critical of any practice which attempts to master, control or manage the world (McWhorter 1992). Instead, explains Ladelle McWhorter, "it is a thinking that disciplines itself to allow the world – the earth, things – to show themselves on their own terms" (1992:2).

Such a conception of an *integrated* ecological practice can be considered as the central theme or primary conceptual parameter for both this thesis and its accompanying practical body of work. It is understood throughout this document to be inclusive of both '*Nature*' and culture. In other words, humans – and by proxy culture and society – are interpreted to be a legitimate and inseparable composites of '*Nature*', if there even is such a thing. Such a conception allows for a holistic practice of ecology, where '*human-care*' equates to '*earth-care*' as our fates are inextricably entangled (Whitefield [sa]). In short, the terms '*culture*' or '*technology*' are not to be misunderstood as dually opposed to '*Nature*'. Rather, in the words of key early systems art pioneer, Hans Haacke,

(t)he difference between "nature" and "technology" is only that the latter is manmade. The functioning of either one can be described by the same conceptual models, and they both obviously follow the same rules of operation. It also seems that the way social organizations behave is not much different. The world does not break up into neat university departments. It is one supersystem with a myriad of subsystems, each one more or less affected by all the others (in Siegel 1971:242-243).

For the purposes of this study a realist philosophical focus remains crucial throughout, especially as I am working from an ecological framework that is necessarily systems-based.¹³ It allows me to place a simultaneous theoretical emphasis on the individual components, as well as the complex whole, all of which exist in their own capacities as legitimate entities. Such a

¹² Throughout this document, I use '*Nature*' in capitalised form to question the usefulness of an overshadowing thing called '*Nature*', which somehow pre-determines and dictates the mundane and spectacular interactions of autonomous objects. In other words, because I believe there is no '*not-Nature*', I refer to '*Nature*' in the single quotation format throughout in order to reassert its imaginary quality. This is not to say that the very word '*nature*' should be avoided, as something can occur *naturally* and an object's qualities can be of a particular *nature* - these are perfectly sensible notions that need not borrow its meaning on a larger '*Nature*' singularity.

¹³ Ecological thinking involves a systems-based conception to make sense of the various relations between various entities that make up ecosystems.

methodology can additionally open up a wider polemic on the common contemporary practical usage of the term 'aesthetics'. I am particularly suspicious of the restrictive understanding thereof as a general theory of beauty and visual taste, rather than as a discourse on the practice and workings of *sense perception*, as it was archaically used (Harper 2001).

1.3 CONTEXTS OF THIS THESIS

As a young practicing artist I am especially interested in creative strategies that necessitate an active involvement with varied emergent processes of earthly life. I believe that such an undertaking is relevant in our current era of rampant hierarchical *monocultures*,¹⁴ which could be said to be rooted in a practice of rigid control by means of linear hierarchies. Some of the symptoms of such a society would then be the non-collaborative class stratification of society, separation and disparity between human professions, dramatic economic inequalities, growing environmental mismanagement and a growing dependence on a non-local industrial food production system, to name but a few examples. These factors can all be understood as the wider contemporary contextual backdrop of this undertaking, or my interpretation of our global *zeitgeist* (Holmgren 2002:xv; Hawken 2007:1-8).

It is in the light of these circumstances that a few friends and I were motivated enough to start the *Eyemvelo Kosbos* project in 2010, as a practical exercise in learning how to produce our own organic food. The design science known as *permaculture*¹⁵ soon became our collective practical focus as it entails a holistic approach to food production which consolidates human cultural practices (which includes agriculture) with ecological care (Whitefield [sa]; Hemenway 2012).

The *Kosbos* is an on-going experiment in the collaborative establishment of a multifunctional space geared towards sustainable cultural production. I facilitated the collective development of this word-of-mouth venture in the historically agricultural neighbourhood of Jamestown on the southern outskirts of Stellenbosch (see figs. 3-5). The initiation of the idea was greatly inspired by Nicolas Bourriaud's conception of *Relational Aesthetics*, where he proposes that the relational artist's function is to restore "the world as something to be lived," rather than just perpetuating the production of yet more spectacle(s) and/or consumer products (2002: 32).

¹⁴ A monoculture usually refers to an agricultural field, planted with only one kind of plant, such as a large industrial field of maize. It can also, however, refer to "a culture dominated by a single element" or a "a prevailing culture marked by homogeneity" (monoculture [Sa])

¹⁵ Permaculture is a holistic systems-based design science which is closely associated with sustainable perennial agriculture. It is discussed in more detail in 4.2.



Figures 3-5: Satellite images of *Eyemvelo Kosbos*, obtained over the last three years.
Google Maps 2013:<http://www.google.com/maps>.

I work and live in Jamestown and this is a crucial aspect of the ensuing research as it reflects an aspect of the cyclical day-to-day nature of my practice. My artworks can therefore be said to be the results of an *'every-day practice'*. This does not refer to *'art of the everyday'* or *'everyday life'*

as art', where the content of one's work makes reference to ordinary daily activities as the topical subject. What it refers to is a systematic day-to-day accrual of modest gestures out of which larger aesthetic assemblages can unpredictably emerge.

Out of my everyday interaction with(in) the *Kosbos* space has emerged a series of artworks which I have titled, *Ecological Concept Objects (E.C.O.)*. As the title suggests, these are conceptual artworks that employ an ecological system in order to realise an ever-morphing aesthetic assemblage. Anchored by a central fruit tree, each *E.C.O.* is made up mostly of edible and functional¹⁶ plants, and all the necessary supporting objects these living entities require to grow (soil, nutrients, water, sunlight, et cetera).

After initiating this series in the *Kosbos* space with the permanent installation of *Openpolynations: E.C.O.s 1-138* (2011-) (see fig.6), I have been fortunate enough to facilitate two more permanent installations of *E.C.O.s* over the last two years. The self-contained *Tower Totem: E.C.O. #139* (2012) (see fig.8) is a freestanding sculpture currently housed at a private residence near Rosebank, Johannesburg. *Bramble Fountain Food Forest: E.C.O.s 140-181* (2013-) (see fig. 9) is a collection of forty-two *E.C.O.s* at the National School of the Arts¹⁷ in Braamfontein, Johannesburg, which collectively forms a 'food forest' landscape, similar to *Openpolynations*.

These works serve as the central practical topic of this thesis. Not only are they ongoing experiments in sustainable food-production, ecology and landscaping, but also an aesthetic engagement with the ontological processes of becoming. All of the work within my oeuvre engages with a beckoning of self-organising potentials lurking just beyond our sensorial and mental reaches. It is thus my proposition that by encouraging the spirit of *collaboration*, *interaction*, and *suspension of disbelief* within a realist philosophical framework, it may be possible to conceptually entice emergent forms into the (artistic) object-making process. It is also important to note that these views are strictly reflecting on a relatively small-scale¹⁸ experimental practice, as a tentative commitment to our own conceptions minimises the long term ramifications of potentially irresponsible ecological action.

¹⁶ The multiple functions of the various plants are discussed in 4.3.

¹⁷ The National School of the Arts is a secondary educational institution (high school - grades 8-12) with an emphasis on the arts (music, drama, dance and visual arts).

¹⁸ The project can be said to be *small-scale* in relation to most ecological and agricultural practices, being no bigger than a large garden. It is, however, of considerable proportion in an art context – spanning a scale comparable to a large land art installation.



Figure 6: Le Roux, N. 2011- . *'Openpolynations'* (panoramic detail). Agroecological landscape. (Private collection, Jamestown).



Figure 7: Le Roux, N. 2012- . *E.C.O.#139 (Tower Totem)*. Perennial plants in mixed media. Dimensions variable.



Figure 8: Le Roux, N. 2013. *Bramble Fountain Food Forest: E.C.O.s 140-181*. Agroecological landscape. (National School of the Arts, Braamfontein).

1.4 SCOPE AND NATURE OF THIS STUDY

The nature of this study is practice-led research, based on my daily activities in and around the agroecological *Kosbos* space. Since 2011 I have been the inhabiting curator of this garden and therefore my general activities vary according to the seasonal responsibilities entailed in such an assignment. However, this thesis focuses solely on my art-related activities in and around this site – which ultimately relates to the majority of what I do in the *Kosbos* anyway.

Although this thesis is primarily concerned with my *E.C.O.* series, this discussion also includes relevant references to some of my other output in more traditional art modes such as drawing (see fig.10). The reason for this is that all of my art practice is generally informed by the same philosophical motivations. In short, these would be the experimental implications of a realist

philosophy of autonomous objects coming into causal relationships with each other, coupled with a commitment to a *Socratic* understanding of wisdom where the limitations of human knowledge and theory is always taken into consideration.

Throughout this thesis I cite theoretical sources that inform my approach to art-making and how I live my life in general. The purpose of this text is not to categorise, judge or assess, but to contribute to a growing discourse which contests – on ontological grounds – many institutionalised dogmas regarding the very nature of reality and causality. Such a discourse simultaneously effects the restoration of awe and wonder to our interpretations of daily life. I also position this document as a significant component of my practical body of work, because I find it difficult to separate theory from practice and I am convinced that *theorising is a practice*.

This text is treated as one fluent narrative throughout – citing relevant publications where applicable. As this is practice-led research presented while still in the process of finalising the practical body of work, most of the discussion concerns the *making* part of my art practice, as opposed to the ‘after-the-fact’ interpretation – or analysis – side. This is due in part to the length restrictions of this dissertation along with the dynamic ever-changing nature of the *E.C.O.* series.

Nevertheless, this thesis is not purely a technical exposition on the making of each individual art piece, but more of a discussion of the philosophical ideas that informs this practice. In addition to discussing my own work, relevant contemporary artworks that embody similar generative strategies are also cited as practical examples. These include, among some others, Hubert Duprat’s work with caddis-fly larvae (1980-1996) (see fig.17) Casey Reas’ *MicroImage* (2003) (see figs.18-19), Hans Haacke’s *Condensation Cube* (1963) (see fig.22), and Robert Smithson’s *Spiral Jetty* (1970) (see fig.23).

I have furthermore found it useful to include the theoretical insights of many of the artists who work with similar conceptual processes in their practice. Although artists from differing contexts will use different metaphors to describe their thinking, the artists I cite generally share a discernable sense of fascination with the non-linear dynamics of things coming into being. Rather than goal or ends oriented work, we can thus say that the scope of this thesis is mainly restricted to *means* oriented work.

1.5 THEORETICAL PREMISE

When trying to make sense of complex aesthetic *assemblages* which are produced through an emergent synergy of various levels of living and non-living interacting components, it is not productive to restrict the ensuing discussion to the purely semiotic realm. This is especially valid when taking into account the given context of sustainability in the midst of contemporary environmental crises.¹⁹ Throughout this text an inquiry into the real is thus taken as the principle point of departure. In other words, when I perceive and talk about artworks (and things in general), the first question I ask is, ‘*what is it?*’ and not, ‘*what does it mean?*’

I have, as far as I can remember, always been attracted to the making of art objects more than experiencing or viewing them. And when I do go out to view art in the galleries, I am always attracted to those objects that stimulate me firstly with its sensory qualities. In other words, my interest isn’t piqued by anything *absent*²⁰ in the actual object – a wider concept that its formal qualities are making reference to, or *signifying*. My interest is, on the other hand, piqued by the *sensory impressions* and impulses that the assembled object stimulates in my being. This is not to say that I am not interested in the *stories* behind artworks. To the contrary, I am very interested in these back-stories, technical processes and historical contexts of artworks, but only of a rare few whose sensual qualities have somehow already attracted my attention.

What I am specifically interested in, is the conceptual processes that can lead to the actualisation and subsequent persistence of resilient aesthetic objects, particularly those that can maintain a form of significance beyond anthropomorphic realms. The philosophical premise is therefore anchored in a discourse on *ontology*, “a branch of metaphysics concerned with the nature and relations of being” (ontology [sa]). Its most fundamental concerns are thus the nature of reality and causality. These are admittedly enormous philosophical questions which I would suggest are not yet resolved and probably never will be. These are however the active forces artists – and all creators (or *makers*, for lack of a better word) – actively work with in order to assemble aesthetic objects.

¹⁹ For more on the topic of the environmental movement’s rise in the face of many disasters, see *Blessed unrest: how the largest movement in the world came into being and no one saw it coming* (2007), by Paul Hawken.

²⁰ Any meaning that arises from the object but that is not encompassed within its physical dimensions, could be understood as *absent* in the actual object.

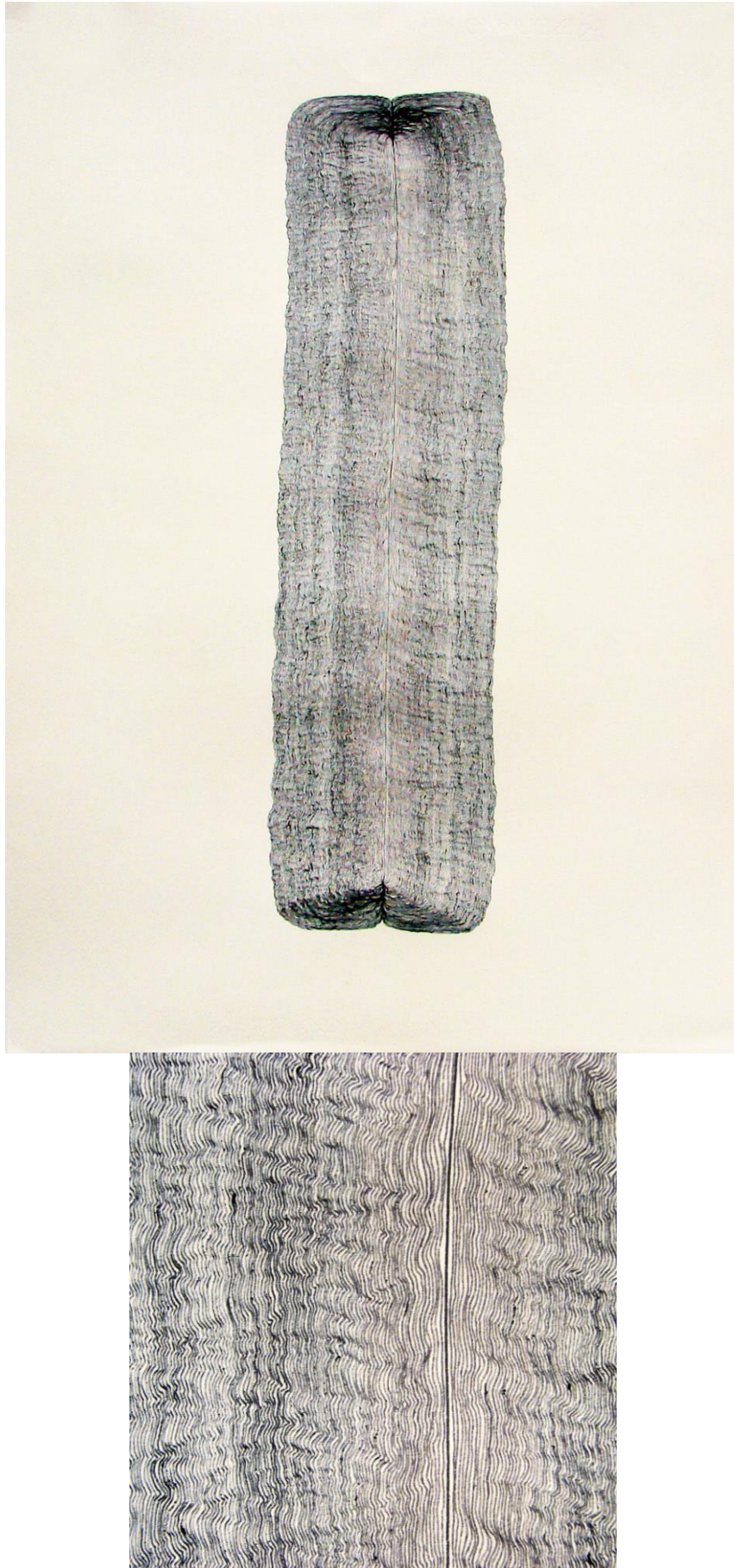


Figure 9: Le Roux, N. 2008. *Deterministic Chaos Drawing #001*. Ballpoint pen on paper. (70 x 50 cm). With detail.

I also try to ground most of the theoretical discussions with practical examples of artworks that pose similar ontological questions. The examples I look at relate to the conceptual processes that I employ in my current work. Examples from the fields of conceptual art, land art, biological generative art and computer-mediated generative art are therefore presented as relevant objects for discussion within this text. These examples are further supported by citing the opinions of various contemporary generative artists, and their views on their practice.

This thesis is primarily about a form of ecological object-making – in other words – the ontological becoming (and subsequent being) of autonomous objects coming into sensual contact with many other autonomous objects, constantly forming new assemblages as they go along. If we can grant an appropriate amount of affordance to autonomous processes in our conceptual designs, we can facilitate the further self-organisation of novel aesthetic assemblages. Such a practice ultimately posits, after Harman’s reading of Emmanuel Leibniz, “aesthetics as first philosophy” – a thinking that uses sensual qualities or sense perception as its point of departure (Harman 2007a).

Aesthetics is subsequently understood as the practice and cultivation of *sense perception* rather than a theory of visual beauty. I see beauty as a *mysterious* apparition in reality, and any attempt at making absolute truth statements as to the nature thereof fails to grasp the very thing that grants beauty its allure. An understanding and working of *aesthetics* that does, however, prove useful to my practice, follows the original Greek meaning of the term – as “the science which treats of the conditions of sensuous perception” – the way it was classically understood from antiquity until the nineteenth century (Harper 2001).

As evident from the above, this thesis also makes use of an etymological methodology when contesting some of the relevant terms to the discussion at hand. Such a methodology can be useful to expose the constructed assumptions of many of the ‘truths’ we take for granted. In addition to ‘*aesthetics*,’ ‘*ecology*’ is another key term that I unpick by means of an etymological methodology.

In conclusion, this thesis is predominantly a discussion of my own work, which is concerned with self-organisation, autonomy and diversity. It attempts to make explicit how a realist philosophical approach to art-making, object building or problem solving can instill a perpetual vigour for the task at hand as it renews mystery and wonder at each step. This also results in a de-throning of

the human being as the pinnacle of the eco-systemic hierarchy on earth. It rather instills a mindset where the human casts herself as a collaborative facilitator of a diverse set of equally real entities vying for existence in the world. This radically withdrawn role I assign to the human is furthermore understood in the art context as a practice of supervising relational links – facilitating critical connections between the constituent components that form art objects.

1.6 LITERATURE SURVEY

The practice-led nature of this research has resulted in the following *interdisciplinary* literature survey of contemporary authors and artists whose work is relevant to my practice. Applicable literature here includes primary source material from the fields of the physical sciences, philosophy, art theory, and interviews with practicing artists. Because of the length restrictions of this thesis, I will briefly summarise core contemporary literature on the topics of generative art, complexity theory, and philosophical realism – in a flowing narrative format.

Realist philosophy can be said to entail an ontological commitment to a mind-independent reality at its most basic level. In other words, things are able to legitimately exist beyond the need for a human viewer or thinking subject (DeLanda 2002:4). This might sound obvious or simplistic, but ever since Immanuel Kant's remarkable *Copernican revolution* in philosophy,²¹ its discourse has by and large²² been restricted to modes-of-access to the things in the world, and not the things-in-themselves. Although most philosophical work since Immanuel Kant's 'Copernican revolution' has burdened the exact empirical sciences with testing and resolving these questions, there is a growing voice of philosophers once again contesting the nature of reality and the things that comprise it (Bryant, Srnicek & Harman 2011: 16).

In this dissertation the three key contemporary realist philosophers cited throughout are Graham Harman, Manuel DeLanda and Bruno Latour. Harman, and his formulation of an Object-Oriented Ontology (OOO), makes a thorough commitment to Heidegger's notion of *withdrawal*. In contrast to Heidegger, he doesn't restrict his philosophy to the human realm of being and bravely extends his ontological commitments to apply to the non-human, inanimate and immaterial realms.

