Technology and ontology in electronic music:
Mego 1994-present

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Abstract

The Vienna based record label Mego is known for establishing an uncompromising, radically experimental electronic music in the 1990s. This thesis considers the work of various different artists on the label, examining in particular their approaches to technology. The artists discussed appear to share an approach that I describe as pragmatic or experimental, which I contrast with idealist or rational approaches. In the latter, music appears to be understood within the framework of a simplistic model of communication, where technology is seen as a medium that should be transparent, allowing the music to pass unaffected. In the pragmatic approach however, I claim that technology is not seen not as a medium for the communication of ideas, but rather as a source of ideas. Implications follow for the ontology of the music. In the simplistic model of communication, physical sound can be considered merely a representation of something more abstract: musical form conceived by the composer. But if music is materially constructed and based on experimentation with the technology at hand, then the sound should not be considered a representation; there is no preconceived idea for it to be a representation of. This concept, which I refer to as 'literalism', is explored in a number of musical examples, and I link it to a definition of noise.

Contents

List of Figures

Acknowledgments

Declaration

This thesis is my own work and has not been submitted or published anywhere else. It is an outcome of the New Aesthetics in Computer Music research project, funded by the Arts and Humanities Research Council.

Introduction

This thesis will focus on the Vienna-based label Mego, and associated artists. Mego, in the latter half of the 1990s, provided a focal point for a new kind of experimental electronic music influenced in various ways by techno, as well as by academic electronic music music, but ultimately resulting in a form of music alien to both traditions. The music of Mego remains largely undocumented in academia, and the gap left by a lack of attention towards it is significant. Cursory attempts have been made to fill this gap, often focussing primarily on the notion of 'glitch', and discussing the incorporation of technological failure into aesthetics. However I will argue that this is insufficient, and that this music has consequences more radical and fundamental in aesthetics.

The aim of the thesis is therefore twofold: to document the history of Mego, and to discuss the ways in which we can describe, analyze or otherwise understand this music. It is interesting to note that this roughly corresponds to Guido Adler's original stated aims of musicology; the historical and the systemic subdivisions (Mugglestone & Adler 1981). Adler's method, briefly, consisted of the identification and documentation of historical categories of music (the first subdivision), followed by the analysis of each category and its underlying trends (the second subdivision). The identification of a category is simplified in this case, as we are using a record label as the focal point, and operating on the assumption that there is something shared between all of the music on the label. The validity of this assumption can then be assessed based on the results of the second subdivision: the investigation of these supposed shared attributes.

Adler viewed the history of music as a series of epochs or categories, each of which requires its own methods of analysis. There is no suggestion of a universal framework for the understanding of music, or a universal aesthetic. He stated that the 'student of tonal art and tonal science is presented with a complex system of musical maxims which have been *extracted from particular tonal products* ... for a time tonal production is muzzled and curbed by these rules and measures, until it again paves for itself a pathway; and once more the demands on the science alter' (Mugglestone & Adler 1981, italics mine). The theory developed by a musicologist is in response to 'particular tonal products'[1], based on analyses

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1 'Tonal' does not have to be taken to exclude 'atonality' or noise—atonality is a misnomer, even according to Schoenberg: 'The word "atonal" could only signify something entirely inconsistent with the nature of tone ... to call any relation of tones atonal is just as farfetched as it would be to designate a relation of colors aspectral or acomplementary. There is no such antithesis.' (Schoenberg 1983), similarly, noise can be considered tonal in its broadest sense, or technically as a summation of inharmonic tones.

of particular pieces of music; it is not free of context or universal. Adler also highlights the way in which theory tends to lag behind practice, with theory in turn stifling practice by solidifying and naturalizing one particular form of music.

Each chapter in the thesis focuses on a particular work, and examines it in an attempt to understand what, if anything, draws together the potential category represented by Mego. Initial research carried out by interviewing and observing relevant artists (New Aesthetics in Computer Music 2011) suggested that this might be found not in stylistic or formal aspects, or even an overarching 'aesthetic', but potentially in a general approach to the process of musical production. I am primarily interested in exploring the role of technology in this process. The thesis therefore becomes something like a contemporary organological study in parts. I conclude that the music in question is in fact notable for an emphasis of the technological, material aspect of its production. This leads to a discussion of the philosophical implications of such an approach; if the music is determined materially rather being a reflection of a predetermined idea, this tells us something about the aesthetic —the fundamental ontological-aesthetic question: '*what* is the music (or art or literature etc.)?'