²¹ In Kant's own words, "from this deduction of our faculty of cognizing a priori [...] there emerges a very strange result [...], namely that with this faculty we can never get beyond the boundaries of possible experience, [...and] that such cognition reaches appearances only, leaving the thing in itself as something actual for itself but uncognized by us" (in Rohlf 2010).

²² British philosopher Alfred N. Whitehead is a notable exception to this trend (Harman in Davis 2012).

Harman typically questions the emphasis on relations (process) over entities (substance),²³ arguing for a metaphysics of autonomous objects (Harman 2009).

When we allow such an ontological conception to seep into our everyday activities and art practice, there is a tremendous emphasis on the *object-hood* of objects, stripped from any political, theoretical or ideological content. Harman's OOO somehow restores a newness and refreshed fervor to my everyday interactions with the diverse plurality of entities populating this planet. What Harman calls for is a focus on the enduring and resilient qualities of objects that make them real, and enable subsequent relations to occur. In an interview with Brian Davis, Harman explains that,

there is no justification for saying that the interesting features that differentiate humans from everything else define an ontological gulf between humans and everything else. This assumption has no evidence on its side, and is really just a lingering Cartesian prejudice, too deficient in imaginative power to guide us in the coming century. Why should ontology be a taxonomy of two different kinds of beings, with thinking humans on the one side and unthinking machines (usually including animals) on the other? (Davis 2012)

Bruno Latour's *Actor-Network-Theory* (ANT) comes to the fore as a critical tool for restoring non-human things to a similar ontological sphere of significance as humans. For Latour, these entities should not be the "hapless bearers of symbolic projection," but real things effecting change in the world (Latour 2005:10). Latour's ANT, like Harman's philosophy, is effectively an attempt to escape the idealist tendencies of reductionism. The main difference between these two contemporary thinkers is whether they emphasise *relations* like Latour, or the autonomous *objects* that form these relations (Davis 2012).

Mexican philosopher Manuel DeLanda completes a trinity of core philosophical sources that inform this study. DeLanda, a prominent scholar of Gilles Deleuze, contests the classic hypothesis that one cause necessarily equates to only one effect (Bryant, Srnicek & Harman 2011:15). With a strong grasp of the physical sciences, DeLanda often uses technical terminology in a very clear way to talk about topics such as non-linear behaviour and emergent properties. In his article, *Material Complexity* (2004), DeLanda explains how it was not the linear-working major scientists who traditionally discovered new material properties, but minor scientists and experimental craftsmen. For DeLanda, "the emphasis here is not only on the spontaneous generation of form, but on the fact that this morphogenetic potential is best

²³ Many interpret Heidegger's tool-theory as an emphasis on practice over theory, but for Harman practice obfuscates the reality of objects no-less than theory (Harman 2002).

expressed, not by the simple and uniform behaviour of materials, but by their complex and variable behaviour” (DeLanda 2004:19-20).

All three of the above-mentioned philosophers feature in a collection of essays, *The speculative turn: continental materialism and realism* (2011), edited by Levi Bryant, Nick Srnicek and Graham Harman. This book serves as a core theoretical volume as it attempts to establish a new movement in philosophy under the moniker, *speculative realism*. Isabelle Stengers, known for her collaborative work on chaos theory with late scientist Ilya Prigogine, is another key author included in *The speculative turn*. Her call for the restoration of a curious sense of wonder to science proves invaluable as it describes similar notions to those that motivate my art practice. Such a practice allows for a considerable amount of affordance for self-organisation which enables emergent properties to come to the fore (Bryant, Srnicek and Harman 2011:15).

In his seminal book, *Emergence: the connected lives of ants, brains, cities and software*, Steven Johnson delineates three general historical phases to explain how our understanding of self-organisation has developed over the years (2001:20-21). He argues that, in the first phase, various thinkers in different fields of study grappled with phenomena brought about by self-organisation. The second phase encompassed the study and understanding of self-organisation when it became a multi-disciplinary field of study in its own right. This was made possible when it was recognised that emergent behaviour was a commonality in many fields of study. Johnson posits that, during the 1990s, we entered a new phase in the history of complexity, where “we stopped analyzing emergence and started creating it. We began building self-organizing systems into our software applications, our video games, our art, our music” (2001:21).

It is at this critical point in the history of self-organization, where the focus shifts firmly from *observation* to *participation*, where I also locate my practice and the focal point of this thesis. The ontological standpoint of *Dasein*, as posited by the German philosopher Martin Heidegger, is accordingly appropriated here to argue for a specific exposition of art, primarily as an activity, but also as one that produces real perceptible objects. *Dasein*, characterized as ‘being-in-the-world,’ is ontologically opposed to *vorhanden*, which refers to naturally occurring things, and *zuhanden*, which indicates manmade artefacts (Heidegger 1949:28). Kenneth Maly explains that *Dasein* is the active process “in which beings emerge as the very unfolding or emerging,” in the way a “wildflower’s bud comes forth into bloom – emerges, unfolds, in it’s coming forth” (in Padruitt 1992:11).

Maly suggests in his translation of Hanspeter Padruitt's text, *Heidegger and Ecology*, that such a conception allows us to consider the "earth as image for connectedness, for the root-domain outside ourselves that we are a part of but do not manage/control" (1992:58). Ladelle McWhorter, editor of *Heidegger and the earth: Essays in environmental philosophy* (1992), explains that Heidegger's notion of *Dasein* is not a proposition for us to master, control, know and shape the world, "it is a thinking that disciplines itself to allow the world – the earth, *things* – to show themselves on their own terms" (1992:2).

As it contains a non-idealist ontology that treats all things as its subject of inquiry, I believe a speculative realist approach can bring philosophy and science closer together. Given the biological nature of my current work, I have included some sources from relevant sciences such as biology. It is interesting to note that some scientists are also coming to the same conclusions as some of the abovementioned philosophers regarding our knowledge of the world. In the 2003 publication, *Biological complexity and integrative pluralism*, Sandra Mitchell makes the following statement:

The suggestion that our current best theories of the nature of nature exactly capture the world in all its details is hubris. The idealized and partial character of our representations suggest that there will never be a single account that can do all the work of describing and explaining complex phenomena. Different degrees of abstraction, attention to different components of a system, are appropriate to our varying pragmatic goals and conceptual and computational abilities. In short, both the ontology and the representation of complex systems recommend adopting a stance of integrative pluralism (Mitchell 2003:xiii).

By relying on realist philosophical literature, a general discussion of objects, concepts, existence, and causality can ensue. A consideration of our world as *complex systems of emergent entities* is established as a metaphysical premise in order to contextualize my art production with other examples of generative art. From the dawn of conceptual art in the 1960s, it has become commonplace for artists to theorise about their practice, and it is for this reason that I also include primary material from art practitioners in this survey.

Generative artist Joseph Nechvatal (in Perret 2007) regards a conceptual understanding of art to be imperative today, as it has come to light that the reductionist presuppositions of modernism are not really challenged by "mere postmodern negations." According to Nechvatal, 'postmodernists' characteristically rebuff reductionism in science, yet they "often assume a kind of fracturing cultural-political reductionism, while some stay trapped in the scientific objectivist model because it is largely the only working one out there politically". Thus, for Nechvatal at

least, what is required are “self-mutating conceptual models that are never just the completed or inverted objectivity of the usual conceptions” (in Perret 2007).

Complexity theory, as a multidisciplinary practice, may offer a foundation for such a ‘self-mutating conceptual model’. Although initially developed in the physical sciences as an inevitable off-shoot of the same General Systems Theory, complexity theory has been appropriated in the humanities by academics such as Manuel DeLanda and Paul Cilliers. DeLanda started experimenting with the conceptual possibilities of complexity in the 1980s, as an alternative to “the then-trendy paradigm of post-structuralism or cultural studies” (Johnson 2001:65). Paul Cilliers, on the other hand, utilizes complexity theory to support a post-structuralist understanding of language in his book, *Complexity and postmodernism: understanding complex systems* (1998).

The development of the computer is central to the development of complex systems, as it finally provided the means to replace the linear mathematical restrictions of analytical science. Before the advent of advanced computational technology, analysis of complex phenomena was done by means of *reductionism*. This involved a breakdown of complex equations into smaller units which could then be further broken down until the parts were ‘manageable’ for linear analysis. However, the advanced computational and modeling capabilities of computing technology have shown that a complex dynamic system is synergistic. In other words the behaviour of the whole is greater than the sum of its parts and cannot be comprehensively analysed by isolating the constituent sections (Cilliers 1998:1-2).

Nechvatal also explains that new computational technologies aided researchers to detect that “matter expressed itself in complex rich ways which were non-linear but, nevertheless, which displayed long-term tendencies and organizational patterns” (in Perret 2007). Through non-linear computation it was noticed that parts of a system attracted or repulsed other parts, producing organized arrangements, yet these are never fixed as individual parts can ‘bifurcate’ – spontaneously switching from an attractive force to a repulsive one. This unpredictable character of systems has led to it acquiring the moniker, ‘self-organizational’, and its resulting behaviour has been deemed as ‘emergent’. Although such an understanding of ‘complex dynamic systems’ was formulated by studying biological phenomena from a mathematical perspective (Johnson 2001:11-21), for Nechvatal, this conception of the world would invariably have an impact on other fields of study:

While the classical sciences isolated physical systems from their surrounding, the new thinking connected to digital fluidity is founded on the realization that all systems in nature are connected and subject to flows of matter and energy that move constantly through them. Dynamic equilibriums result from chaotic energy and manifest themselves in creative processes that generate richly organized patterns – patterns that teeter on the complex stable and complex unstable. For me it is neither surprising nor coincidental that paradigmatic epistemological change for thought and art would follow such developments. In art, science fiction, critical studies, and in an array of philosophical discourses, chaotic and rhizomatic approaches towards turbulent behaviour are affecting our consciousness in respect to order and composition” (in Perret 2007).

Nechvatal’s words are evidently making reference to the work of Giles Deleuze and Felix Guattari, who have encouraged an ontology where things – be they social, physical or mental – are not to be understood in an ‘arboreal’ or linear way. Rather, we should examine it as if it were a rhizome, a network whereof the lines “always tie back to another. That is why one can never posit a dualism or a dichotomy, even in the rudimentary form of the good and the bad.” Therefore, “(g)ood and bad are only products of an active and temporary selection, which must be renewed” (Deleuze & Guattari 1987:9).

Perhaps the torchbearer for contemporary ontological realism, the late Gilles Deleuze conceptualised many ideas that have a lot to contribute to this discussion. In *Intensive science and virtual philosophy* (2004), Manuel DeLanda identifies one of the key implications of Deleuze’s ontology as follows :

(T)he world itself emerges transformed: the very idea that there can be a set of true sentences which give us the facts once and for all, an idea presupposing a closed and finished world, gives way to an open world full of divergent processes yielding novel and unexpected entities, the kind of world that would not sit still long enough for us to take a snapshot of it and present as the final truth (DeLanda 2004:7).

Within the field of art theory, Philip Galanter’s paper, *What is Generative Art? Complexity Theory as a context for Art Theory* (2003) is adopted as a key text. Galanter provides a definition of generative art as a systems practice that is contextualised by means of complexity theory (2003:4). He even goes as far as to suggest that generative art practice reminds us that our reality – the universe itself – is already a generative system. “And through generative art we can regain our sense of place and participation in that universe” (2003:19). Although not made explicit, Galanter’s paper hints at existential or ontological insights in its formulation.

Complex systems design typically entails the implementation and maintenance of many relatively simple systems, which overlap, cross-pollinate and self-organize into a synergistic whole whereof a detailed prediction of all the ensuing emergent forms remains elusive. Longer-term behaviour patterns are nevertheless distinguishable in hindsight and it is here where the

knowledge-building potential of generative art practice lies. If this is explored within a fixed space it can potentially encourage the participators or visitors to recognise the system's behaviour patterns on a productive and consistent basis. By restricting the overall scope to the direct physical sphere of influence (i.e. small and simple), we can then allow the complex nature of our world's systems to reveal themselves on their own accord.

Generative art, like much of conceptual art, is a process-oriented practice that does not have the accomplishment of an exact end result as its goal. Its purpose is rather to see what variety of end-results creative processes can actualise, when left to their own devices. Margaret Boden & Ernest Edmonds have more recently also done comprehensive studies of generative art, and its definitive characteristics. They trace generative art's primary motivations to the practice of pioneering conceptual artists such as Hans Haacke and Sol LeWitt (2009). A deliberate relinquishing of control is identified in Haacke's work as he attempted to assemble "something which experiences, reacts to its environment, changes, is nonstable . . . , always looks different, the shape of which cannot be predicted precisely" (Lippard in Boden and Edmonds 2009:11).

In *All systems go: recovering Jack Burnham's 'Systems Aesthetics'* (2006), contemporary art theorist, Luke Skrebowski, appeals for the recovery of Jack Burnham's formulation of 'systems aesthetics'. Skrebowski shows how Burnham's holistic thinking was ahead of its time by anticipating many of the key shifts art practice underwent in the wake of conceptual art's proliferation. Burnham's short-lived appropriation of general systems theory provides a complex reading of artistic processes that is perhaps more relevant today than it was in the 1960s. Generative artist Jon McCormack should also be noted for adopting ideas from evolutionary biology to explain the processes of generative practice in *Art and the mirror of nature* (2003).

Given our present-day context of interconnected technologies and an urgent incentive for environmental reparation, it is perhaps not surprising that a holistic systems thinking has once again come to the fore in art discourse. The emergent properties of generative art are indicative of a curious experimentation with unforeseen anomalies resultant from systematic processes. Furthermore, it can be deduced that emergence is a ubiquitous property concealed within all of reality, as suggested by this survey's selected texts from philosophy and science.

1.7 CHAPTER BREAKDOWN

The following passage sets out to provide an overview of the chapters to follow. The first chapter (Part Two) ensues to clarify my theoretical position in regards to art making. I understand my practice as making conscious use of self-organisational and emergent properties latent in earthly objects and processes. This is argued to be tenable as long as the artist can maintain a systematic ‘overseeing’ position in relation to the hybrid objects she assembles. If one can maintain simple rule-based generative mechanisms, an active synergy ensues where the emergent output supersedes the sum of the constituent inputs.

I set off by citing the *Actor-Network Theory* (ANT) of Bruno Latour – to establish a premise rooted in realist philosophy. I focus on Graham Harman’s reading of ANT as a radical break from the dominant philosophical ideas of German philosopher, Immanuel Kant, especially regarding his views on our modes of access to the world. Shortly thereafter I introduce Harman’s own *Object-Oriented Ontology* (OOO) as a viable contemporary alternative to reductive thinking. A critique is established of any presupposition that upholds a mutually exclusive ‘Nature’ and culture binary.

I present my *Deterministic Chaos Drawing* (*D.C.D.*) series as a practical example where very simple conceptual processes yield complex emergent forms. I provide a technical description of the conceptual drawing methodologies that I employ, framing the *D.C.D.* series as rule-based *algorithm*²⁴ drawings. As generative art is relatively new apparition in art discourse I provide two contemporary definitions (Galanter 2003; Boden & Edmunds 2009) to ground the discussion academically. These definitions explicate systems-thinking and complexity theory as key practical and theoretical tools for exploring a generative art practice.

There are clear links between generative practice and the general systems approach which many conceptual artists and even minimalists employed. Many of these artists were, like the art theorist Jack Burnham, greatly influenced by Claude Shannon’s *information theory*²⁵ and *cybernetics*.²⁶ A process is thus put forward where conceptualised aesthetic processes can assist in the emergence of divergent actualised forms. Such processes are then once again shown to problematise a ‘Nature’-culture dichotomy as an ontological premise. I establish

²⁴ The Merriam-Webster dictionary describes an algorithm as “a set of steps that are followed in order to solve a mathematical problem or to complete a computer process” (algorithm [Sa]). See also Robert Jackson’s paper, *Algorithmic allure: Heidegger, Harman and Every Icon* (2010).

²⁵ *Information theory* is a mathematical model developed by Claude Shannon in an attempt to quantify information (Blackburn 1996:194).

²⁶ Simon Blackburn defines *cybernetics* as, “(t)he science of communication and control systems (Blackburn 1996:91).

generative artists' general affinity for *surprise*, *potential* and *novelty* – a curious experimentation with aesthetics and causality in an attempt to uncover alluring emergent forms.

Several contemporary generative artists are cited as primary material in this section, in addition to this research being practice-led, the topic of discussion is also process-oriented art. This resonates sweetly with Burnham's visionary identification of 'invisible parts' and 'boundary concepts' as the most important part of systems-practice (Burnham 1968). It is finally proposed that the premise of generative art is also ontological of nature, as opposed to a practice that remains within the bounds of signification.

To conclude the chapter, I present '*Non-Semiotic Object Building*' as a phrase for ontologically concerned art-making such as my own. It can be seen as a practice which gains its significance from internal processes rather than by signification of external discourses. I thus encourage a return of the *autonomous* art object, but not in its modernist conception which upholds an anthropocentric prejudice. A *realist* understanding of autonomous objects has to include humans, animals, inert things, inorganic objects, concepts and ideas, in its discourse. It is thus a relational conception of actualising objects by means of non-semiotic rule-based processes.

Chapter two provides a practical contextualisation of my art practice by pointing out prominent examples of art employing similar 'impersonal forces' in its realization and presentation. I show how a systems-based art practice is perhaps as old as art itself, as every art object is formed by a relational arrangement of more than one thing. After briefly mentioning the pointillist painting system I focus on examples from conceptual art as a notable precursor of generative art.

I start with the first manifestos of conceptual art, written by Sol LeWitt (1967; 1969). LeWitt was himself a conceptual artist and these texts are characteristic to the general adoption of theorising roles by artists themselves (as opposed to art critics) at that time. I unpick valuable insights from LeWitt's methodological yet terse statements, which make it abundantly clear that he considered the plan or concept to be the most important component of an artwork. I then make the connection between LeWitt's thinking and newer philosophical movements such as Latour's ANT and complexity theory.

Art theorist Jack Burnham and his formulation of a 'systems aesthetics' comes into the discussion as it identifies *interaction* and *autonomy* as sought-after values in system-based

practice. Citing the work of contemporary art scholar, Luke Skrebowski, I put forward the suggestion that Burnham's theories pre-empted many of the critical insights into conceptualism that are better known today. Skrebowski further holds that 'system aesthetics' was perhaps more wide-ranging than other theories of 'dematerialisation' and the 'expanded field' (2006: 6-7).²⁷

The next subject to be discussed is the work and words of American artist Hans Haacke who, like his close associate Burnham, saw artworks not as inert material things, but authentic networks of interacting processes. I describe Haacke's *Condensation Cube* (1963) as a pertinent example of his earlier oeuvre, which was primarily concerned with systems. The *Condensation Cube* is presented as a precursor to contemporary generative art practice after Galanter (2003), who suggests the work pre-empted most of what is discussed in contemporary complexity theory.

To bring some balance to the discussion I also make reference to Robert Smithson, a contemporary of LeWitt, Haacke and Burnham, who, unlike them, was not as enthusiastic about the theoretical ideas of conceptual art. I discuss Smithson's *Spiral Jetty* (1970) – a familiar instance of land art – as a practical example. I also briefly bring up the contemporary notion of 'sustainable art', which notes the general lack of disregard for environmental impacts in the making of many land artworks, including *Spiral Jetty*.

This serves as a prelude to a further critique of the 'Nature'-culture dichotomy that cannot come to grips with the inseparable relational entanglement that these two supposed antipodes have with each other. I therefore make the suggestion that the earlier mentioned ideas of Haacke and LeWitt maintains many significant insights for art practice to this day. Their focus on conceptual processes as the very *medium* of their artworks attempted to avoid human subjectivity. We are thus presented with the conundrum of distinguishing between formal qualities and relational concepts as the critical component in art-making processes.

In the final chapter, Part Four, I systematically describe my *Ecological Concept Object* (2011-) series and the ideas and events which led to its conceptualisation as a biological generative artwork. I describe the modular nature of each *E.C.O.*, which is made up of 22 perennial plants growing in a suitable organic medium. In addition to serving as a continually transforming

²⁷ These terms refer specifically to Lucy Lippard's *Six Years: The Dematerialization of the Art Object from 1966 to 1972* (1973), and *Sculpture in the Expanded Field* (1979) by Rosalind Krauss.

aesthetic object, it also serves as a functional ecological entity that produces food, herbs and medicine.