By this I do not mean defining the word music; delimiting what does and does not qualify as music. It is more to do with discussing what *type* of thing we are dealing with when listening to music (or looking at an artwork, or reading etc.). For instance, when we think of a book, the thing of importance is not taken to be the physical object itself. If we destroy the object, the 'book' still exists—if there are many copies then the content still exists. For philosophers of aesthetics such as Nelson Goodman this leads to the idea that a book has 'notional' form:

> Goodman drew an important distinction between what he called notional and non-notional works of art. In a novel, for example, he argued that any sequence of letters that corresponds with the original text is a genuine instance of the work. One might say that the essence of the novel is not the book object at all. It is in the 'notional object' that we access through the book. He drew a distinction between execution, e.g. the writing of a novel and its implementation as a book. (Edmonds 2007)

One can say the same of music. When written as a score, the music is not the paper that the score is written on, it is notional; even a recording of music can be reproduced in various ways and on various formats. The music is not generally taken to be the material medium

itself, the music is only notional. Goodman takes this position, advocating, like many analytic philosophers, the concept of a 'work'. If the existence of such an abstraction is taken as given, the task for the philosopher is to define the nature of a work. A musical work, for example, cannot be the actual sound produced, since the same work can be played numerous times, perhaps even on different instruments while still being considered the same work. The musical work therefore (what is often taken to be 'The Music' itself) is taken to be an abstract entity. Importantly however for Goodman, the musical work is purely a linguistic construct. He defends a nominalist view, in which the work has no existence outside of language, only individual instances of the work actually exist. (Goodman 1976)

Lydia Goehr compares this nominalist view to the more extreme Platonist position, in which the work is considered to be a thing that exists in its own right, apart from any instances or performances of it (Goehr 1994). But she ultimately considers all analytic approaches (identified as nominalist, Platonist, Aristotolean and idealist) to share an unjustified elevation of the abstract 'work concept'. The approach to artistic production that these ontologies engender is central to this thesis. They will be drawn in contrast to an approach in which we cannot consider the 'work' as an abstract entity set apart from its material realization as Goodman does in his distinction between execution and implementation. I identify a musical practice that suggests the music is materially constituted (manifest as a recording or a live performance), rather than being ideal (a 'work').

To debate the nature of a musical work already assumes the existence of such a thing, or that such a thing indeed has a nature. The question being asked is already idealist, irrespective of any answer. As Goehr explains, this is even the case if the question is concealed as one concerning language and commonsense: 'when we talk of a musical work, to what are we referring?' Attempts to articulate an answer to this always seem to have been found wanting, yet surely we already know the answer since we often talk about 'musical works' without the least bit of confusion caused.

I have already used the word 'work' to describe the music on Mego, and will continue to do so, purely for convenience. However the 'works' I refer to are not the same kind of works described by analytic philosophers, or found in the Western canon. Due to the centrality of timbral aspects, they can exist only as audio, and cannot be reduced to any higher level abstraction such as a score. In Goodman's terms we are concerned with 'non-notional works'; they are not abstract entities. This means that the kind of issues dealt with

by musical ontologists (e.g. to what extent can different performances be said to be instances of the same work, what counts as a work and what does not, etc.) become largely irrelevant.

Despite this, it is the contention of this thesis that ontological discussions are still of interest in issues of aesthetics, even if the conclusion amounts to the rejection of a general ontology. We could instead, as Goehr does (and as is suggested by Adler), take a more historical approach to musical ontology. 'What is a musical work?' is a very different question to 'what is this specific musical work?' We are then, via ontology, examining the aesthetics of particular musics—what music is considered to 'be' will fundamentally affect the way it is both created and appreciated.

To summarize, in the discussion of how we should understand this music, I focus on the creative process, which reveals the importance of technology as a determining factor. This in turn leads to a discussion of the ontological (and aesthetic) implications. The remainder of this chapter therefore introduces the relevant themes of technology and ontology. There is then a brief overview of the history of Mego and discussion of how it sits in a wider context, before I consider specific musical examples in the chapters that follow.