I also briefly discuss permaculture, a holistic design science which greatly influenced the conception of the *E.C.O.* series. I reflect on the difficulty of defining what exactly permaculture is by citing different definitions thereof. A practice where the environmentally responsible use of resources is employed in order to care for humanity is subsequently identified as the core defining principle of permaculture. It is therefore a relational premise where 'earth care' takes care of all. I believe this can only truly happen when humans stop seeing themselves as separate from 'Nature'.

I furthermore propose that permaculture is a practice that consciously defies a 'Nature'-culture split in reality. It involves a careful negotiation with autonomous entities based on a discerning sensitivity towards their qualities, as opposed to a rigid anthropocentric ordering of matter. The holistic systems conception ensures that good permaculture practice equates to making as many connections as possible when arranging entities in relation to each other. I also establish the concept of a food forest, or edible landscape, as the specific mode of permaculture that my current work employs.

A discussion of my current work, *Openpolynations: E.C.O.s 1-138* (2011-), takes place as I describe how it came to be within a larger collaborative ecological project, *Eyemvelo Kosbos*. I explain how the local environmental conditions have shaped the piece, as it conforms to the limitations imposed by the conceptual and spatial boundaries of a small agricultural plot. Within this space an active design process of 'excavation, demarcation, relocation, repeat' is shown to steadily make way for a gardening cycle of 'weeding, amending, food production, repeat'.

Emphasis is placed on the fact that this project is located in direct proximity to my home and studio, which is important to get a sense of my *day-to-day* practice. I expound on the content and form of *Openpolynations*, an agroecological landscape made out of modular units of beneficial plant assemblages. This project furthermore tests the tenability of a multi-functional cultural and ecological space, where I have formulated a process of 'inhabitation, map-making, adjustment, repeat'. I then posit a subsequent investigation into the Greek etymological roots of the term 'ecology', as was done by Martin Heidegger. This once again reiterates the unsuitability of a 'Nature'/culture split as an unproductive departure point for action in the world.

In the following section I discuss the one anomalous example of an *E.C.O.* that is presented in isolation, namely *E.C.O. #139: Tower Totem (2012-)*, before I briefly detail its conception and reflect on its public presentation at the 2012 edition of the FNB Joburg Art Fair. I then introduce a follow-up commission for a series of *E.C.O.s* that came about in 2013 partly due to exhibiting *Tower Totem* the previous year. *Bramble Fountain Food Forest: E.C.O.s #140-181 (2013-)* is a permanent installation of 42 *E.C.O.s* on the northeastern embankment of the National School of the Arts in Braamfontein. The extremely urban setting of this project is contrasted to the semi-rural environs of *Openpolynations*.

I wrap up the thesis by sharing some final commentary on the practical aspects of this research. By pointing out that my interest lies in ontological processes, I frame the *E.C.O.* series as conceptual mechanisms for manifesting novel form. It is therefore concerned with the facilitation of resilient ecological art objects, and not signifying icons. This project is part of my artistic oeuvre which has resulted out of an experimental curiosity with impersonal forces active in the world.

The fifth and final part of this document serves as the conclusion, wherein I stress the ontological nature of this research. It ensues with a brief summary of the completed research, before I explicate the fact that an interdisciplinary theoretical methodology has been applied as a result of this study's practice-led nature. I also indicate that the aim of this research is to contribute to a growing discourse about the nature of causality in theoretical discussions of art.

I then elaborate on the main deductions which I have extracted from this research. Ontological processes of causality, being and becoming are argued to be productive avenues for artists to explore. I furthermore explain how the theoretical underpinnings of generative and conceptual art support a realist philosophy.

I propose a realist adaptation of Heidegger's *Dasein*, can also assist us in encouraging emergent dynamics in our practices. This leads up to a final deduction that questions our current conception of aesthetics, and calls for a restoration of its archaic use –as the science and study of *sense perception*. I also hint at a conception of art-making as a technologically mediated practice, while ascribing concepts and ideas as the *medium* of generative art.

PART TWO:

THE THEORETICAL UNDERPINNING OF MY WORK.

2.1 COLLABORATING WITH THE WORLD

A tentative experimental approach is undertaken in my art practice as I prefer not to be in total control of all the aspects concerning creative resolution or aesthetic decision-making. Said differently, I accept that there are limits to my range of premeditated conceptual designs and a necessary gap between the results of my means (execution) and the initially planned ends (design). I consider this gap to be necessary to any commendable creative endeavour, as a practiced awareness thereof can cultivate a sustainable means of working with the inherent limitations of our earthbound existence.

The emphasis in my practice is therefore not concentrated on the specific desired outcomes of my premeditated designs. To the contrary, emphasis is typically placed on a system of processes that ‘builds’ the final object. By allowing these aspects to actively generate output which both informs and forms the final artwork, I can cede at least partial control of certain aspects involved in the art-making process. With the employment of art as a *generative* practice, the world is subsequently approached as a dynamic complex²⁸ of hybrid assemblages all of which display self-organising characteristics.

This chapter sets out to establish a theoretical context for my art production in general. I look specifically to realist philosophy for inspiration as my work is concerned with ontology as opposed to signification. I also describe a series of drawings I have developed called, *Deterministic Chaos Drawings*, subsequently establish a premise or generative art. By looking at contemporary examples of generative artworks, I formulate the notion of ‘*non-semiotic object building*’, as a general description for my practice.

In his essay, *Material Complexity* (2004), contemporary philosopher Manuel DeLanda suggests that, “we are beginning to understand that any complex system, whether composed of interacting molecules, organic creatures or economic agents, is capable of spontaneously generating order and actively organizing itself into new structures and forms. It is precisely this

²⁸ For the sake of clarity, my usage of ‘complex’ typically denotes it in its noun form, as opposed to its adjective form. In other words, a complex should be thought of as a thing, specifically a system built out of smaller simpler components, like, for example, when we refer to a ‘housing complex.’

ability of matter and energy to self-organize that is of greatest significance to the philosopher” (2004:17).

He adds that “(t)he study of material complexity is now the rule, and a new awareness of the self-organizing capacities of matter is beginning to emerge in this field” (2004: 18). This is the case despite what he calls “royal or major science” having tended to emphasize linear equations, as opposed to the dynamic mathematics of non-equilibrium complexity (DeLanda 2004: 18). DeLanda maintains that this has resulted in a reductive understanding of matter as “*an inert receptacle for forms imposed from the outside*, a view with many similarities to Creationism and Platonism” (2004:19).

DeLanda subsequently agrees with influential French philosopher Gilles Deleuze’s views on matter, whereby artists (along with craftsmen and ‘minor scientists’) generally conceived of matter and form’s relation in a non-linear way. Instead of foisting rigid form on inert matter, they typically “teased a form out of an active material, collaborating with it in the production of a final product” (in DeLanda 2004:18-19).

Collaboration is thus a key idea when talking about object making in these terms as it makes the presence of a plurality abundantly clear. Furthermore, this collaboration also acknowledges not only the other humans involved, but also the inanimate objects and intangible ideas as *key* participants in the creative process. I would like to think of my work as a ‘collaboration with the world’ – a world which is alive and rife with emergence. This would be opposed to an anthropocentric hierarchical domination of predictable matter.²⁹ Collaboration (as opposed to control) requires the convener of the collaborative effort to be sensitive and attentive to the variable qualities and behavioral tendencies of the various participants. It casts the role of collaborative artist as a sort of surveyor or ‘*perspectivist*’ – as suggested by art theorist Jack Burnham:

In evaluating systems the artist is a perspectivist considering goals, boundaries, structure, input, output, and related activity inside and outside the system. Where the object almost always has a fixed shape and boundaries, the consistency of a system may be altered in time and space, its behaviour determined both by external conditions and its mechanisms of control (Burnham 1974:17).

²⁹ For a more political (and ecofeminist) summary of this hierarchical domination, see “*War is the Father of All Things*” (Heraclitus) “*But Naure is the Mother of Life*”(Claudia von Werlhof) by Maria Mies. It is an adaptation of a keynote address delivered at “Ecology, Imperialism and the Contradistinctions of Capitalism (2005).

In the art-making process the active agents of the collaborative system could among other things include environmental factors, tools, materials, display settings and all else which could generally fall under the category of *context* in typical discussions of artworks – in both their conception and production. Burnham posits a systems perspective as opposed to a *singular object* perspective that was so endorsed by modern art theorists (most notably Greenberg and Fried). However, as I see it, there is not a singular art object existent that isn't already a *hybrid* of all these contextual factors coalescing into a unique novel assemblage.

It is important in my practice to consider these contextual factors not only as controllable vectors in the production of artworks, but also to actively utilize their limitations and restrictions as generative conceptual input for the realisation of art objects. This is achieved by affording maximum autonomy and agency to emergent processing glitches throughout the creative process as perceptible or hidden layers of a growing palimpsest that often *requires* bona fide mistakes to uncover certain aesthetic potentials. The result is a synergistic process that is *grown* from a collection of divergent yet consistent feedback loops that affords the art object the ability to take on qualities not present in any of the constituent parts when considered separately.

Contemporary French sociologist Bruno Latour provides us with the theoretical armoury to think about reality on these terms. Latour has developed his *Actor-Network Theory* [ANT] as a tool for engaging critically with the many entities and processes prevalent in the world, especially in those instances where the human cultivation of knowledge or scientific fact is at stake.

In Latour's own words, his call for '*reassembling the social*' seeks to transcend our understanding of the *social* as a category designating only the human domain:

Even though most social scientists would prefer to call 'social' a homogeneous thing, it's perfectly acceptable to designate by the same word a trail of associations between heterogeneous elements. Since in both cases the word retains the same origin—from the Latin root *socius*— it is possible to remain faithful to the original intuitions of the social sciences by redefining sociology not as the 'science of the social', but as the tracing of associations (Latour 2005:5).

It should be noted that this 'tracing of associations' could easily be misconstrued as a kind of general systems theory that seeks to consolidate the details of reality into bigger networks and processes which ultimately reduce the details to not-so-significant cogs of a larger machine. However, Latour actively sets out to *avoid* the tendency to reduce autonomous things in the world to the bigger contexts which supposedly frame and determine them. This is confirmed by

the editors of *The speculative turn: continental materialism and realism* (2011), a collection of essays about a new wave of realism among contemporary philosophers:

Against all forms of reduction to physical objects, cultural structures, systems of power, texts, discourses, or phenomena in consciousness, Latour argues for an 'irreductionism' in which all entities are equally real (though not equally strong) insofar as they act on other entities. While nonhuman actors such as germs, weather patterns, atoms, and mountains obviously relate to the world around them, the same is true of Harry Potter, the Virgin Mary, democracies, and hallucinations. The incorporeal and corporeal realms are equally capable of having effects on the world. Moreover, the effort to reduce one level of reality to another invariably leaves residues of the reduced entity that are not fully translatable by the reduction: no interpretation of a dream or a historical event ever gets it quite right, nor would it even be possible to do so (Bryant, Srnicek & Harman 2011: 5-6).

In his article, *Return of the reality principle* (2003), American philosopher Graham Harman contextualises the significance of Latour's contribution to the field of philosophy:

Whereas the great classical philosophers freely discussed such metaphysical topics as the structure of space and time, the nature of the soul, and the essential and accidental qualities of objects, Kant called a halt to this sort of philosophy with a famously radical step. In Kant's view, philosophy is impossible if it attempts to discuss things as they are in themselves; therefore, it is necessary to limit ourselves to discussing the modes of human access to the world. Since none of us can step beyond the boundaries set by the nature of human cognition, philosophy must become more modest, confining itself to a theory of the nature and limits of human experience. One result of this revolution has been the abandonment of direct claims about reality itself in favor of new obsessions with language, logic, sense-perception, moods, or the interpretation of texts – obsessions defining the work of nearly every key philosopher of the past two centuries. Since Kant, philosophers either have held to a single privileged gap between humans and an incompletely knowable world, or have insisted outright that there is only a play of appearances and no things in themselves at all. But whichever way the domino is flipped, in both cases it is the human being that stands at the center of philosophy. (Harman 2003).

Harman maintains that Bruno Latour's philosophy entirely subverts this recent tradition in philosophy. Whereas the work of, for example, Jacques Lacan and Jacques Derrida can be said to be in keeping with Kant's demarcation of philosophy to the realm of human access, Latour breaks the mould by including the non-human realm as a critical part of philosophical discourse. His ANT embraces diverse entities such as diseases, plants, corporations, computers, and theories all as significant 'actors' in the messy trials and tribulations of earthly existence. These actors, which naturally include humans, are engaged in the incessant interchanging of force (Harman 2003).

Graham Harman has extensively cited Latour's insights as a keystone philosophical source in the development of a metaphysics he calls *Object-Oriented Ontology* [OOO] (Harman 2003; 2005; 2009; et al). I believe that Harman's OOO could potentially provide a philosophical handle

to come to grips with creative processes where creatures, inert ‘matter’, as well as concepts and ideas, are all taken into consideration to some degree of significance.

OOO has already made a notable impact on the contemporary art scene, as was evident at the *Documenta (13)* exhibition in Kassel, Germany (2012). The exhibition’s curator, Carolyn Christov-Bakargiev, was strongly influenced by Harman and like-minded speculative realists (Bromberg 2013; Chayka 2013). In a critical review of the exhibition, Svenya Bromberg elucidates this philosophical influence:

Christov-Bakargiev defined this form of art, that has clear crossovers with the spheres of physics, biology and philosophy as ‘basic research’ [*Grundlagenforschung*]; artists describe their activity as an inquiry into ‘processes beyond human control’, into ‘fields of possibility’ that have to do with poetics, ‘wonder and mystery’ as opposed to mere reality. [...] The gesture of ‘object-oriented art’ is clearly one that does not allow for nature to remain the eternally excluded other of human existence, but makes it into something that art can investigate, situate, question and multiply re-imagine. This also challenges any straightforward environmentalist approach that calls for the conservation of the ‘what is’, and renders questionable any easy translation into politics of the assemblages presented by the artwork, [...] It is an aesthetics that is invested in exploring potentialities of singular objects and assemblages and in creating fundamentally new spaces of possibility (Bromberg 2013).

To make sense of what is commonly perceived as extraneous values and influences in the art-making process, OOO might indeed prove helpful to understand the world as a “democracy of objects” as has so poetically been suggested by another contemporary object-oriented philosopher, Levi Bryant (2011). If we were to follow the proverbial rabbit hole left in the wake of OOO’s extensive metaphysical excavations, all of the ideas, concepts, tools and materials should accordingly be approached as discernible entities (or objects) with varying degrees of autonomy and power in the art-making process. Humans, as actors in this network, do not only have a clear ability to rearrange these entities, but also to (re)distribute significance among them.

Affording individual objects such agency in the world can re-mystify a reductive mechanistic thinking which upholds stable mathematical laws underlying all of ‘Nature’. Although a staunch proponent of (good) science, Bruno Latour has done a lot of work to show the tremendous subjective interpretations that go into producing so-called objective scientific ‘truths’ (Latour and Woolgar 1986). The metaphysical implications of his realist ANT also goes a long way in destabilising the artificial ontological rift between ‘Nature’ and society (or culture) (Latour 1993).

Indeed, Harman holds that, according to Latour,

modernity aspires to undertake a double purifying movement: scientific fact is to be purified of any contaminating social biases, while social reality is to be interpreted as the arbitrary production of human decision-makers. Hence the wild swings of modern intellectuals between arrogant hard-core realism and social constructionist sophistry. This mutual quarantine separating society from nature is essentially the same division made by Kant between a structured but limited world of appearances and an elusive underground of absolute things in themselves. But this division is thrown into doubt by the rampant spread of *hybrids*, objects that are not easily classified as nature or culture. These hybrids are everywhere [...] What we have is neither pure nature nor pure society, but a motley *Parliament of Things*. And although advanced societies tend to produce hybrid objects in the most obvious ways, hybrids have really always been with us. The universe is not split into two distinct zones, as Kant would have it, but into *millions* of actors who resist and beckon one another (Harman 2003).

I am personally attracted to any philosophy which can somehow restore the experience of awe and wonder in our encounters with things in the world, rather than diminishing these encounters as deterministic outcomes of already known behavioural facts or laws. When positing invisible realities which underlie perceptible reality, we invariably discount a wealth of unique data confronting our sensory faculties. In an experimental art practice such as my own, I believe that *potential* is an extremely important requirement, and when we have too many pre-conceived ideas about what we think should occur, this potential is easily diminished or even lost. To avoid such a compromise a certain amount of open-mindedness, or open-ended limitations to our convictions and expectations, is required. We can thus say that a tentative (at best) application of previous standing knowledge is vital if we want to sustain the expansion of this very knowledge base.

Isabelle Stengers, a noted author on self-organisation and chaos theory (Prigogine and Stengers 1984), is an important example of a contemporary philosopher who indeed likes to conceive of the universe as an *open* complex system (Prigogine and Stengers 1997). Her essay, *Wondering about Materialism* (2011) is included in the above-mentioned, *The speculative turn*, wherein Stengers is said by the editors to criticise an 'eliminativist' comprehension of 'Nature', whereby we must remove all the claims to truths about reality except for the laws of physics. This reductive materialism furthermore not only frames our human experience of reality, but also transforms it (Bryant, Srnicek and Harman 2011: 15).

Like Bruno Latour, Stengers isn't necessarily opposed to the project of science in general, but is critical of instances of a kind of *static* science, which is used mainly to uphold pre-existing 'truths' about the nature of reality. Instead she proposes a more fluid process of growing new

branches of knowledge through an experimental curiosity. Bryant, Harman and Snircek explain that,

(a)gainst this reductive naturalism, Stengers proposes a messier and more complex materialism, one based on struggle among multiple entities and levels and not upon reducing the diversity of the world to a single plane. Stengers asks us not to reduce the world immediately to a mathematico-physical framework, but to 'wonder' about it—to let it upset our established categories and shift our own theories. *Wonder, Stengers writes, is not about mysticism, but rather about the true scientific spirit that refuses the tendency towards ordering and reduction in favour of an openness that leads science astray from established knowledge.* Science, unlike judicial proceedings, is not guided by a firm and unwavering set of rules and procedures, but is the production of rare events that provide new insight into reality. The risk is that with the rise of a knowledge economy, science may indeed turn into a rigid practice unwilling to undermine the status quo due to political and economic interests. The issue then is to re-invoke a sense of wonder in order to counter these stratifying tendencies (Bryant, Srnicek and Harman 2011: 15) (emphasis added).

This sense of wonder is more than likely the most important factor in not only my art practice, but my approach to life in general. I have found that the active reintroduction of awe into the mundane sectors of my everyday life can provide a rich stratum for inspiration and creativity, especially as far as the production of new artworks is concerned. Indeed, a practical process of consistently invigorating renewed wonder is always at least equal in significance to the sensual qualities of the final product that such a process delivers. The question then is whether there are ways by which a tentative approach to art making – in other words avoiding a commitment to premeditated end-goals – can somehow deliver coherently resolved art objects.

2.2 DETERMINISTIC CHAOS DRAWINGS

In an attempt to produce comprehensible art objects by means of a tentative generative approach, I have thus far produced fifty drawings in an ongoing series that I have titled, *Deterministic Chaos Drawings* (2008-2013) (see figs.10-14). These drawings are monochrome ballpoint pen compositions that are the diverse results of my sustained execution of a very simple creative rule-set (or algorithm). It is a linear process of tracing one line at a time that displays non-linear mathematical feedback dynamics by coalescing into unforeseeable aesthetic assemblages.

The complexity of these drawings belies its conceptual simplicity: I start by drawing an initial line, which serves as the *deterministic* aspect of the work and influences all else to follow. This line can take on any form and is often directly based on familiar found imagery (see figs. 10,11). I continue the process by copying the initial line as close as possible to its source without ever touching it. As soon as I have concluded the tracing of the complete initial line across the whole

surface, I repeat the process over and over again until some arbitrary threshold is reached. This threshold, or point of saturation, can be determined before-hand or intuitively settled during the process.

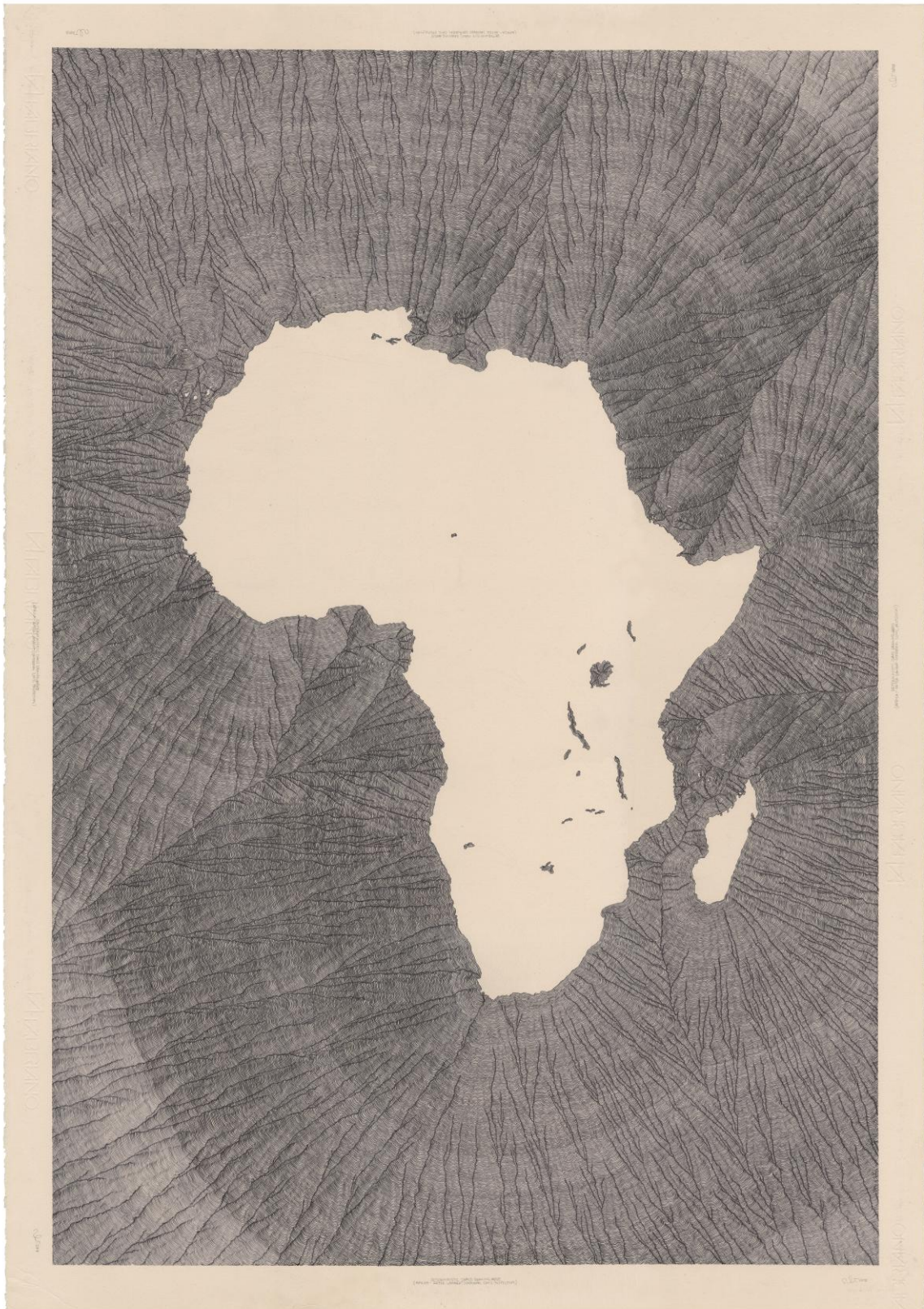


Figure 10: Le Roux, N. *Deterministic Chaos Drawing # 025 (Africa - after Lambert conformal conic projection)* (2010). Ballpoint pen on paper. (70 x 100 cm).



Figure 11: Le Roux, N. 2010. *Deterministic Chaos Drawing # 027 (After Cahill's butterfly projection)* Ballpoint pen on Paper paper. (70 x 100 cm).

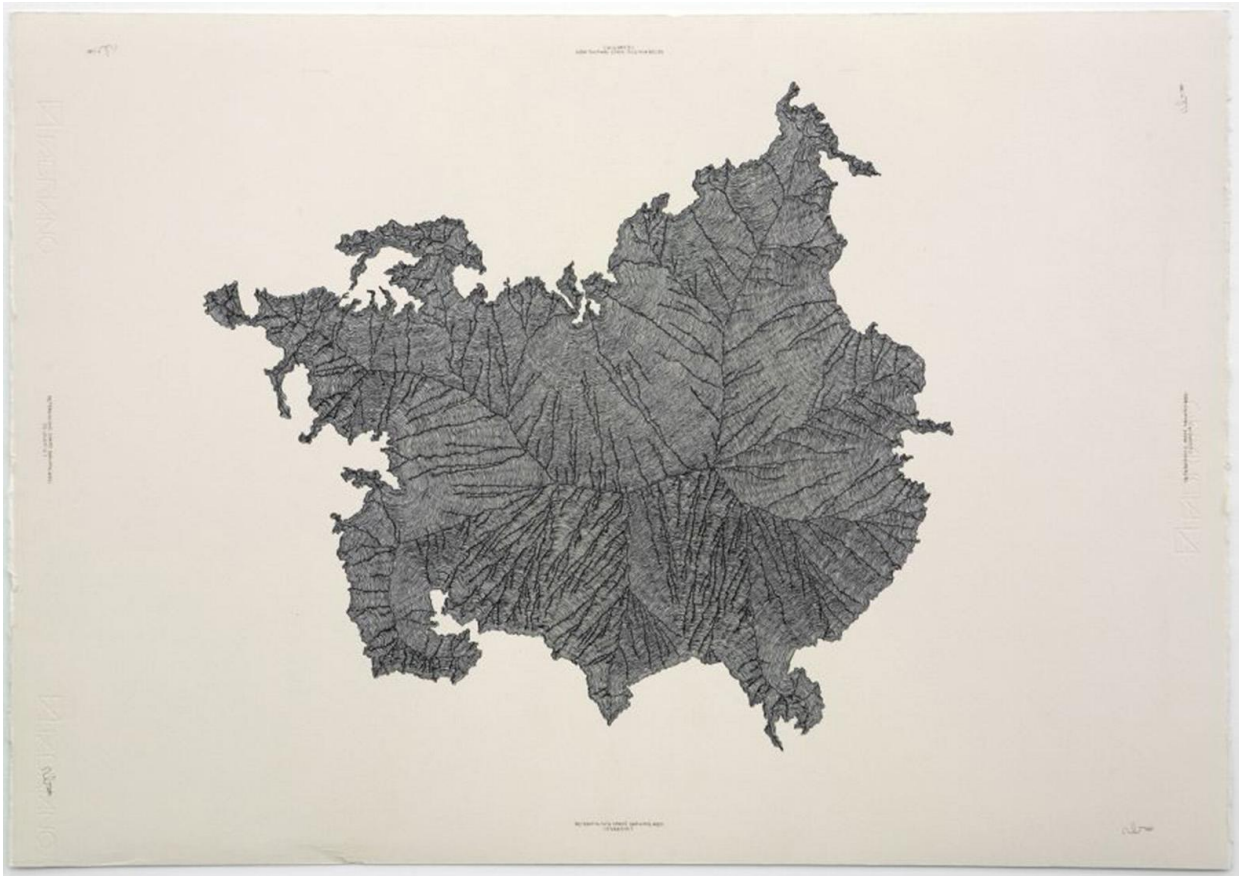


Figure 12: Le Roux, N. 2012. *Deterministic Chaos Drawing #031 (Eurasia)*. Ballpoint pen on paper (50 x 70 cm).

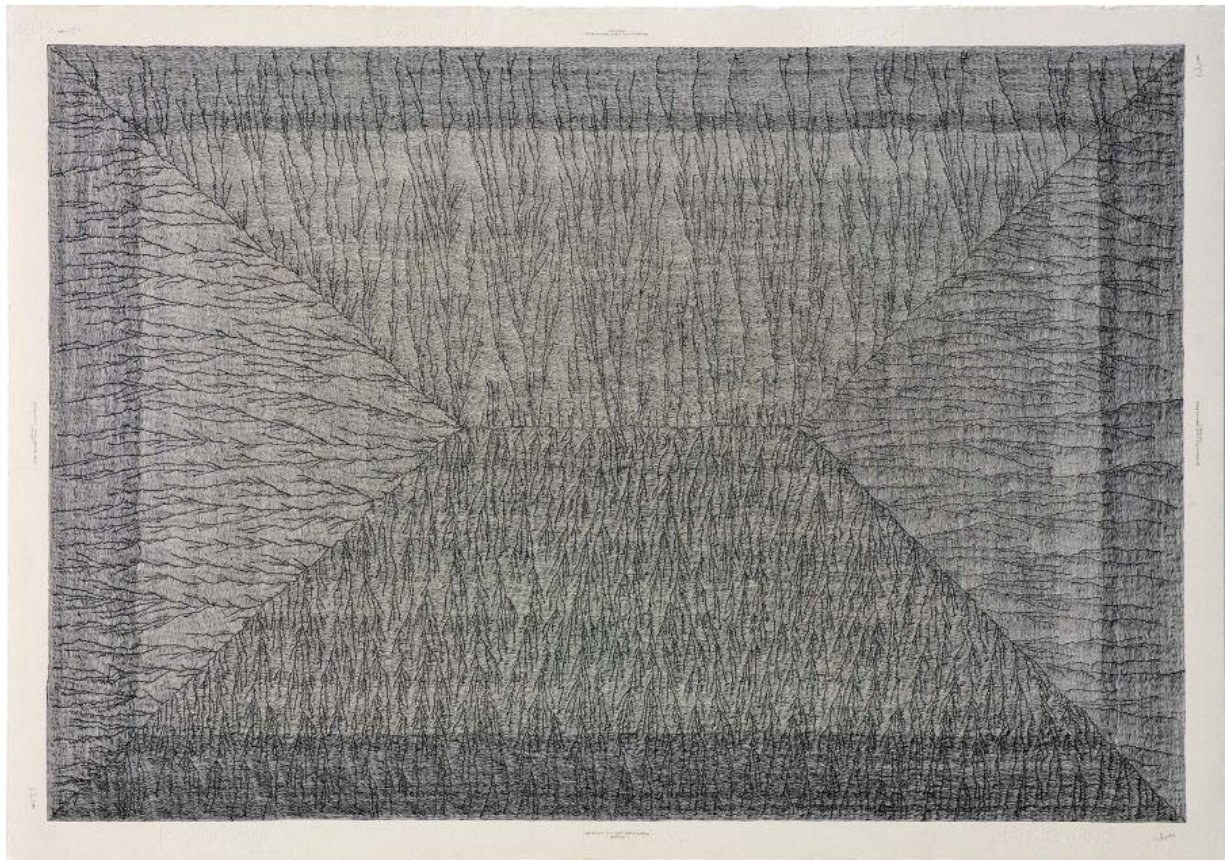


Figure 13: Le Roux, N. 2012. *Deterministic Chaos Drawing #032 (Aporue)*. Ballpoint pen on paper (70 x 100 cm).

There is thus a notable amount of agency in aesthetic decision-making on my behalf throughout the process. Nevertheless, the crucial details are determined not by my conscious control at each step of the production, but by the contingent concrescence of my accurate *and* inaccurate tracings. This is partly due to the fact that I do not trace the original source over and over, but rather trace each individual line as the model copy in turn. What results is a continuation of familiar – yet literally brand new – source material with every action that I take. It is a feedback loop system out of which emerges a synergy which is, by definition, beyond expectation. I am therefore sometimes just as surprised at many of the formal qualities these drawings come to take on, as an unfamiliar viewer encountering the drawing for the very first time might perhaps be.

Because of my own physical limitations in addition to the scale and medium that I choose to employ, I can technically never make an exact copy of the previous line. The handmade nature of the drawing ensures that the distances are not consistent and the lines often touch. To stay diligent to the original generative rule-set I am subsequently forced to repeat these 'mistakes' as I continue the process and the lines accrue into denser forms or masses. What I find interesting about the compositions is not necessarily the technical accuracy of my execution of the rule-set, but rather the unpredictable nature of both the accurate and inaccurate tracings coalescing into an emergent linear assemblage.

There is a crucial element of repetition in such action, which focuses a meditation and familiarity on the part of my hand executing the drawing. This leads to a conscious practice of cultivating muscle-memory, allowing the body to do the work without too much thinking effort. It is nonetheless crucial to note that there is not a conscious execution of any pre-determined final goal when carrying out this process. There is only the conscious execution of a pre-determined means that becomes embodied in a unique aesthetic configuration.

Nevertheless, novelty is regularly introduced whenever the pen blotches or my arm tires and the line wavers. As I go along, my willful execution of the original rule-set results in the unpredictable human and technical errors becoming new source material. Besides always having the potential of ignoring the whole conceptual rule-set, I also have the choice of ignoring the individual mistakes by drawing idealized copies of the original line. However, by means of trial-and-error experimentation I have concluded that generally the best option is to diligently follow the bifurcations.

In certain cases an overall shape or form is perhaps partially predictable, but it is never knowable in advance. It is only by going through the methodological process that the final drawing will reveal itself. This is also perhaps why I generally enjoy the production of the drawing more-so than the final drawing as object, although I cannot claim to have ever been too disappointed with the end results thus far.

2.3 GENERATIVE ART

The *DCD* series can be viewed as an example of generative art. This is the case as the focal point of the work is not on the 'message' that the content of the singular objects may convey. The emphasis is much rather on an experimental interaction with the ontological process of becoming or 'making-present'. As such a large degree of novelty and aesthetic variation is resultant from what is basically the same generative procedure. My interests herein naturally lie much more with the self-organisational ontological implications, than it does with signifying and semiotic mechanisms of representation.

Philip Galanter's paper, *What is generative art? complexity theory as a context for art theory* (2003), argues for an understanding of generative art by means of complexity theory. Although often associated with the use of computers, generative art is not necessarily restricted to computer or software art. Galanter therefore sees the defining factor of generative art to be the presence of a process or a system of production to which the artist relinquishes at least partial control (2003:4).

A more technical and up-to-date exposition as to the key elements of generative art is forthcoming from the collaborative efforts of Margaret Boden and Ernest Edmonds, specifically their text, *What is Generative Art?* (2009):

In G(enerative)-art, [...] the artwork is generated, at least in part, by some process that is not under the artist's direct control. This is a very broad definition. It does not specify the minimal size of the "part". It does not lay down just what sort of generative process is in question. It does not say what counts as being outside the artist's direct control. And it is silent on the extent (if any) to which the processes concerned may have been deliberately moulded by the artist before 'losing' direct control. In short, our definition of G(enerative)-art is largely intuitive. In general, it picks out cases of art-making in which personal control is deliberately diminished, or even wholly relinquished, and relatively impersonal processes take over. Those impersonal processes vary greatly. They may be physical, psychological, sociocultural, biological, or abstract (formal). And if abstract, they may or may not be implemented in a computer (Boden and Edmonds 2009: 29-30).

The tremendous emphasis on the use of systems and processes as the a medium of art production shares many commonalities with many examples from art history, especially the work of many early conceptual artists (Galanter 2003; Boden & Edmonds 2009). Galanter notes the simple mathematical rule-sets which Minimalists painters such as Carl Andre (see fig. 15), Mel Bochner (see fig. 16), and Paul Mogensen (see fig. 17) employed to create their compositions (2003:3). Sol LeWitt and Hans Haacke are prominent figures from the dawn of conceptual art who also advocated and employed systems as a creative means (Galanter 2003:3).

We will examine some of the relevant ideas of LeWitt and Haacke later, but for now we can turn our attention to an example of contemporary physical (or biological) generative art. Hubert Duprat's ongoing 'collaborations' with aquatic caddis-fly larvae (see fig. 17) are quintessential examples of contemporary generative artworks that are not computer based (McCormack 2003:6). Duprat produces sculptures of gold, pearls and other precious stones by removing the natural larva cases of Trichoptera species and subsequently placing the larvae in artificial jewel-filled environments. The creatures then appropriate the materials from their precious stone surroundings as building materials for the construction of their larva casings, forming beautiful minuscule sculptural artworks in the process (Duprat and Besson 1998).

By participating in an already-existing natural system, Duprat generates new aesthetic experiences that he has limited control over. In an interview with Duprat, Christian Besson approaches the work from the perspective of information theory. He cites the work of French biologist Henri Atlan, who appropriated Claude Shannon concept of *noise*, as a biological metaphor. Atlan writes that,

(a)bsolute novelty stems from the indeterminate act of stimuli which thus play the part of random upheavals in the system which they affect. The acquisition of new knowledge by experiment is a specific case of information growth under the effect of noise (in Duprat and Besson 1998:175).

Besson's reads Duprat's input into the caddis-fly larvae's living system as "introducing noise" – thus complicating the caddis-fly's relationship with its environment of *being*, in the widest sense of the word. Besson suggests that the perceived reaction of the creature – i.e. the appropriation of gems to construct new larva casings – could be posited in either one of two opposing ways:

From a biological viewpoint, a random event triggers self-organization. From a human viewpoint, the experimenter's intent produces this effect. [...] Is the caddis worm's precious case the work of the insect or the work of the artist? This is not the right question (in Duprat and Besson 1998:176).

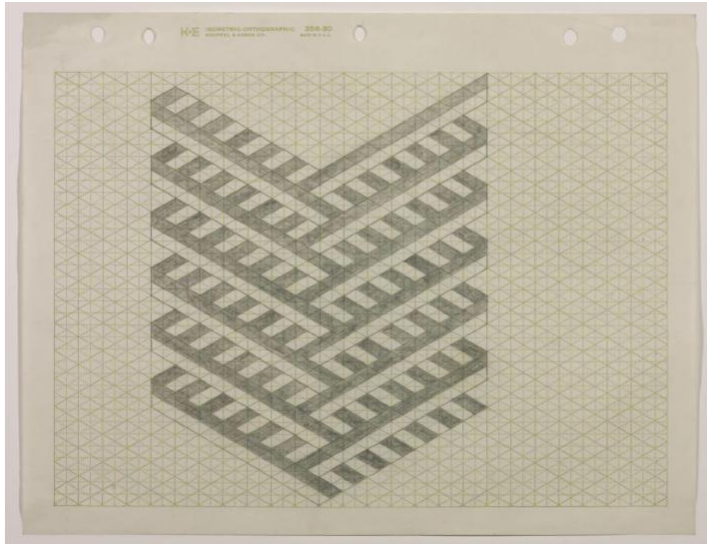


Figure 14: Andre, C. 1967. *Drawing for 'The Perfect Painting.'* Graphite on paper (21.6 x 27.9 cm).
Tate: <http://www.tate.org.uk/art/artworks/andre-drawing-for-the-perfect-painting-t02136>



Figure 15: Bochner, M. 1998. *Measurement: 41/22 (in 3 parts)*. Oil, acrylic, on canvas (32 x 32 cm).
ArtnetAuctions: <http://www.artnet.com/auctions/artists/mel-bochner/measurement-4122-in-3-parts>

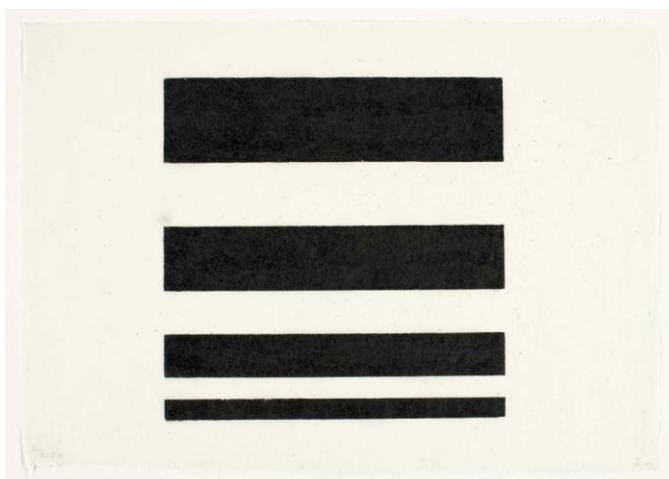


Figure 16: Mogensen, P. 1985. *Portfolio part I*. Woodcut on paper (27.9 x 38.1 cm).
Arts connected: <http://artsconnected.org/resource/81823/portfolio-part-i>



Figure 17: Duprat H. 1980-1996. Aquatic Caddis fly larvae with cases of gold, pearls, precious stones. (2-3 cm).
Craft House: <http://crafthaus.ning.com/profiles/blogs/art-project-duprat-s-aquatic-caddis-fly-larvae-work-with-gold-opa>

Duprat's work raises several critical questions around mankind's positioning in the 'natural' world, not least that of 'interference' and/or 'disturbance' of natural ecosystems. It is important to acknowledge here that Duprat has studied and experimented with these worms since his childhood. He did this not in order to verify any universal laws, but out of a sincere curiosity and fascination of a remarkable naturally occurring system (Duprat and Besson 1998:173).