Technology

Music or sound art (I am uninterested in the distinction) as with any artistic production, is in essence a kind of making, of techne. Despite this, music has traditionally been considered one of the liberal arts, separated from mechanical craft based practices. I will try to avoid this distinction and attempt to show that, far from existing in an ideal mathematical realm, music can in fact be better understood as a craft, a product of material processes. As such, the relationship with technology in the production and reception of music is of primary importance. Music is fundamentally a technological phenomenon; literally the combination of téchnē and logía, the application of a body of knowledge in the production of something physical (etymology of course proves nothing, but in this case highlights a certain narrow conception of technology and hopefully broadens its scope).

Especially if we take this broad definition, technology has always been integral to music. More than merely facilitating work, the technological, material, nature of music has been a determining factor in its development. For example in Western art music the development of notation enabled repeatable performances. But in addition to this enabling function, its limitations began to define the content to some extent: restricting music to a

twelve note scale affording adherence to a key, eventually leading to equal temperament and so on; contextually it separates the concepts of composer and performer; and more fundamentally it reinforces the view of music as a series of discrete events ordered in time. Likewise, recent technologies such as the the MIDI standard further reinforce the event based nature of music.

So what we *choose* to do is determined by technology, not just what we are *able* to do. Stated this way it appears obvious, but the view that technology merely enables work appears to be widespread. We could call this the 'any sound you can imagine' approach, in which a composer has a musical 'idea' and wishes to *use* technology to communicate it. In this view, if the technology is seen to be determining the music, it is considered bad practice (see Fell 2010 for further discussion). This could be thought of as a rationalist approach, and it does not take account of the fact that ideas are based on experience. In the case of composition this might be the knowledge of what the technology being used is capable of doing. Even (or especially) in pioneering work, for instance the invention of a new synthesis technique, the compositional process is one of empirical experimentation with what is physically possible, not the rational formation of a musical idea followed by its realization. The process is primarily a technical one, the music is not divorced from its material basis.

So the influence of technology on music is nothing new. But although it may always be the case that the material means of musical production fundamentally affect the result, some music, and music criticism, appear to have been conceptualized as if this was not the case. I will return to numerous examples of this throughout the thesis.

In order to discuss the technological aspect of music, I will draw on some existing philosophy of technology, in particular developing a pragmatic position based mainly on Dewey's work. He uses the concept of 'technological inquiry' as a fundamental description of the way in which we act in the world. It places practical activity at the centre of thought, demonstrated for example by his attitude towards ancient Greek philosophy and science (as summarized by Hickman):

> The problem was that the social status of Greek artisans was
> inferior to that of scientists and 'thinkers'; and their methods could
> not, therefore, for reasons that were purely and unfortunately social
> ... be used as part of scientific inquiry. So the Greeks pursued a
> version of science in which instrumentation was no more than
> peripheral ... Greek scientists and philosophers failed to do what

their artisans, businessmen, and practical people knew what had to
be done to solve problems: they failed to test their conclusions by
means of overt actions. In short they had not so much science as
'the idea' of science: *their science was not technological*. (Hickman
1990, italics mine)

I will later discuss various examples of musics that are not technological, that privilege
rationalist thought over embodied practice, or transcendence over material concerns. All
activity should be seen as technological according to Dewey, including abstract thought:

While there may be good grounds elsewhere for distinguishing
extra-organic tools from those that are interorganic—a hammer
from a 'therefore' for example—such a distinction is not appropriate
to Dewey's technologized theory of inquiry. Controlled thinking is
technological insofar as it utilizes tools and instruments: some of
those tools are conceptual; some, physical; some, the hardware that
extends our limbs and senses. For the purposes of Dewey's theory
of inquiry, tools of all types come into play. (Hickman 1990)

I therefore attempt to give an account of music as a fundamentally technological activity, in
which the physical tools used in musical production are given as much weight as
conceptual and theoretical tools.

Heidegger's conception of technology is also discussed (Heidegger 1993),
particularly in relation to Rutsky's 'high techne' (Rutsky 1999), in chapter two. Heidegger
defines a 'nontechnological' essence of technology—technology as noninstrumental, i.e.
not primarily defined by its functional use as a means to an end. He describes this 'techne'
as unsecuring the instrumental order of the world, and therefore revealing its being.
Modern technology though, he claims, fixes the world in place, enframes it in instrumental
terms. Rutsky takes as his subject the idea of a postmodern technology—with a 'high tech'
aesthetic—and explores this concept in relation to Heidegger's techne.