Also, it should be noted that these species are severely threatened in their 'natural' environment because of increased industrial pollution in river networks (Duprat and Besson 1998:177). It could subsequently even be posited that Duprat's *aesthetic* interests in the Trichoptera species' activities could very well be determining their survival on this planet. Such an inference might be a tad ambitious, but it does hark back to the systems musings of Jack Burnham's who rather prophetically suggested that, in a systems paradigm, "esthetic decision-making becomes an integral part of any future technocracy. As yet few governments fully appreciate that the alternative is biological self-destruction" (1968:16).

But before we get too 'out-there' too soon, I will return to Duprat's 'intervention' of a 'natural' system, for I can anticipate the groans of hardened 'ecologists' or 'environmentalists', who insist on restoring the 'natural order' of the world. From this vantage point there cannot be much positive to extract from Duprat's work, as he is clearly interfering with the caddis-fly's natural habitat and reproductive cycle and thus disrespecting animal rights. A lot of so-called 'environmentalists' adopt precisely such an attitude when facing the contradictory nature of humans' interactions with other species, subconsciously perpetuating a hostile dichotomy of 'Nature' versus culture.

Little do people who would uphold such a position realise that this conception is upholding the very modernist and Enlightenment notions, where man, as rational subject, is tasked with ordering 'Nature', as chaotic object. It is exactly this type of thinking that has arguably contributed a great deal to the current environmental problems we are currently facing (McWhorter 1992; Mies 2006; Toulmin 1980). However, an in-depth discussion of this topic is beyond the scope of this thesis.

In his formulation of generative art as complex systems, Galanter makes reference to Abraham Moles's 1966 publication, *Information Theory and Esthetic Perception* (2003:8). In an attempt to analyse our experience of music, Moles adopted Claude Shannon's mathematical models for

communication systems, or 'information theory', alongside the phenomenological work done by Maurice Merleau-Ponty in the field of perceptual psychology. What Moles found was that our aesthetic interest lay in music that was *complex* according to Shannon's model for communication. In other words, aesthetically pleasing music is a balance between the highly ordered, where, say, the note G is rhythmically repeated ad infinitum, and the highly disordered, where, for example, completely random notes are sounded at totally haphazard intervals. A level of familiarity is thus required on the part of the listener, otherwise she would have no knowledge of what she is being exposed to, thus preventing any cognitive re-cognition (pun intended). However, although the experience of the work needs to be re-cognisable, it should not become unequivocally repetitive, for then the listener loses interest as she is not expecting anything 'new' to look forward to (Galanter 2003).

If we were to apply Moles's findings to the domain of the visual arts, as Galanter has done, the connections to generative practices become quite obvious. Generative art practitioner Pablo Miranda Carranza insightfully likens generative techniques to the "way a gardener cultivates plants" (in Petersen 2004). The gardener can quite assuredly expect the seedlings to assume a general and recognizable form when they become trees, such as a trunk, branches, leaves, *et cetera*. However, the gardener never knows exactly when and where the branches will appear, or indeed exactly how they will look. There is thus an element of order at play here, combined with an element of disorder. Hence we find that, time and time again, the gardener is surprised by the nuanced temporal revelations of the self-organising systems that form the tree.

This experience is all too familiar to generative artists who continually attest to the 'surprising' nature of their practice (Simon in Plough 2003; Galanter 2003; Utterback in Soerensen 2005; Watz in Petersen 2005; Magnusson in Petersen 2004). Thomas Petersen surmises this aspect of unpredictability when he notes that, "(w)hatever a generative system is based on (autonomous algorithms or some sort of input), there is usually a space wherein multiple potential expressions can arise" (2004).

Generative artist Jon McCormack also turns to the field of biology in order to explain his understanding of generative art processes (McCormack 2003:5-6). The author or artist's input, usually an unambiguous "formal specification of process" (McCormack 2003:5), is demarcated by McCormack as the *genotype*. When the genotype is enacted in the world it produces the *phenotype*, which is basically our perceptible experience of the artwork. Because the phenotype

“unfolds in the world,” the total amount of information produced in the phenotype is noticeably in excess of the genotype itself (2003:5)³⁰. McCormack furthermore suggests that emergent properties are characteristic to generative art when he points out that new qualities, not specified in the genotype, emerge from “local interactions between individual components” (2003:6).

In Casey Reas’s piece *MicroImage* (2003) (see fig.29), we witness the emergent properties of generative systems quite explicitly. The work consists of three juxtaposed screens displaying steadily morphing compositions that are generated by exactly the same computer algorithm. However, despite consisting of identical genotypes, the forms displayed on the screens are never identical, each taking on a different appearance as its phenotype evolves. Reas explains that all three devices run on exactly the same code, despite producing divergent end results. Despite the shared identical programming of each screen, it makes obvious “how diverse the manifestation effect of that code is” (Reas in Champion 2003:43). Needless to say, from a purely phenomenological point of view, the viewer of *MicroImage* might not necessarily grasp the work’s emergent properties if not informed of the fact that the data on all three screens are generated by identical systems.

This makes Jack Burnham’s conception of a 'systems aesthetic' critical, considering that, already in 1968, he pointed out that, “(i)n a systems context, invisibility, or invisible parts, share equal importance with things seen” (1968:22). Burnham’s argument for an understanding of art through a systems lens has been made all the more relevant by the development of advanced computational technology. However, as Galanter has shown (2003:15), we do not necessarily require the use of computers to work in a generative way with the world, as is the case with many Conceptual works, and Duprat’s work with caddis-fly larvae.

We can thus conclude that generative art is a practice which is not overly concerned about what the final product *signifies*. This is not to say that the final products are uninteresting for, if it were so, few would persist with this sub-genre of art practice. However this is not the case as I would include myself in a substantial grouping of current and former artists dabbling with experimental and partly autonomous processes for building significant objects. As these processes rely on generative mechanisms outside the realm of human control, it is difficult to make a convincing case for these objects attaining their significance from semiotic or representational

³⁰ According to McCormack this synergistic quality often referred to as “*database amplification*” (McCormack 2003:5).

methodologies. This does however not imply that signs or signifiers are absent in these art objects, but only that they are of secondary concern – and certainly that they come after emergence in a process of becoming.

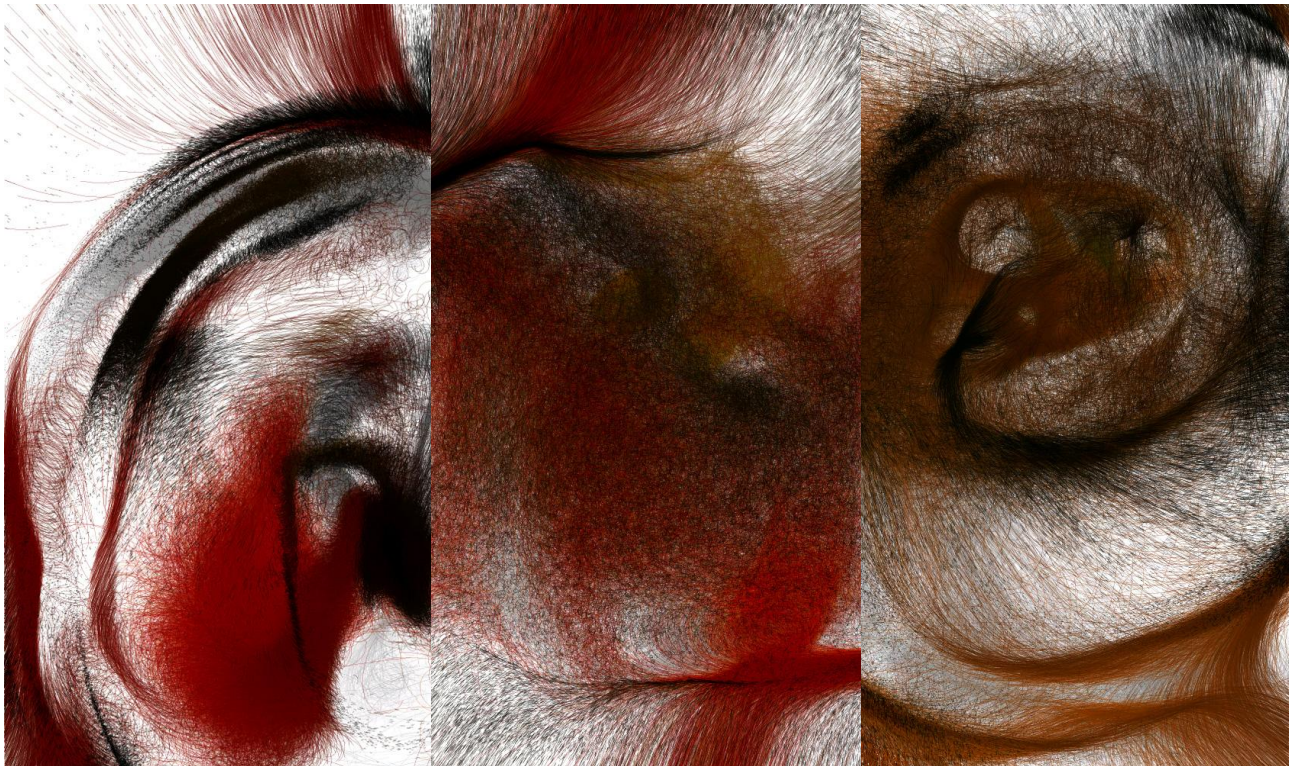


Figure 18: Reas, C. 2003. *MicroImage*. Triptych of digital prints (5 x 2.8 m).
Group C: <http://www.groupc.net/2003/microimage>



Figure 19: Reas, C. 2003. *MicroImage*. Triptych of software and three large-scale prints. (5 x 2.8 m). Installation view.
Ars Electronica Archive: http://90.146.8.18/bilderclient/FE_2003_bhnessa_025_p.jpg

2.4 NON-SEMIOTIC OBJECT BUILDING

The above passage is a vital prelude to sharing my frustration of instances when my work is misunderstood, especially following brief inspection. In many private discussions of my drawings I have been disappointed to learn that many viewers attempt to *read* the work as a semiotic object, when trying to understand its meaning. In other words, what they seem to consider to be important about these works (if they do consider it at all noteworthy) has not so much to do with the phenomenological impression that the sensual qualities of the artwork effects on their senses. Rather, they typically seem to expect the meaning to come from the signification of a concept that the work is supposedly representing. The very point of these drawings however is to not overly rely on something *outside* of them, but to subsist as alluring objects present to the viewer as the corporeal evidence of creative *building* or *growing* processes.

When I make these works I am engaging with the ontological process of becoming (or *coming into being*). When we make an object we are making actual alterations to reality. I am not entirely convinced by the notion that the vital component of good art is the (re)arrangement of signifiers. In other words, I am not generally attracted to art objects – in terms of both making and viewing – because of the external narratives and debates they reference or relate to. Something has again to be said for the object itself as an autonomous thing, but perhaps not on such 'grand narrative' terms as Michael Fried and Clement Greenberg used in first half of the twentieth century.

The editors of *The Speculative Turn* are in agreement with this sentiment, when they state:

It has long been commonplace within continental philosophy to focus on discourse, text, culture, consciousness, power, or ideas as what constitutes reality. But despite the vaunted anti-humanism of many of the thinkers identified with these trends, what they give us is less a critique of humanity's place in the world, than a less sweeping critique of the self-enclosed Cartesian subject. Humanity remains at the centre of these works, and reality appears in philosophy only as the correlate of human thought. In this respect phenomenology, structuralism, post-structuralism, deconstruction, and postmodernism have all been perfect exemplars of the anti-realist trend in continental philosophy. Without deriding the significant contributions of these philosophies, something is clearly amiss in these trends. In the face of the looming ecological catastrophe, and the increasing infiltration of technology into the everyday world (including our own bodies), it is not clear that the anti-realist position is equipped to face up to these developments (Bryant, Srnicek and Harman 2011: 2-3).

It is my personal opinion that a lot of contemporary art runs the risk of 'reducing away' the full sensory experience of the work to a one-dimensional representational device as if it were only a body of text or symbolic icon. All too often you encounter the explanation behind the content to be more important than the actual art object. I wish to avoid the production of such artworks.

However, that is not to say that I am overly concerned with adopting or finding the 'perfect' formal rule-set for making art objects. This thesis is not at all concerned by a singular universal set of formal structuring that I believe to be the most satisfying. To the contrary, a commitment to rule-sets, systems, concepts and structures is made only insofar as to nullify constant self-doubting interference on my part. It is a way to surrender myself to a working process and in-so-doing encourage a diverse range of novel methodologies by means of modest experimentation with earthly processes.

This is also not to say that I emphasise practice over theory, as the highly reductive dichotomy would have it. I believe that theorising is also a practice and I furthermore do not necessarily differentiate between physical things and immaterial thoughts, concept and designs, at least as far as its significance to *creative processing* is concerned. For me digital media, drawings on paper, advertising slogans and national anthems, are no less real (or important) than rocks, caterpillars and meteorological low pressure zones.

This position on my part has been greatly influenced by the writing of Graham Harman and his *Object-Oriented Ontology* [OOO]. Harman is a scholar of existentialist Martin Heidegger and his philosophy has been greatly influenced by his unique reading of the German's work, especially the famous 'tool-analysis' (Harman 2002; 2005; 2007b). For Harman, Heidegger's tool-analysis makes clear that we do not primarily engage with objects by perceiving or theorizing about them, but rather by merely relying on them for serving some sort of function. The hammer is only in our consciousness as a tool for knocking nails, until the hammer breaks and we become wholly aware of all its qualities and constituent parts. Although this insight is useful enough for Harman, it does not *only* imply that every theory is based upon a practice and we require an everyday working relation with things before viewing them or theorizing about it. The fact is that even our practical relation to things do not fully grasp the full reality of those things:

The tribesman who dwells with the godlike leopard, or the prisoner who writes secret messages in lemon juice, are no closer to the dark reality of these objects than the theorist who gazes at them. If perception and theory both objectify entities, reducing them to one-sided caricatures of their thundering depths, the same is true of practical manipulation. We distort when we see, and distort when we use. Nor is the sin of caricature a merely human vice. Dogs do not make contact with the full reality of bones, and neither do locusts with cornstalks, viruses with cells, rocks with windows, nor planets with moons. It is not human consciousness that distorts the reality of things, but relationality per se (2007b: 176).

Harman takes a massive leaf out of Latour's book and realises that every interaction is a reduction. Once it really kicks in that any relation to any kind of entity is always already a reduction of sorts, you are immediately conscious of your own limitations as to 'reading' reality.

Human thinking is only able to cognise a few layers of complexity until our linear logic fails us and we have to rely on electronic means to do our non-linear equations. Therefore we should perhaps heed the great philosophical wisdom of Socrates and adopt a bit more humility as far as what we can actually claim to *know*. Harman's philosophy would suggest that we cannot truly know anything and that goes for all things on an almost flat ontological plane. Harman does however suggest that although real objects do not make contact with each other, their sensual qualities do connect and it is on this basis that hybrid objects and assemblages form via allegiances. Indeed any hybrid assemblage is already a new object which sensual qualities can be known but never its inner most ontological depths (Harman 2007b).

In such a way reality can be understood to be *re-mystified* thanks to, ironically enough, realist philosophy. It follows then that aesthetics, understood in its original meaning as *sense perception* (Harper 2001),³¹ is foremost in the philosophical quest of unearthing the real. A self-motivated, time-consuming experimental tinkering with given objects can lead to new assemblages or hybrid objects. When this activity is furthermore restricted to the handmade, the 'mad scientist' can harmlessly assemble ahead, limiting the consequences of experiments gone wrong. We can thus deduce from this chapter an ontological conception of a simultaneous autonomy and interdependence in the world. Such a notion can prove to be very useful to the artist – especially so if she is interested in process.

31 Historian Douglas Harper provides some background into how the meaning has changed over the last 300 odd years: "Popularized in English by translation of Immanuel Kant, and used originally in the classically correct sense "the science which treats of the conditions of sensuous perception." Kant had tried to correct the term after Alexander Baumgarten had taken it in German to mean "criticism of taste" (1750s), but Baumgarten's sense attained popularity in English c.1830s (despite scholarly resistance) and removed the word from any philosophical base. Walter Pater used it (1868) to describe the late 19c. movement that advocated "art for art's sake," which further blurred the sense." (Harper 2001).

PART THREE:

A HISTORICAL PRECEDENT FOR SYSTEMS ART

3.1 SOL LEWITT AND CONCEPTUAL ART

We do not have to go that far back to encounter a historical precedent for art practices which emphasise the variable outcomes of aesthetic systems-based processing. Indeed, it is arguable that all works of art relies on some kind of system in order to be realised, although not all of them involve relinquished personal control as a concept. A good example of the kind of art I am interested in would be Pointillism, a trend in late nineteenth-century painting where the final image is made up of tiny little pixels of pure colour (see figs. 20-21) (Boden and Edmonds 2009:28). For the purposes of this study however, I shall focus on some key figures from conceptual art onwards, especially those examples which clearly illustrate a systems approach to art-making. In the following chapter I will therefore discuss practical examples and theoretical work from the dawn of conceptual art. I will cite the work of Sol LeWitt, Hans Haacke, Robert Smithson and Jack Burnham in order to provide a historical context for my practice.

Sol LeWitt's *Paragraphs on Conceptual Art*, first published in 1967, is considered as the first manifesto of Conceptual Art (Alberro & Stimson 2000:xx). However, it has to be kept in mind that Conceptual art was never a fixed, rigidly delineated group or movement (such as Pointillism perhaps was). Rather, it was centered around a somewhat loose collective of American-based artists who acted out against the authoritative claims of glorified art critics, specifically Clement Greenberg and Michael Fried, at the twilight of Modernism in art (Alberro & Stimson 2000:xli).

In other words, it was the realisation of a general urge among artists to reclaim the right to decide what art is, or as Joseph Kosuth so succinctly put it, "Conceptual art annexes the function of the critic" (in Alberro & Stimson 2000:xli). Indeed, LeWitt introduces his manifesto by citing the editor of *Artforum*, whom had requested LeWitt to avoid "the notion that the artist is a kind of ape that has to explained by the civilized critic" (in LeWitt 1967:12). Theorising about art thus now fell firmly within the legitimate range of a Conceptual artist's output.

Seeing that this text was initially published in the United States at a time when post-structural continental philosophy had yet to reach its shores, we can perhaps forgive LeWitt for seemingly restricting the gambit of his "Paragraphs on Conceptual Art" to the grand reductionist



Figure 20: Pissarro, C. 1886. *Eragny Landscape*. Watercolour on paper (55.9 x 66 cm).
Wiki-Paintings: <http://www.wikipaintings.org/en/camille-pissarro/eragny-landscape#supersized-artistPaintings-208157>

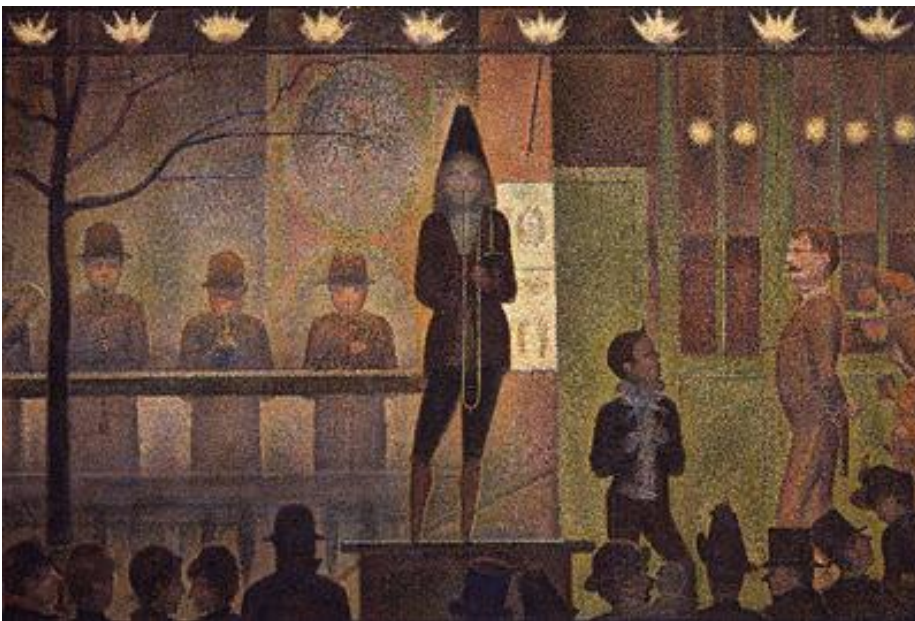


Figure 21: Seurat, G.P. *Parade de Cirque*. 1887-1888. Oil on canvas (100 x 150 cm). With detail.
My Kid Could Paint That: http://my-kid-could-paint-that.blogspot.com/2012_01_29_archive.html

presuppositions of high Modernism. We find that he posits an initial dichotomy where subjectivity was seemingly to be avoided at all cost:

Since the functions of conception and perception are contradictory (one pre-, the other post-fact) the artist would mitigate his idea by applying subjective judgement to it. If the artist wishes to explore his idea thoroughly, then arbitrary or chance decisions would be kept to a minimum, while caprice, taste and other whimsies would be eliminated from the making of the art (LeWitt 1967:13).

LeWitt thus contrasted conceptual art with 'perceptual' (i.e. 'formal') art by attempting to develop as objective an art practice as possible. This led to a radical abandonment of, among other things, artistic skill, technique and aestheticised style as necessary aspects of art-making process. The critical factor for LeWitt was instead the creation of a pre-set *concept*, which becomes the artwork, to transmit *ideas* to the viewer:

To work with a plan that is pre-set is one way of avoiding subjectivity. It also obviated the necessity of designing each work in turn. The plan would design the work. Some plans would require millions of variations, and some a limited number, but both are finite. Other plans imply infinity. In each case, however, the artist would select the basic form and rules that would govern the solution of the problem. After that the fewer decisions made in the course of completing the work, the better (1967:13).

For LeWitt, the concept or plan was thus the most important aspect in the production of art. After instigating a strict set of rules, the disciplined artist would cease control to her own abstract conception(s). It is difficult not to make connections here with the reductionist tradition of Descartes' understanding of 'rationalism', whereby objective abstract universal theorems are thought to be superior to subjective local sensory experience. (Blackburn 1996:318-319). However, LeWitt explicitly denies and questions the importance of rationality in Conceptual Art. He followed up his *Paragraphs on Conceptual Art* with a second, more concise manifesto entitled *Sentences on Conceptual Art* (1969). LeWitt doesn't beat around the bush to redress his position:

- 1 - *Conceptual artists are mystics rather than rationalists. They leap to conclusions that logic cannot reach.*
- 2 - *Rational judgements repeat rational judgements.*
- 3 - *Illogical judgements lead to new experience.*
- 4 - *Formal art is essentially rational* (1969:106).

There is evidently a fervent denial of 'rationality' on the part of the Conceptual artist. Nevertheless, it is interesting to note how LeWitt then formulates an 'irrational' approach in a seemingly paradoxical fashion:

- 5 - *Irrational thoughts should be followed absolutely and logically* (1969:106).

However, if viewed in the context of the rest of LeWitt's *Sentences*, number 5 is perhaps not necessarily as paradoxical as it first seems:

- 6 – *If the artist changes his mind midway through the execution of the piece he compromises the result and repeats past results.*
- 7 – *The artist's will is secondary to the process he initiates from idea to completion. His willfulness may only be ego. [...]*
- 9 – *The concept and idea are different. The former implies a general direction while the latter is the components. Ideas implement the concept.*
- 10 – *Ideas alone can be works of art; they are in a chain of development that may eventually find some form. All ideas need not be made physical.*
- 11 – *Ideas do not necessarily proceed in logical order. They may set one off in unexpected directions that may eventually find some form. All ideas need not be made physical (1969:106).*

There is thus a critical distinction drawn between *concepts* and *ideas*. Concepts are the structures that are set in place - the rules or laws which govern a system - similar to a mathematical algorithm. These structures are realised by means of ideas, and the interaction of ideas and concepts brings about more ideas, so therefore they are *generative*. LeWitt holds that concepts, as structures, are by definition abstract, rigid, and logical, but stresses that this is not where *art* is to be found. "*Ideas alone can be works of art*" proclaims LeWitt, and it is here where the irrationality is to be located as, "*(i)deas do not necessarily proceed in logical order*" (1969:106).

Therefore, when LeWitt suggests that, "*(i)rrational thoughts should be followed absolutely and logically*" (1969:106), he is not circumscribing art (i.e. ideas, i.e. irrational thoughts) as subordinate to the domain of the absolute or logic (i.e. concepts). Instead, LeWitt is merely pointing out that, as with language, we cannot escape the use of structures when making art. However, it is when we meddle with the structure in the art making process that conceptual clarity is often obscured and track of the idea is lost. The result is a focus, at least on the side of the artist, on developing the means or mechanisms to generate objects or experiences, rather than overemphasising the desired end result of the means. It is thus a bottom-up (as opposed to top-down) way of working that is primarily concerned with the processes of the ontological becoming of artworks.

LeWitt, as a practicing artist, assumes authority from the theoretical art critics and formulates his understanding of art as the irrational and unpredictable 'thing' that happens when genuine active agents interact by way of mutual structures. Such a reading of LeWitt shares a lot of commonalities yet again with Bruno Latour's *Actor-Network Theory* and complexity theory. Following the directives of the latter, we could posit that LeWitt's practice places a tremendous

emphasis on complex self-organizational systems in the art making process, although he never specifically uses such terminology. Nevertheless, two of LeWitt's American contemporaries, Hans Haacke and Jack Burnham, drew explicitly from early Systems Theory in an attempt to express their conception of art during the same era.

3.2 JACK BURNHAM, HANS HAACKE AND SYSTEMS AESTHETICS

Like LeWitt, art theorist Jack Burnham also questioned the authoritative proclamations of the 'mastermind critics' such as Greenberg and Fried (it seemed to be a general trend at the time). The blossoming fields of systems theory and cybernetics provided Jack Burnham with an alternative conception of art to the dominant Modernist notions of the 'genius' artist as lone harbinger of truth and beauty in the visual arts. In his 1968 essay, *Systems Esthetics*, Burnham responds to Michael Fried's much debated 1967 text, *Art and Objecthood*:

The systems approach goes beyond a concern with staged environments and happenings; it deals in a revolutionary fashion with the problem of boundary concepts. In systems perspectives there are no contrived confines such as the theatre proscenium or picture frame. Conceptual focus rather than material limits define the system (1968:17).

Burnham came to understand art, and the art world, as a complex system consisting of many interacting components. While these components formed part of other systems, they seldom carried any meaning *without* the system:

The components of systems – whether these are artistic or functional – have no higher meaning or value. System components derive their value solely through their assigned context. Therefore it would be impossible to regard a fragment of an art system as a work of art in itself – as say, one might treasure a fragment of one of the Parthenon friezes (1968:21).

Like the writing of LeWitt around this time, Burnham's rhetoric here suggests a form of reductionism where individual components can only derive meaning from a larger contextual framework. Unlike conventional reductionism, which reduces things to its smaller constituent parts, this is reductionism *upwards*, and is similar to philosophies which posit a god or similar force as an ultimate cause overshadowing all objects underneath it. Graham Harman calls such a strategy *overmining* which, along with its opposite variant *undermining*, as the two dominant forms of *idealist* (anti-realist) trends in Western philosophy for the last 300 years (Harman 2013).

Burnham, then unaware of such critique, was drawing inspiration from research done in the physical sciences, predominantly by biologists such as Ludwig von Bertalanffy (Burnham 1970). Von Bertalanffy formed his conclusions through a consideration of society as a system, similar to

how an organism is a system – a complex of fluctuating constituent cells, all exerting an effect on the whole organism's well-being. Burnham understood the implications of such an understanding and considered it applicable to the whole world, including the art world. Such a consideration soon led Burnham to realise that the meaning of art was not just ordained by the viewer, never mind the artist. "Systems," he says, "exist as on-going independent entities away from the viewer. In the systems hierarchy of control, *interaction* and *autonomy* become desirable values" (Burnham 1968:22).

In contrast to the preceding citations, it would now appear as if Burnham is suddenly making realist philosophical commitments. The basic premise of realist philosophy, again, holds that reality exists independently of our perception thereof (DeLanda 2002:4). By insisting that "(s)ystems, exist as on-going independent entities away from the viewer" he is indeed committing to the very position that defines a realist philosopher.

Contemporary art theorist Luke Skrebowski maintains that Burnham's 'systems aesthetics' anticipated most of the key interventions that Conceptual art practice would come to effect on contemporary art as we know it today. According to Skrebowski,

Burnham's 'systems aesthetics' comprehends five key insights:

1. That there has been a transition from an object-oriented to a systems-oriented culture.
2. That art does not reside in material entities.
3. That art is not autonomous.
4. That art is conceptual focus.
5. That no definition or theory of art can be historically invariant (2006:7-8).

For Skrebowski, Burnham's insights clearly appeared earlier and were arguably more comprehensive than the better-known readings such as Lucy Lippard's 'dematerialization of the art object' (1973) and Rosalind Krauss' suggestion of 'sculpture in the expanded field' (1979) (Skrebowski 2006:7-8). The reason for Burnham's relative obscurity in the wider discourse of conceptual art is perhaps due to his own abandonment of his thinking at that time.

Skrebowski suggests that Burnham's initial excitement about the introduction of novel technologies and ideas from the field of cybernetics was replaced by disillusion. In many ways similar to Hans Haacke's desertion of the generative systems present in his earlier art production, Burnham came to reject the ideas inspired by cybernetics and information theory. Summarizing the results of artists who appropriated these ideas in their work as "mediocre to disastrous," he remained pessimistic about the usefulness of such thinking. "Ultimately,"

suggested Burnham, “systems theory may be another attempt by science to resist the emotional pain and ambiguity that remain an unavoidable aspect of life” (in Skrebowski 2006:8).

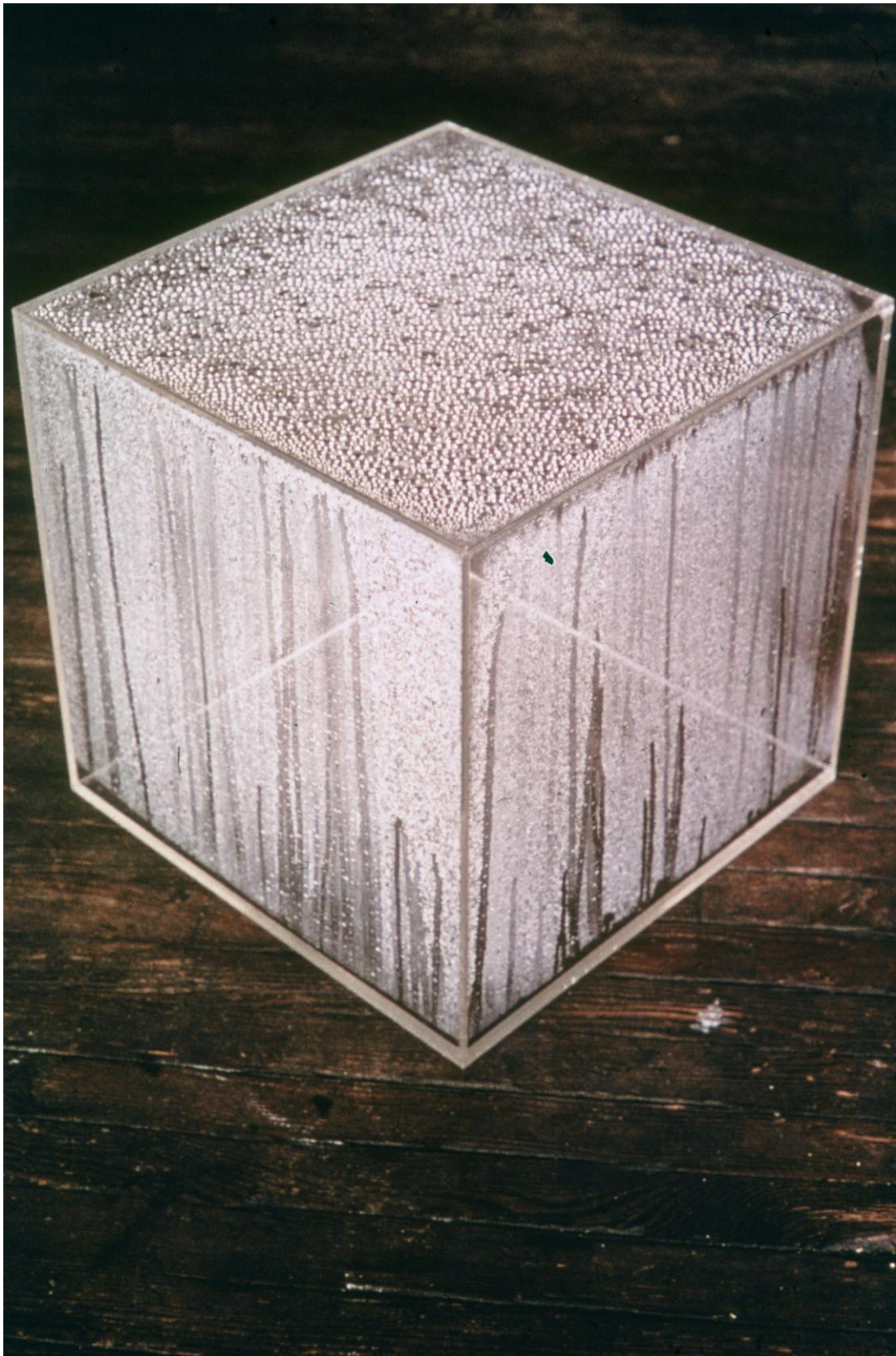


Figure 22: Haacke, H. 1963. *Condensation Cube*. Perspex, steel and water (30.5 x 30.5 x 30.5 cm).
Dome: <http://dome.mit.edu/handle/1721.3/16835>

Hans Haacke, a prominent conceptual artist, was a close associate of Jack Burnham (Siegel 1971:243). Haacke first rose to public prominence with his art installations that were not to be considered as lifeless autonomous 'objects':

A sculpture that physically reacts to its environment is no longer to be regarded as an object. The range of outside factors affecting it, as well as its own radius of action, reach beyond the space it materially occupies. It thus merges with the environment in a relationship that is better understood as a "system" of interdependent processes. These processes evolve without the viewer's empathy. He becomes a witness. A system is not imagined, it is real (Haacke in Burnham 1968:22).

Haacke's *Condensation Cube* (1963) (see fig.22) is a pertinent example of an artwork becoming more than a static object. The work consists of a small amount of water contained in a transparent perspex cube. An ongoing cycle of evaporation and condensation is then initiated by the fluctuating temperatures and air currents of the environment where the work is on display. The interaction between the atmosphere and water continually produces ever-changing water-drop patterns on the inner surface of the cube. However, regardless of what was going on inside his cube, links were not surprisingly still being made between the particular form of Haacke's work and the then in-vogue style of Minimalist sculpture. Haacke dismissed this link, suggesting that his concerns were exactly the opposite of Minimalism:

A very important difference between the work of Minimalist sculptors and my work is that they were interested in inertness, whereas I was concerned with change. From the beginning the concept of change has been the ideological basis of my work. All the way down there is nothing static – nothing that does not change, or instigate real change (in Siegel 1971:243-244).

Haacke thus acknowledged the continually changing nature of our world's systems by incorporating it as an integral part of his work. In doing so, he opened up an alternative reading of the artist's place in the world, in contrast with the Modernist ideals. In a work such as *Condensation Cube*, the artist, or 'rational subject', is not dictating order of 'Nature', or 'irrational object', into an aesthetic form conveying 'truth' or 'beauty'. Rather, the artist is consciously collaborating with the already established systems of his environment, debunking hierarchically loaded constructions of 'subject' and 'object'. Writing more than 30 years after *Condensation Cube* was first conceived, generative artist Philip Galanter surmised that it "entirely anticipates everything we now know about complex systems and chaos" (in Petersen & Ploug 2004).

However, such a reading of Haacke's work was not forthcoming in the late 1960s, considering that James Gleick's book *Chaos: making a new science* (1987) arrived more than a decade later. In hindsight, we could posit that this it was perhaps Burnham's attachment to Platonic presuppositions that resulted in his systems approach never catching on as the dominant

paradigm against Modernist art (McCormack 2003:5). Instead, there was a greater general influence from linguistic theory, predominantly from France, as post-structuralist philosophy played a huge role in the fermentation of 'postmodernism' in art (Trodd 2001:90).

"Yet need we retire systems aesthetics with Jack Burnham?" asks Luke Skrebowski is nevertheless not convinced that we should discard Burnham's appropriation of systems-theory (complexity) to the history books:

It is not necessary to write systems thinking out of art history, nor to denigrate the powerful methodological purchase of systems aesthetics, simply because of the equivocal critical standing of the theory's originator. In Bertalanffy's original description, systems are 'sets of elements standing in interaction'. More concisely expressed, systems aesthetics tries to think art as a relation of relations. As such, it perhaps still offers resources for understanding post-object based art. Recovering the degree to which postformalist art engaged Burnham's systems aesthetics allows historical works to be accounted for in richer terms. Furthermore, future accounts of the development of twentieth-century art might restore systems aesthetics to view as an important genealogical precursor to the relational aesthetics of a more recent generation of artists explicitly indebted to work produced c.1970 (Skrebowski 2006:9).

3.3 ROBERT SMITHSON AND LAND ART

Already in 1972, land artist Robert Smithson sensed the problematic underlying aspects of conceptual art. Smithson emerged from the same New York art scene of the late 1960s as Haacke, Burnham and LeWitt, and shared many qualities with many of the conceptual artists. However, he seemed to be very aware of the latent Platonic residues at the core of conceptual art's philosophy – even though it was tapping into very productive ontological areas opened by a general systems understanding.

Smithson was particularly sarcastic in his assessment of conceptual art:

Because galleries and museums have been victims of "cutbacks," they need a cheaper product – objects are thus reduced to "ideas," and as a result we get "Conceptual Art." Compared to isolated objects, isolated ideas in the metaphysical context of a gallery offer the random art audience an aesthetic bargain (1972:284).

We thus see in the Land Art movement of the 1960s and 70s, epitomised by artists such as Smithson, a concerted attempt to make art more 'real', taking it into the world and out of the fabricated domain of galleries. "The artist must come out of the isolation of galleries and museums," says Smithson, "and provide a concrete consciousness for the present as it really exists, and not simply present abstractions and utopias" (in Wallis 1998:32). In retrospect, this might have proved to be a somewhat futile effort, as these 'Earth Artists' often had to return to the very galleries they were trying to subvert, in order to sell documentation of their works that

were 'out there in the world'. They therefore couldn't completely escape the workings of the 'art world system' that Burnham had written so extensively about.