This consideration of technology and aesthetics leads to Heidegger's thoughts on
the relationship between techne and poesis. Art (like technology) is described by Heidegger
as revealing being, pointing towards the aforementioned aesthetic and ontological
consequence of a technological approach; a 'non-notional' artform. I develop a theory of
'literal' music, in which the sound is not a carrier of meaning or a medium of
communication; it does not attempt to signify anything above and beyond its own being.

Communication

Throughout the thesis when I use the term communication, it should be taken unless otherwise stated to refer to the linear model of communication, usually attributed to Shannon (Shannon et al. 1969). It is sometimes referred to as the Sender-Message-Channel-Receiver model, i.e. there is an identifiable message (information) being transmitted from a sender to a receiver. The channel, according to Shannon, is 'merely the medium used to transmit the signal from transmitter to receiver'.

Communication theory has of course become a complex field of study with many competing theories, going beyond the Sender-Message-Channel-Receiver model. My interest here however, is in the way in which certain understandings of music appear to retain the linear model.

Idealism and Ontology

This model of communication is linked to what we might call idealism. Idealism here is meant in its broadest possible sense, as philosophies in which abstract entities are in any way considered to have their own existence (in the analytic tradition idealism has generally come to refer only to philosophies in which abstracta exist in thought, opposed to creationism in which they have independent existence). We will repeatedly return to this concept of idealism, so it should be defined in some detail before continuing. In its most extreme form, it would be an approach in which the music itself is seen as something abstract (the 'work') 'behind' or 'contained within' the physical sound, and is therefore universal and set apart from the contingency of the material world. The genesis of such music must be some kind of immaculate conception in the composer's mind, developed through pure imagination and the 'inner ear', which is then communicated with technology as a mediating entity. If the technology interferes in any way, imparting its character, this is seen as a weakness of the technology or its application. The resulting physical sound is a shadow of the arrangement of the ideal forms it represents.

The split between idealist and what can loosely be termed materialist approaches to music is ancient. Aristoxinus argued for empiricism in music (Barnes 2004), claiming that a scale should be judged by the ear and not by mathematical ratios, disdaining the possibility of music's transcendence beyond the sensible world. This was in reaction to Plato's advocacy of Pythagorean theory, which holds music as a rational exercise, revealing truths underlying all things and reflecting a universal harmony. This is the height of idealism; Plato claimed that all of reality is a reflection of ideal forms, and in music saw

the potential to transcend the sensible world through pure mathematical reason (Hamilton 2007).

Plato's idealism, and idealism in general, arises from the question of universals. The Socratic method attempted to find *general* definitions—for concepts such as 'justice' or 'goodness'. This involves first collecting instances of, for example, 'just' acts. Socrates claimed that most people stop at this point satisfied that they have defined the term, but the next step is crucial, constituting perhaps the invention of inductive argument: the common 'essence' between the acts must be found. This method makes the assumption that a universal, abstract thing like 'justice' actually exists. It may well be the case that there *are* only individual acts, with no unifying essence behind them. But Plato maintained that universals must have their own existence in order for us to understand the world. For instance, a 'good' pie and a 'good' book share almost no qualities superficially, so to understand what they have in common, we must have knowledge of such a thing as 'Good'. Hence the need for a realm of ideal forms, of which the world we perceive is merely a reflection. Note that the term idealism in the context of Plato does not imply existence in the mind, as the English word 'idea' might suggest. It comes rather from the Greek *idea* meaning pattern or form. For Plato these *ideai* are the only things that truly exist, so even mind is subordinate to the ideal realm. (Guthrie 1968)

If this kind of philosophy sounds spiritual, that's because it is—Plato believed in a soul or spirit that comes from and returns to the ideal realm on birth and death, a concept modified from Pythagoreanism. We 'remember' universal concepts from the ideal realm when we see material approximations of them. Pythagoreanism was essentially a religion, steeped in mysticism. In a break from the materialism that previous natural philosophers had begun to move towards, it is based around an explicit belief in the immortality of the soul and its transmigration.

Spiritualism aside, it appears to be through music that the Pythagoreans came to their most important metaphysical conclusions. Someone (possibly Hippasus (Barnes 2004)) discovered that the most pleasing intervals to the ear were ratios between whole numbers. Specifically, these were the numbers 1, 2, 3 and 4, which sum to 10, described in Pythagorean theory as the perfect number. 2:1 is an octave, 3:2 is a fifth, and 4:3 is a fourth. The revelation here, was that something like the tuning of a lyre is not based on trial and error, which previously must have seemed to be the only option. It is in fact based on an *inherent* order, it has an existence beyond the human experience of it. Music itself is therefore not arbitrary, but based on absolute and eternal laws.

At this point in Greek thought, it has been argued by scholars that abstract concepts were not yet understood as separate from their material basis, i.e. the belief was that, fundamentally, things *are* numbers. The number is not conceptually divorced from the thing counted. For instance, 1 *is* a point, 2 *is* a line, 3 *is* a surface, 4 *is* a volume (Guthrie 1968).

The world is therefore conceived as principally pure form. For Pythagoreans, 'numbers are causes of substances and of their being' (Aristotle, in Barnes 2004). They believed that the discoveries they made regarding music reflected the order of the entire universe. Since harmonies depend on number, so too must everything else in nature. This is the 'music of the spheres', as championed by Plato, the complimentary and harmonic movement of all things around each other. So at this point, music is certainly not regarded as something material, but is used as a term to indicate mathematical patterns which were seen, not as abstracted from the world, but as the world itself. This is the first recorded idealist philosophy: the world is form, what we perceive as material is simply a reflection (as Plato would later describe it) of this idealized mathematical reality, or 'kosmos' (order, beauty).

As seductive as this theory is, we need to examine its consequences. The Pythagoreans concluded that music is the imposition of order onto chaos, more specifically the introduction of an ordered and mathematical limit on chaotic unlimited material (*aperion*). The range of possible tones is infinite, but when restricted to certain numbers it creates beauty. And so it is with the world. This is referred to by Philolaus as 'harmonizing'; the coming into being of things from the *aperion* is their harmonization, i.e. their subordination to limits (Guthrie 1968). Ethical and aesthetic conclusions follow that limits are inherently good, and the unlimited is bad. Everything is defined in terms of universal absolutes—what is intelligible and determinate is preferred over the vague and shapeless. Such black and white approaches to ethics and aesthetics, based on opposites, led Pythagoras (according to Aristotle) to split the world fundamentally into opposite principles: good, light, unity, male, limits; and bad, darkness, plurality, female, the unlimited. Thus we begin to see what I would argue is the patriarchal impulse behind idealism, a fear of ambiguity and a desire to understand and dominate the world.

Schiller, in his 'Aesthetic Letters' (Schiller 2004, part III) provides an Apollonian/Dionysian type of framework for understanding this impulse. He called it the formal instinct (*formtrieb*), and very clearly links the desire to abstract to the desire for order. Pure form constitutes a kind of escapism in which we can retreat from the chaos and

relativism of the real world into a world of eternal order and certainty. He contrasts this with the sensuous instinct (*sinnestrieb*) which is the desire for physical experience, rooted in the real world. Schiller here is not talking about ontology. It should be clear that form and matter are not at all separable, we cannot have one without the other, *except in thought*. This is the crux of naïve idealism. A fundamental dualism is formed by rationalism; the potential for abstract thought appears to split the world irreconcilably into the empirical on one hand, and knowledge arrived at through pure reason on the other. Both epistemological and ontological idealism can be associated with an elevation of the latter.

Parmenides' philosophy is the archetypical example of an exercise in pure reason (Guthrie 1968); he argued ultimately that difference and change are impossible. This was a remarkable feat of abstract thought, consisting of rational argument without apparent reference to external facts. He said that all things that exist have the fact that they exist in common, so what differentiates them? This must be something other than existence, which clearly does not exist, so all of existence must be a single mass of undifferentiated substance. There can be no such thing as a void for things to move around in, because a void by definition is the absence of existence—it does not exist. Likewise, for change to occur, something must become something else, something it is not. The coming into being of something that does not exist is impossible, since 'something that does not exist' is a contradiction. So the world as we perceive it does not exist—it must be merely an illusion (one of the most convincing counter arguments against Parmenides uses his own denial of the non-existent: how can something that does not exist even produce an illusion?) Running completely contrary to common sense, this is the perfect example of what happens when abstractions are thought to be 'real', or are given primacy over empirical evidence. Nietzsche describes Parmenides thinking, which is considered to have been very influential on Plato, as fundamentally flawed in its reification of 'such fearsome abstractions as the 'existent' and 'non-existent'':