When Smithson wrote about his landmark 1970 work, *Spiral Jetty* (see fig.23) he alluded to an apparent dismissal of systems in his work:

The site was a rotary that enclosed itself in an immense roundness. From that gyrating space emerged the possibility of the *Spiral Jetty*. No ideas, no concepts, no systems, no structures, no abstractions could hold themselves together in the actuality of that evidence (in Wallis 1998:31).

It is ironic to note then that our visual experience of the *Spiral Jetty's* 'actuality' was for a long time confined to photographic representations taken around the time when the work was constructed. Within a few years after the work was constructed the water level of the Great Salt Lake rose and the work remained consistently covered by water until it re-emerged in 2004. It is debatable whether or not Smithson foresaw such a submarine fate for his work, but it remains a pertinent example of how our world's systems interface with man-made structures.

Although Smithson might have claimed that no systems 'could hold themselves together in the actuality of the evidence,' the actuality is that (from a certain perspective) he chose to implement his *system* (the amassing of 6,500 tons of basalt rock in a spiral formation) within a *larger system* (the Great Salk Lake). The interaction of these and other systems produces an ongoing sensory experience that Smithson quite possibly could not entirely foresee.

Indeed, Smithson – along with numerous other environmental artists, have recently been criticized for not considering the wider environmental impact of their earthworks (Fowkes and Fowkes, 2006). This is quite literally the case with almost all of the more permanent Land Art works, as they interact with the larger environments which host them. Such works illustrate how our Earth-world is not an inert conglomerate of predictable mechanics, and also not just constructions of a combination of our fallible sensory faculties and minds. On an ontological level we could thus say that the Earth is in fact 'alive' with an ongoing renewal of emergent entities which could all potentially be influential collaborators in human endeavours, including art making.



Figure 23: Smithson, R. 1970. *Spiral Jetty*. Black basalt rocks, limestone, earth.
Too Much Art: <http://images.metmuseum.org/CRDImages/ph/original/DP166795.jpg>

By means of a more relational systems understanding, Hans Haacke became very aware of this complicit entanglement of the supposedly mutually exclusive spheres of ‘Nature’ and ‘technology.’ Haacke maintained that his simultaneous adoption of ‘natural’ and ‘technological’ systems was only problematic for critics with “with a naïve understanding of nature – nature being the blue sky, the Rockies, Smokey the Bear” (in Siegel 1971:242-243). For Haacke the only significant difference between these spheres was the fact that one of them had been made by humans. He saw in the spheres of ‘technology’ and ‘Nature’ the same conceptual frameworks and operating systems, which could also be extended to social institutions. “The world does not break up into neat university departments,” maintains Haacke, “(i)t is one supersystem with a myriad of subsystems, each one more or less affected by all the others” (in Siegel 1971:242-243).

It should then be duly noted that conceptual artists such as LeWitt and Haacke's erstwhile approach to art-making still has a lot to offer to our understanding of art today. For conceptual artists a disciplined commitment to process was critical as, not only could it supposedly eliminate an undesired subjectivity, but it restricted the incessant intervention and doubts of the grand 'genius' artist's ego in the work's formation from conception to perception (LeWitt 1969). It is this disciplined notion of surrendered intervention on the part of the artist that can make manifest the presence of the active self-organised emergence in the world.

Nevertheless, conceptualism's emphasis still remained with ideas, rather than sensory experience. This is why Smithson's contrary thinking becomes critical, for, as Burnham so eloquently put it, he was "treating the whole as a time-bound web of man-nature interactions" (1968:20). Smithson might not have had any interest in 'abstract' insights regarding general systems and art, but he was certainly aware of the undeniable phenomenological 'evidence' that artworks bring forth. Although generally included as part of the overarching Conceptual art era, Smithson here introduces a subtle subversion of the dominant relational trend which is still going strong in contemporary art circles.³²

Smithson's emphasis on the 'actuality of evidence' at once forces us to zoom in at the real object as opposed to thinking of all the conceptual connections which contextualize and frame it. Especially in an earthworks piece like *Spiral Jetty*, Smithson confronts the viewer with a resilient thing, which is positioned as an autonomous object, as the much derided Modernist critics such as Greenberg liked to say, yet inseparable from other local objects and intensities. We should thus legitimately question where our priorities in the art-making context should lie. Should the orientation of our practice favour the conceptual generative systems (concepts and relational definition) or the eventually desired unified object (formal qualities and autonomous definition)?

I would suggest that an amalgamation of both poles would perhaps prove most productive, as there is a lot of good attributes to both sides of the debate. To conclude we can deduce from the artists above a disciplined practice – to stop oneself from 'knowing the object in advance' pre-empting creative action. Coming from this systems approach with an ontological emphasis on individual autonomous thing, I shall now turn to a discussion of my own current work. In my practice I place tremendous emphasis on processes – but only in order to be in awe at the autonomous aesthetic objects which self-organise out of these processes.

32 See, for example, Nicolas Bourriaud's *Relational Aesthetics* (2002).

PART FOUR:

A DISCUSSION OF MY CURRENT WORK.

4.1 THE ECOLOGICAL CONCEPT OBJECT (E.C.O.)

The following chapter offers a general description and background of my current generative art production, along with related ideas which directly inform it. In an effort to befuddle a quick reading of my artistic output as fixed mechanisms for signification, I have conceptualised a generative artwork which adopts live biological organisms as medium. The *Ecological Concept Object* (2011-) is a biological generative art series whereof 181 instances exist at present time (see figs. 24-29). The work consists of living plants hosted within a suitable environment and therefore takes on the physical form of sculpture or, said differently, a three dimensional 'object' form. The nature of these works requires them to be existent outdoors and in permanent installations, especially when many *ECOs* are collectively installed in a shared space, making them similar in ilk to permanent land art³³ installations.

Like all other artworks the *figures* are supported by a specific *ground* and all of these are framed by a larger context, like a gallery or museum would frame a painting. Each *E.C.O.* is a modular arrangement of at least twenty-two differing species of beneficial³⁴ *perennial* plants as *figure* in a mixed media (sand, rock, earth, et al.) *ground*. The context would be the wider environmental conditions of each particular *E.C.O.*'s location. The simultaneous presence of a differentiable figure, ground and context indicates a relational quality – a quality whereupon the whole piece hinges. The varying relations between the different components coalesce into the unpredictable non-linear *growth* of an *adaptive* complex assemblage. Although each individual *E.C.O.*'s intricate growth and detail is unique, all remain instances of the conceptual artwork and therefore share a common design. Each *E.C.O.* is essentially similar in terms of the specific species used, depending on availability and suitability of plants for the given location.

33 If it were to be called that, I would prefer to qualify it as *generative* land art.

34 Beneficial is here used in its widest sense to connote the purposes of society and 'Nature', i.e. plants which either serve a direct human purpose such as food or medicine plants, along with plants that have ecologically beneficial properties such as nitrogen fixing and pest repellent species....



Figure 24: Le Roux, N. 2011-. *Ecological Concept Object #014 (Pear)*. 22 Perennial plants in mixed media. Dimensions variable.



Figure 25: Le Roux, N. 2011-. *Ecological Concept Object #029 (Fig)*. 22 Perennial plants in mixed media. Dimensions variable.



Figure 26: Le Roux, N. 2011-. *Ecological Concept Object #021 (Oom Sarel Peach)*. 22 Perennial plants in mixed media. Dimensions variable.



Figure 27: Le Roux, N. 2011-. *Ecological Concept Object #063 (Grapefruit)*. 22 Perennial plants in mixed media. Dimensions variable.



Figure 4 Figure 28: Le Roux, N. 2011- . *Ecological Concept Object #109 (Almond)*. 22 Perennial plants in mixed media. Dimensions variable.



Figure 29: Le Roux, N. 2011- . *Ecological Concept Object #006 (Fairtime Dessert Peach)*. 22 Perennial plants in mixed media. Dimensions variable.

The *figure*, then, is made up of twenty-one herbaceous shrubs surrounding a central fruit-yielding tree, such as Apple, Pear, Peach, Apricot, Fig, Olive, Pomegranate and Almond, to name but a few. The guild of shrubbery present in a singular *E.C.O.* can vary, but is usually made up of a *polyculture*³⁵ of an underlying layer of useful herbaceous plant species including edibles (Strawberry, Cape Gooseberry, *et cetera*), herbs (Rosemary, Sage, Thyme, *et cetera*) medicinal species (Dandelion, Chamomile, Lemon Verbena *et cetera*), ecological species³⁶ (Wilde Dagga, Pelargonium, Wormwood, Garlic *et cetera*) and last, but certainly not least, dynamic accumulators³⁷ (Lucerne, Yarrow, Comfrey *et cetera*).³⁸

The *ground* of each *E.C.O.* is completely dependent on the endemic soil conditions of its host location, except in the rare instance of *E.C.O. #139 (Tower Totem)*, which has a self-contained shell, making it a movable object. In addition to the given conditions, the ground requires the presence of additional soil amendments such as organic compost, mulch, organic fertilisers, manure, earthworms, among others. These should ideally be added on an ongoing annual basis if the artworks are to be adequately maintained.

This does not necessarily imply that individual *E.C.O.s* will cease to exist if not adequately maintained, as the aesthetic content of the work is largely built up from a self-organisational autonomy. Some components of individual *E.C.O.s* might however perish, and the main determining factor in this regard would be the availability of water. If the location is known to go through prolonged dry spells, artificial irrigation infrastructure is another prerequisite for the generative process.

By presenting a collection of live growing entities as an art object it is my hope to undermine a quick reading of such objects as mere *signifiers*. A quick reading of the *E.C.O.* series would hopefully rather deliver the conclusion that it is a landscaping feature or garden design. It is thus an artwork that has been motivated by the spirit of *being* or *becoming* – as an ontological exercise more-so than a semiotic one. Even if the viewer of these works would prefer to approach it as some kind of representational device, she will still be confronted with actual ‘food for nourishing the body’, as opposed to the trite ‘food for thought’.

³⁵ A *polyculture* would be the opposite of a *monoculture*, and consists of a diverse range of differing species co-existing in a shared space.

³⁶ These would be those plants that either attract beneficial creatures, or repel pest creatures to from a shared location with a specific ecology,

³⁷ These are critical plants that have the capacity to act as nitrogen fixers, mineral collectors – an idea popularised by permaculture design for passively establishing niche ecologies.

³⁸ The roles that these plants can play are not fixed categories, and there is plenty of overlap with multifunctionality.

With the realisation of the *E.C.O.* series of works, affordance is made for a large degree of self-organisation in both the aesthetic decision making and the actual production of the work. It is thus an accurate example of my general approach to art practice which stands in contradistinction to control-based endeavours, which hinge on a mastery over all aspects of production to a tee. The process therefore becomes the art object, which carries within its sensual qualities traces of the process.

In short we can thus say that an *E.C.O.* is a modular conceptual art piece, with Ecology as both its subject and means. In other words, it actively relies on pre-existing biological processes to realise its steadily morphing aesthetic qualities. Just like in the *D.C.D.* series, there is a relatively fixed idea that is repeated and allowed to express itself in some of its many variegated potentials of anomalous behavior. The role of the artist subsequently withdraws into a position of facilitation and observation or appreciation of the embodiment of ideas. It is up to the curator to decide how much 'technological interference³⁹' is appropriate.

By only fixing designated control of the initial implementation of the arrangement of components with their necessary allies (the concept), the idea emerges as an organic assemblage coming in interaction with a host of environmental factors and other local entities beyond my influence. The thinking behind this is that if you incorporate a large enough diversity of interactive components that share suitable common relations to exist in mutual grounds, a resilient complex adaptive system might self-actualise.

4.2 PERMACULTURE

This holistic systems-based approach of the *E.C.O.* series is greatly informed and influenced by the design practice known as *permaculture*. Existing simultaneously as an ethos, lifestyle and general approach to problem solving, rather than a rigid set of practices, a satisfying definition of permaculture is seemingly elusive. In an online article entitled "*What Permaculture Isn't - and Is*" (2012), biologist and permaculture teacher Toby Hemenway seeks to clarify the confusion by insisting that we are still lacking a new paradigm for defining permaculture:

Permaculture, then, is not a philosophy or worldview, and is not a single tool either. But to use permaculture well requires adopting a new worldview and new tools. Like the early chemists who called themselves philosophers, right now the boundary between the tools,

³⁹ 'Technological interference' would for example here infer mulching, pruning, harvesting, feeding et al. The part of the generative artwork not left over to impersonal forces.

the approach to using them, and the worldview that makes their effective use possible are blurry (Hemenway 2012).

Hemenway does however not shy away from sharing his opinion on this matter of definition. He proposes to define Permaculture by suggesting that it attempts to solve the contemporary crisis of sustainability, by identifying appropriate tools out of the overwhelming plethora of available technologies. This crisis of sustainability requires us to meet the needs of humans while bettering the local ecosystems and general state of our living environment. A premise of caring for the earth, *while* caring for people – the cornerstone ethical concerns of Permaculture – makes clear the awareness of *relational* dynamics as central to its practice (Hemenway 2012).

Permaculturalist Patrick Whitefield has also attempted to elucidate the definition of his practice. For Whitefield, the aim of Permaculture would in terse terms be the creation of “edible ecosystems” (Whitefield n.d.). Such ecosystems would be geared toward delivering a large useful yield in return for relatively low energy inputs, while having a beneficial ecological impact on the wider environment. Like Hemenway, Whitefield also stresses the critical role that relations play in Permaculture design:

Most of the elements of permaculture design, from conservatories to irrigation ponds, are not unique to it. Even the less familiar elements which are associated with original permaculture, such as the forest garden, have their equivalents in other parts of the world or in other times. The contribution which permaculture brings to the practice of sustainability is less to do with the elements it contains than the connections between them. The network of beneficial relationships which characterises a permaculture system is an alternative to the excessive use of energy which is characteristic of present-day systems (Whitefield [sa]).

Permaculture design is thus not a practice concerned with dictating or imposition. It has much more to do with a cultivated sensitivity towards – and subsequent careful negotiation with – already-existing systems and their unique expressions in specific localities. It is a ‘think global, act local’ endeavor as it attempts to design human living space in such a way, that the humans, their offspring and all their collective allies subsist and flourish in the long-run (Mollison 1979).

In Permaculture you are thus setting the scene for the emergence of things and events which consolidate human-care and earth-care. The key realisation to make here is contained in the third and final Permaculture ethical concern which is in some ways the definitive concept of the practice. This introduces an anti-reductionist logical insight that the care and wellbeing of humans *equates* to the well-being and care of the earth as humans are very much still inseparably allied and dependent on the earth while it serves as our host environment, or “root-domain” (Padrutt 1992). Such a conscious understanding of culture’s irrevocable ties with

'Nature' should not be misconstrued as a symbolic activity of honouring an intelligent god or Gaia entity, but a pragmatic endeavour of appropriate creative action in any given earthly situation.

It is very much a fine example of Latour's ANT, where each entity, element or actor is constantly in collision with other ones – a 'trail of associations' where all the actors reduce each other to certain perceptible values (Latour 2005). It is up to the permaculture designer to arrange the diverse array of actors (at least those under the control of humans) in such a way that it results in a holistic thriving of the whole system, within the given biological parameters of our existence. Good Permaculture design then, does not reduce objects to one central role, but allows these objects to make as many beneficial allies as possible, using known relations between things (most of which have been known and done since antiquity) to discover new ones to benefit most of the other nodes in the network, including ourselves (Mollison 1979:1).

One such diverse arrangement of objects that has come to typify Permaculture is the *food forest*. A food forest is an edible landscape that is realised in the form of a woodland ecosystem. It is therefore made up of a diverse combination of edible fruit trees, shrubs, berries, vines, herbs and other ecologically beneficial species. The technical term for the cultivation of land in such a manner is agro-forestry as it is a reforestation technique which simultaneously produces a useful agricultural yield. It is especially this specific landscape design concept of Permaculture which informs the *E.C.O.* series, and these works can thus also be described as *agro-ecological artworks*.⁴⁰

4.3 OPENPOLYNATIONS: *E.C.O.s* #1-138

Openpolynations (2011-) is a collection of 138 *E.C.O.s* on private property in the formerly rural neighbourhood of Jamestown, on the outskirts of Stellenbosch. When a collection of *E.C.O.*'s are installed within a shared location an agro-ecological edible landscape emerges, as is the case here. *Openpolynations* is a collection of generative artworks that both forms and is contained by precisely such a landscape – a productive food and medicine garden. It is made up of a fluctuating range of diverse components as are all gardens, which is beautifully illustrated by Michel Foucault inclusion of gardens as prominent examples of what he deemed to be a *heterotopia* (Foucault 1967).⁴¹

⁴⁰ If we require an even more technical description, we could call the work an agro-ecological generative land art.

⁴¹ Foucault conceptualises a *heterotopia* as the opposite of a *utopia*. It is a transient space consisting of plural diversity, as opposed to static uniformity.

The *E.C.O.* is the form whereby I have decided to explore a practical application of a complex generative artwork in my given context. The local socio-geographical history is central to the nature of the content and form that this permanent site-specific intervention has taken on. By incorporating forms such as edible plants alongside Jamestown's fairly neglected gravitational irrigation infrastructure into the generative strategy, I am hopeful that the work is taking on a locally tenable form.

Any system design requires some sort of overall parameter, and this parameter of a specific form of ecological sustainability has already been fixed for the space. The physical parameters consist of approximately 22 x 150 meters of agriculturally zoned private property in Webersvallei Road, Jamestown (see figs.3-5). In 2010, an old vegetable farming friend, Neil Graham, and I reached an agreement with the owners of the plot to make use of the land in some sort of agricultural capacity. Soon after we set into motion the creation of a multi-functional *permanent* space for collaborative and individual practical experimentation within ecologically sound parameters. We subsequently pursued collaborative activities which fell in line with our shared interests in ecological diversity, sustainable self-reliance, skill development (and sharing), self-organisation from the grounds up, and permaculture design and practice (which synthesises most of these concepts). We attracted a few more core collaborators⁴² who have invested their energies (in the form of labour and capital) towards the construction and facilitation of this mutual space for learning and practical testing of a variety of sustainable agro-ecologically based activities.

This spatial (plot boundary) and conceptual (agriculture) aspects are therefore the primary system parameters of *Openpolynations* and the reason it has taken on the form of a physical generative artwork. This space, which we have collaboratively dubbed '*Eyemvelo Kosbos*,' thus became a vessel for organic, inorganic, and live elements to be gathered, processed and transformed. It is subsequently up to us as the designers, curators and gardeners, to arrange these elements in a coherent way to the mutually agreed upon conceptual parameters of the space (see figs.30-31).

⁴² Faan Rossouw, then a BSc Ecology student at Stellenbosch University, and Cornel Cilliers are the core collaborators who contributed capital and physical labour to our collective cause.



Figure 30: *Eyemvelo kosbos* (2013).



Figure 31: *Eyemvelo kosbos* (2014).

These same elements can each be understood as chaotic nodes that are introduced into a stable network of de-composition and subsequent emergent automatic re-composition, as sub-particles divide and elementally reconnect into emergent forms. Real recycling truly takes place when waste objects can become independent functional design elements in a larger system which is sustainable precisely because of the congruency of this diverse entanglement. This is the task at hand when permaculture is adopted as the general anchoring principle for a collaborative project.

Prominent activities that we have been able to sustain thus far have included biological farming, food production, composting, dynamic soil building, construction with recycled materials, landscaping, land art and others - all as part of a general coherent systems design practice. Within the *Kosbos*, collaborators are also free to explore individual interests and projects, as long as it resonates with the mutually agreed ecological system parameters. Within the first two years we had completed or initiated the construction of a series of dams, passive irrigation ditches (swales), a nursery, a chicken coup cum composting unit, and a greenhouse which all form part of a larger ecological space (see fig.32). A steady process of '*excavation, demarcation, relocation, repeat*' has occurred as pathways and garden beds begin to take on ever more fixed positions, and the productive cycle of '*weeding, amending, food production, repeat*' becomes ever more regular.