> The logical truth of the pair of opposites being and nonbeing is completely empty, if the object of which it is a reflection cannot be given, i.e., *the sense perception from which this antithesis was abstracted*. Without such derivation from a perception, it is no more than playing with ideas, which in fact yields no knowledge ... Words are but symbols for the relations of things to one another and to us; nowhere do they touch upon absolute truth. (Nietzsche 1996, italics mine)

We end up with a Parmenidean type of philosophy when we fail to recognize abstractions as abstractions, i.e. as abstracted *from* experience. Without this recognition, meaning in language tends to be seen as absolute—an abstract concept is taken to be real simply because there exists a word to represent it. Since Wittgenstein, philosophy has tended to describe meaning as something along the lines of a 'social-linguistic product' instead. Sentences about the world, even if they appear to be irrefutably 'true', do not hold any truth value outside of language. As Rorty says, 'truth cannot be out there—cannot exist independently of the human mind—because sentences cannot so exist, or be out there. The world is out there, but descriptions of the world are not' (Rorty 1989). For Parmenides though, 'thinking' and 'being' (or the 'truth' about being) were the same thing, which involved a subordination of the senses, using the capacity for abstraction to split thought and experience in two, 'encouraging man to indulge in that wholly erroneous distinction between "spirit" and "body" which, especially since Plato, lies upon philosophy like a curse ... This is a conclusion which rests on the assumption that we have an organ of knowledge which reaches into the essence of things and is independent of experience' (Nietzsche 1996).

For Nietzsche, in contrast to this elevation of logic and reason, materialism is very different. Thales' prototypal materialism was the result of a less rational thought process: 'what drove him to it was a metaphysical conviction which had its origin in mystic intuition' (Nietzsche 1996). Nietzsche shows a clear preference for this kind of intuition in philosophy over what he sees as a fundamentally flawed reliance on logic and reason—concepts are *derived* from reality, reality should not be seen as a reflection of concepts.

The materialism of Thales and others from the milesian school leads onto the atomism of later philosophers such as Democritus and Epicurus, in which there is an attempt to have material causes account for everything (light, sound, even the soul are said to be atoms in various combinations). Democritus questioned the reliability of the senses (light atoms could be subject to interference before they reach the eye etc.), leading to a doubting of any kind of stable reality. He said that things are 'by convention sweet and by convention bitter, by convention hot, by convention cold, by convention colour; in reality, atoms and the empty' (Barnes 2004). That these qualities come merely from the temporary arrangement of atoms and their contact with the senses means they are relative to the perceiver and do not exist as absolutes. Nothing can be said in absolute terms to *be* red, only that someone might perceive it that way. In relation to the 'problem of universals' then, this position is nominalist—universals such as 'red' or 'circle' or 'beauty' do not exist,

they are simply words to denote rough correspondence to a perceived quality in particular instances. Later, Plato's position, in a similar vein to Pythagoreanism, held the ultimate nature of reality to be abstract, precisely to get around this relativism. Universals in this case are real[2]; something can be, for example, *inherently* beautiful.

But before this return to idealism, the sophists began teaching a kind of relativism in line with Democritus. If universals like sweet or bitter do not exist except as arbitrary conventions, then it follows that justice and injustice, good and bad, right and wrong do not exist in nature either. Gorgias, aping the usual title for a book on physics at the time—'On nature or the existent'—wrote 'On nature or the non-existent'. The implication is that there is no such thing as nature, no fundamental truths.

This resulted in essentially a very pragmatic philosophy. If truth is relative, then all opinions are equally 'true'. If a particular person tastes sugar as bitter rather than sweet, then for them it is true that sugar is bitter. And in matters of ethics, if someone thinks it is okay to murder then that is true for them. However, Protagoras argued that some truths can be said to be 'better' than others in some sense, they are preferable for practical reasons. Often this comes down to popular consent, as with the social contract—it may not be a fundamental truth that murder is bad, but enough people agree that it is for it to be practical to turn it into law. What becomes important is rhetoric—persuading others of your own 'truths'. Given this, it might sometimes be prudent to *act* as if there are absolute truths, even if we know they are not absolute. As Democritus said, although there is no such thing as 'a good man', 'one should either be *or imitate* a good man' (Barnes 2004). Similarly in aesthetic judgement, we say one thing is better than another even though we know this means nothing in absolute terms.

A lot of the themes I discuss in this thesis with reference to music later were already well established before Socrates/Plato. Importantly it seems that the materialism of the natural philosophers led into the relativist pragmatism of the sophists. However, after Plato, idealism (often in the form of theology) seems to dominate western thought until the reappearance of materialism in the 19th century, and pragmatism, phenomenology etc. in the 20th century.