After developing the space to a point where the most basic and foundational systems were set into place, individual career moves resulted in myself becoming caretaker and designer of the garden in a solitary capacity in 2012. Luckily a large portion of the heavy physical labour had already been completed at that stage and more manageable 'gardening' activities is mostly what remains to be sustained. I am also still in contact and surrounded by many individuals who share some kind of interest in the landscape and collaborate with me on individual projects, which remain components and off-shoots of the overall landscape, which serves as a base of production.

Shortly after initiating this project I had already moved to Jamestown to take up the position of 'live-in' caretaker of the plot. I have been living right next to the *Kosbos* ever since September of 2010 and have gone about organising my life and art practice around the many responsibilities that the maintenance of a half hectare agro-ecological project entails. The space has become my home and workplace and it is where I spend most of my time, solving little conceptual problems

which are all self-created consequences of my playful fascination with the emergent properties of familiar things. A personal long-term ambition – to oversee and study the consolidation of a resilient and diverse ecological landscape that will hopefully flourish well beyond my lifespan – has subsequently emerged as one of my life goals.

Such a conception for long term action involves the perpetual sustenance of a multitude of mobile and inanimate entities co-existing in a fruitful synergy. I quickly realised that the most realistic way for me to perpetually recognise and deal with such a vast diversity of entities on a day-to-day basis was to create a modular copy-and-paste ecological landscaping plan. This layout, although not identical in terms of content would be identical in structure. Not only would it quickly breed a familiarity - but also satisfy my aesthetic needs for ontological tinkering, in other words, *making things* – specifically by utilising the non-linear emergence that is ubiquitous throughout the world.

Being academically trained as a visual artist, I approached this task with the same generative strategies that has informed my artistic production to date. As many fruit trees had already been planted – it was just a question of populating the spaces in between to form a dense woodland ecosystem. It is for this reason that I conceptualised an aesthetic code for an assemblage of at least 22 differing ecologically useful perennial plant species. These 22 plants (the guild) would each surround a central fruit tree, which would serve as the central figure and visual *anchor* of the assemblage.

My subsequent tasks have predominantly been directly related to the maintenance and further implementation of these *Ecological Concept Objects*. This includes the production of viable soil medium, cultivation of relevant species, daily watering and seasonal pruning of the growing plants. It is the kind of tasks that require a daily commitment so it has only been possible to immerse myself in such a process as I also live adjacent to the space. This day to day intimacy and complicity with the objects you are steadily building is critical in the case of a biological – and therefore resource dependent – generative mechanisms.⁴³

⁴³ It should be noted that all processes are resource dependant. Even a painting depends on a many different underlying processes and entities to both exist and remain perceptible in our reality.



Figure 32: Collage of some Eyemvelo Kosbos projects (2010-).

As I have been living alongside the steady development of *Openpolynations* within the *Kosbos* space, I have come to understand my daily renewed activities as a type of proof for the tenability of a multi-functional cultural *and* ecological space. The process of *inhabitation, map-making, adjustment, repeat*; is fundamentally my ecological practice. This is in keeping with German philosopher Martin Heidegger's suggestion that we understand the term 'ecology' according to its Greek root-words. Heidegger destabilized the contemporary understanding of the word *ecology*, by deconstructing the word and exploring the constitutive parts' original Greek meanings. "In Greek 'dwell' is οἰκέω and οἶκος means 'home' or 'household,' while 'say' means in Greek λέγειν and λόγος means 'saying.' *Dwelling-saying is eco-logy*" (Padrutt in McWhorter 1992: 14).

The similarities between many examples of visual digital generative art and the way 'Nature' grows is no coincidence. I put 'Nature' between quotation marks as I, like contemporary realist philosopher Timothy Morton, am not convinced that a singular noun object such as 'Nature' actually exists (Morton 2007). It is very much a reductive concept to dismissively bracket out many of the most amazing unified singularities or things existent in our world. If we wanted to talk about a distinct singular thing I would compromise only insofar as talking about the earth as a real existing object, but it is clearly a massively hybrid assemblage which cannot be considered as separate from humans. Therefore I do not see a 'Nature' / culture split as a productive starting point for problem-solving, design and action in the world.

When one commits to something close to a flat ontology⁴⁴ it is sensible to identify your lifestyle's allied entities and make the relational connections between all your daily living activities – such as walking, doing the dishes, household waste disposal, human and animal waste disposal (sewage), and so on – and critical eco-systemic infrastructure which produces food, stores and purifies water, attracts beneficial organisms, and pleases the inhabitant (healthy recreation). I have identified permaculture as such a practice which harbours a healthy interdependence with other living and non-living entities within a shared territory.

A practice of *renewal* – or a commitment to feedback loops – can cultivate a reassuring familiarity while it also offers up constant unpredictable excitement in the form of emergent

44 Manuel DeLanda suggests that, "while an ontology based on relations between general types and particular instances is *hierarchical*, each level representing a different ontological category (organism, species, genera), an approach in terms of interacting parts and emergent wholes leads to a *flat ontology*, one made exclusively of unique, singular individuals, differing in spatio-temporal scale but not in ontological status" (DeLanda 2002:58).

anomalies. The *Kosbos* provides me with the setting and source material to develop and test such a practice. The *Openpolynations* project does not exhaust the landscape however, as it remains a multi-functional space for other people who have contributed to its existence. For the owner it is a private organic garden which will increasingly yield periodical gluts of healthy organic food. For others it is a learning mechanism for food production, while for some it is a place for practicing a hobby as productive recreation. Although my relation to the *Kosbos* is not only aesthetic in nature, my particular aesthetic interests have irreversibly led to the facilitation and ongoing existence of this space.

It should also be taken into account that the *Kosbos* has tremendous use-value for many other non-human entities. If you can, as Harman suggests, firstly accept that all entities or objects are equally real and secondly that all objects reduce each other when interacting - in both theory and practice - then the trick is to reduce things into as complex assemblages as possible, by establishing a diverse array of significant relational links.

4.4 SOME REMARKS ON SINGULAR *E.C.O.s*

With the *E.C.O.* body of work I am also showing that generative art practice can serve as a tenable and sustainable tool for the actualisation of resilient ecological landscapes. Although not necessarily the primary function for these objects, if it were to be used as an ecological reparation strategy a collection of at least a small plurality is required. However, there is one case where I have isolated an *E.C.O.* into a self-contained 'singular' assemblage. *E.C.O. #139 (Tower Totem)* (2012-) (see fig.33) is the only 'freestanding' - and therefore transportable - object I have produced in the series so far. It should also be noted that, although it is freestanding, it is currently located in a private residence's quite lush garden as a semi-permanent display. It is therefore not isolated and interacting with a multitude of species inhabiting the garden and its immediate surrounds, not to mention the larger intensities of Johannesburg's local climatic conditions.

Tower Totem is a typical *E.C.O.*, but instead of being permanently planted in a fixed location, the contents are self-contained within a wood-cladded ferrocement⁴⁵ shell. It is thus built in such a way that it is transportable, and this insures the possibility of moving it over time to perhaps reveal how it adapts to new environments.

⁴⁵ Ferrocement is a thin, but strong layer of cement held together by an internal chicken-mesh wire.

It was conceived as part of Johannesburg-based Gallery AOP's exhibition stall at the 2012 FNB Joburg Art Fair. The work sparked a lot of conversations which most predictably had to do with what the artwork means, or in other words, what it symbolises. This was obviously vastly different to an experience of a landscape made up of a collection of related objects. It was however clear that this was a 'functional' artwork as visitors recognised familiar edible species. It also somehow attracted the attention of a lot of children who, unlike their well-trained parents, could not resist touching and interacting with the sculpture.



Figure 33: Le Roux, N. 2012-. *E.C.O. # 139 (Tower Totem)*. 22 Perennial plants in mixed media. Dimensions variable.

4.5 BRAMBLE FOUNTAIN: E.C.O.s #140-181.

In March 2013 I was commissioned by the FNB Joburg Art Fair to install a permanent ecological artwork on a publicly visible embankment of the National School of the Arts in Braamfontein, Johannesburg (see fig.35). This commission was largely based on the above-mentioned public presentation of *E.C.O.#139: Tower Totem* in 2012.

The idea for an environmental land-art based work in that space came from Brenda Sakellarides, a mother and member of the school's governing body. She was put in touch with members of City of Joburg municipality via the Johannesburg International Arts Alive Festival. Brenda received encouraging feedback as cities all over the world have faced food security issues coupled with Braamfontein municipality's drive towards urban regeneration, food security and 'greening' the city. The *E.C.O.* series fitted the bill perfectly as it is an artwork that literally embodies all those ideals, rather than just symbolically signifying it.

Not only was this a wonderful opportunity for me to produce more *E.C.O.s*, it was also a chance to see how the work would be received in an urban context, which stands in sharp contrast to the semi-rural environs of *Openpolynations*. Although the initial plan was to construct one *E.C.O.* sculpture, I quickly reconsidered upon visiting the site. The sheer size of the embankment would have dwarfed a single object standing in the middle of nowhere. I thus decided to install a landscape, consisting of 42 *E.C.O.s* in total. The name *Bramble Fountain* was chosen as a title for the landscape in a reference to the name of the local area, 'Braamfontein'. If this Afrikaans word were to be directly translated into English the result would be 'Bramble Fountain' (*braam* = bramble; *fontein* = fountain).

Construction started in late July 2013. After some consultation, we quickly realised that the embankment is too steep to make earthworks with heavy machinery a tenable option. Therefore all construction and installation on this landscape has taken place manually with the assistance of hand tools. With the aid of a dumpy level, we measured four evenly spaced level lines on the embankment which would serve as guides for our terraces. Digging the terraces was critical, not only for its ecological niche-building benefits, but also to serve as footpaths to make the site accessible for subsequent work. Once we had footpaths, bed construction and gardening work could commence. The grass was then removed from the spaces demarcated for the *E.C.O.s*.



Figure 5 Figure 34: Le Roux, N. 2013. *Bramble fountain food forest* - G. Acrylic screen-print on paper (51 x 37cm). Scale representation of E.C.O.s #140-181.

The characteristically red sandy Johannesburg soil was amended with fifteen cubic meters of organic compost. A drip irrigation system was installed to maximise water retention and minimise wastage. Once this was done the planting could commence. The help of volunteers was enlisted to plant over 900 plants in the space of five days. Most of the volunteers came from the ranks of learners from the National School of the Arts, who stayed on after school to assist in realising the project before its September 2013 deadline. After the plants had been planted the whole site was covered by a wealth of organic matter to assist in water retention, weed suppression, and providing soil-building micro organisms a habitat to thrive in. Organic fertilisers and soil amendments were also added to the mix of mulch and compost.

As this work consists of living entities, it will require ongoing maintenance as any gardener worth their salt would attest. As soon as the plants start accumulating substantial mass seasonal pruning will be in order to ensure sufficient space and light for smaller plants. It will also become increasingly important to harvest, process and remove fallen and damaged fruit as the trees mature over the coming years.

To close, I return once again to Harman and specifically his insights regarding resilient landscapes. Harman maintains that,

a landscape is not built out of pieces except in the causal or generative sense. To a certain extent the original objects can be removed without changing the landscape; if not, then the landscape isn't real. [...]. The landscape is something deeper and more enduring than the events that unfold within it. But it is also something more shallow than its subcomponents, since the initial founding components of the landscape can disappear while the physical place remains the same (in Davis 2012).

Like all the other work in the *E.C.O.* series, the *Bramble Fountain Food Forest* is still very young, perhaps too young to determine its resilience and versatility. Like all the *ECOs* in this series, it will take time to develop and enjoy the emergence of the growth patterns, as the assemblage consolidates into a discernible singularity.

4.6 CLOSING REMARKS

My motivation behind this series of works is underlined by my fascination with the ontological processes of emergence and self-organisation. The *E.C.O.* series is therefore much more a conceptual mechanism for manifesting a specific physical form or thing, than it is a symbolical mechanism relaying a particular agenda or issue about the earth or environment per se. This is not to discount any specific symbolic reading of the work; it is just that my interest does not lie in

communicating any specific message. Meaning making is left entirely to the viewer, visitor, inhabitant or collaborator with the various projects at large – each to her own.

These objects are therefore presented as part of my larger art practice that can be described as a general small-scale experimentation with systems of emergence. I see my work as a collaboration with the world and therefore I am always looking for new ways that allow me to relinquish complete aesthetic control and consequently to enable the unencumbered emergence of reality on its own terms. My presentation of the *Ecological Concept Object* series is an effort to continue this process in a suitable manner, especially taking into account the state of our contemporary environments.

PART FIVE:

CONCLUSION

5.1 SUMMARY OF RESEARCH

The practice-led nature of this research document has resulted in its scope encompassing interdisciplinary fields of study. A central premise, based on realist ontology, is however adopted to theorise about generative art in an ecological context. Examples of biological generative art, such as my own, are few and far between and it is my hope that this research will contribute to a growing discourse of emergence, complexity and non-linear dynamics in art theory. I would furthermore suggest that an ontological – as opposed to a semiotic – approach to art-making and reality in general can restore an open-ended worldview of awe and wonder, which consolidates art-making with experimental non-reductive scientific insights.

The philosophical and scientific ideas cited throughout this text all are connected to my general interest in self-organising systems, emergent properties and the role it plays in our object-making practices. These interests were furthermore anchored by my participation and management of an agroecological permaculture project, and my day-to-day inhabitation thereof. Within this space I developed the *Ecological Concept Object* series of artworks, which serves as the central practical topic of this thesis.

In the lead up to discussing these works I firstly established an understanding of the implications of realist philosophy – and the correlations it shares with my practice. This leads up to my formulation of ‘non-semiotic object building’ as a moniker for what I do, and the type of art I am interested in. I included contemporary theoretical insights alongside examples of artworks by artists who work with generative means to establish the general idea of an ontologically motivated art practice. By citing prominent examples of conceptual and land art, a historical contextualisation is also provided.

5.2 MAIN FINDINGS OF RESEARCH

The first major finding that this study made was to show that it is a legitimate venture for artists to explore ontological processes of causality, being and becoming. This was accomplished by pointing out the shared philosophical insights between realist philosophers and generative art practitioners. Secondly, the generative and conceptual artworks that are discussed also provide

further evidence supporting a realist ontology that commits to emergent causality – referenced to show ontological implications of emergent systems.

This thesis also developed further insights into a practical approach based on a Socratic conception of humble and tentative knowledge building. Such an approach is critical of a general over eagerness to understand, control and manage *everything* on this planet on our own anthropocentric terms. This overeager housekeeping tendency can probably be attributed to many causes, but the conclusions that I draw from this study make me believe that a central one is *idealism*. Any form of reductionism – through either undermining or overshadowing the reality of things – can be said to represent idealism, which per definition incessantly reduces the intricate specific details of things away to a ‘truer’ anthropomorphised layer of reality.

I therefore feel it is critical *not* to make a necessary ontological gap between the so-called dichotomy of 'Nature' and 'culture', among others. I do not believe that there are infallible mechanical systems or laws that underlie and predetermine ‘Nature’. Nor am I convinced that some bigger anthropomorphic deity or forces are actually the explanation for all of the horrors and joys of earthly existence. I do not know what underlies or overshadows the emergence of things, but I do propose that these things are real, and that furthermore – as artists – we have a very powerful ability to manipulate the propagation or destruction of these entities in our everyday realities.

I have also found that a continued reinforcement of practices which integrate the polarities of ‘Nature’ and culture as *mutually inclusive* is very necessary in our contemporary post-industrial age. In addition to many artists who work in a similar way, this study has also identified permaculture, a holistic systems design science, as another instance of such non-reductive practice. The principles and content of permaculture has additionally informed my conception of the *E.C.O.* series tremendously. Another option out of the ‘Nature’-culture dichotomy is also established – a more radical approach of discarding the concept of ‘Nature’ completely, especially in our accounts of ecology, after Timothy Morton. This radical strategy does however not imply that something can be said to occur ‘naturally’ or that an object is of a particular nature, as these are perfectly sensible notions.

I have found a general systems approach to a practice involving real autonomous entities to be very useful to this study. Therefore I have developed my own interpretation of a realist

philosophy by amalgamating the work of Graham Harman, Manuel DeLanda and Bruno Latour, as the core theoretical sources. All these philosophers can be said to put forward a realist ontology –albeit with differing focus on either relations or relata.⁴⁶ Thus a thesis is built on a philosophical discussion of real emergent things co-existing by means of unique relations to each other.

We thus have to ask ourselves to what extent is a complex systems understanding of the world in accordance with Heidegger's concept of *Dasein*. If our experience of the world is that of a mere 'proof' for self-organizing principles, we are once again flirting with the analytic attitude of abstract rationality and logic that so characterized Enlightenment Platonism and modernism. However, a practical approach to our world's self-organizing and emergent properties, where the emphasis is on experimentation and experience, as opposed to analysis, comes much closer to Heidegger's notion of *Dasein*. I have deduced that the creative arts, whether it is visual, musical, or performance based, offer us a great opportunity to foster an emergent systems comprehension of 'being-in-the-world', where we allow the world to be 'on its own terms'.

I have finally also extrapolated that it is time for a serious reconsideration of how we understand and use 'aesthetics' as a term? I would suggest that we should at least return some of the other senses into the equation – aesthetics not as beauty or taste but as *sense perception*. With such a conception aesthetics can bring art back to the everyday for a conception of 'art as life', and not 'life as art'. This traditional use of aesthetics can furthermore encourage the possibility of cultivating our aesthetic sensibilities practically, as opposed to purely theoretically.

5.3 FUTURE RESEARCH

The major limitation of this study has predominantly been of temporal nature as analysis of my own work has proved difficult. The reason for this is the relatively short existence of the *E.C.O.* series compared to its overall life-cycle. Fruit trees, for instance, can take up to ten years to mature so to comprehensively appreciate and examine these works would require a much longer time period for observation.

The discussion of conceptual art can also be expanded as it poses many interesting questions regarding art production and its mediation. If we note that, technically speaking, conceptual art does not employ physical objects as its medium, but rather immaterial ideas. So concepts are to

⁴⁶ Relata are the things that relations exist between.

conceptual art what pigments are to a painting – its mode of delivery. Said differently, conceptual art is where *ideas* are used as pigment. Following these theoretical lines, art practice then ultimately becomes a question of technology – as the medium becomes the most important factor in the facilitation of a synergistic process that becomes the artwork. Such a formulation where the primary interest lies in the medium as opposed to its message, can serve as a point of departure for further studies.

Other relevant questions opened up by this study involve the accrual of significance by art objects. Firstly, can we make art that has significance to non-humans? Secondly, are there examples of art that has significance to humans without necessarily being considered as art? And lastly, can artworks only have significance when presented within an art context of art? Possible answers to these questions are hinted at in this study, but they are largely left open for debate and further research.

5.4 CONCLUDING REMARKS

The original contribution that biological generative art can offer the field of visual arts is an open-ended cautious approach where slow self-organised change affords space for observation, consideration and subsequent alteration. By showing the links between realist philosophy, generative art practice, and complexity theory, a case is made that signified meaning (representation) is not necessarily central to our attribution of significance to things in the world.

I find the conceptual underpinnings of generative practice to be extremely fecund for an artistic endeavour motivated by a curiosity for contingent emergence of novel assemblages. In such a practice consistency is the key, rather than ingenuity. The ingenuity emerges on its own as an inevitable consequence of consistent actions. As the proverbial saying goes, ‘practice makes perfect’, and not ‘perfection makes perfect’ or even ‘good design makes perfect’. This is fundamentally my position for not only all art endeavours, but life in general. It is a sensitive and deep relation to things-in-themselves, while never committing to any final judgments about those things. When we suspend (or at least limit) our *a-priori* ideas about what exactly things are, we are more inclined to notice the novel anomalous emergent properties that things could potentially exhibit. I propose that this is an invaluable tool for artists, allowing us to ‘collaborate with the world’, as opposed to controlling it.

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