In aesthetics, we could sum up the question of idealism by asking: to talk about 'beautiful' things, do we need a class-concept of 'beautiful' that has its own existence separate to the things themselves? Guthrie points out that most people these days would

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2   This position is confusingly labeled realism—referring to the idea that universals are real. Realism tends to be used these days to refer to the reality of an 'external' world, i.e. as opposed to idealism. Materialism is a type of realism in this latter sense, but is ironically congruent with a nominalist view of universals.

say no in answer to this, and yet we still use everyday language as if the answer was yes (Guthrie 1968). For instance we talk about diseases as if they are absolute categories, yet no two cases of a disease are the same. There are only individual patients with symptoms that are always unique. The categorization does not have ontological consequences, it is generally understood by doctors to be merely a tool. Likewise in music, we can use notation, mathematical representation, algorithmic description etc. whilst remaining aware that these abstracta are only tools in a process that is essentially material. However, the evidence suggests that there remains a lot of implicit idealism in musical practice and theory, as I will show in the rest of the thesis—reification of the score, the subordination of sound to gestural 'content', technology used merely as a medium for communication, and so on.

Romanticism

This latent idealism can on the one hand readily manifest itself in a classical way, something like the music of the spheres; the ideal forms indicated by the music are based around notions of universal harmony and mathematical perfection. This crops up in certain aspects of computer music, particularly in algorithmic composition, which is considered in chapter 5. However, since I am defining the music represented by Mego negatively— explaining what it defines itself in opposition to—perhaps of greater relevance is what we might call romantic idealism: the expression of 'the self' through music.

Romanticism as a movement, it is usually argued, was not unified by any particular style (e.g. Honour 1979). However there are a clear set of values and approach to art that we can identify in the romantic period: universal rules of form, the rejection of the 'cold' formalism of classicism in favour of instinct and emotion, and the expression of the self as absolutely primary. Music is particularly susceptible to these ideas: according to Blayney Brown, 'because they sprang entirely from within, music and poetry were the supreme romantic arts' (Brown 2001).

The romantic arts are variously described as dealing with universal themes of death, nothingness, 'the sacred', 'fantasies of infinity' (Brown 2001). Friedrich Schlegel claimed '[the sacred] can never be seized because the mere imposition of form deforms it' (Berlin 2001). So despite a refocussing of concern to the specific and individual—the self—with Schlegel's romanticism there is still an innate interest in something that *cannot* exist materially; something ideal. Honour also describes the point of a romantic artwork as being a (necessarily) inadequate expression of something fundamentally inexpressible. This

inexpressible 'something' that can only be gestured towards (i.e. Schlegel's 'the sacred'), never fully grasped, is identified by Honour as the idea of the spirit or soul of the artist (Honour 1979). This focus on the artwork as window to the soul of the artist gives rise to the concept of the artistic genius, who occupies a privileged position. For Butler, 'romanticism inflates the role of the artist' and results in 'a heightened interest in the personality of the artist' (Butler 1981).

Rejecting formalism and concentrating instead on the individual gives the artist free rein; expressed in maxims at the height of the romantic period such as 'the artist's only law is his feelings' or 'trust your own genius' (Caspar David Friedrich and Washington Allston respectively, quoted in Honour 1979). The free rein of the imagination was, according to Brown, 'preferable to current reality... escapism lay at the heart of the romantic instinct' (Brown 2001). So perhaps despite appearances to the contrary, romanticism actually represents a similar escapism to the aforementioned form drive. Expression defined as escapism like this is not concerned with materiality other than as a signifier of more abstract concepts.

As Brown argues, there is a certain nostalgia for faith in romanticism; faith in a god is replaced by faith in the 'emotional self'. There is an elevation of the human, a spiritual humanism—the soul (with which music has some special relationship), the sacred, transcendence and so on. The expression of what it is to be human, the human condition and its communication to others is often taken to be central in much artistic practice, particularly music. There are exceptions, in both theory and practice—notably serialism, other kinds of formalism and the avant-garde in general—but there appears to be a tendency to lapse back into themes of expression.

Musique concrète for example seems ostensibly concerned with the results of experimentation and interaction with concrete sound materials, however it bears a resemblance to later spectromorphological thinking in the electroacoustic tradition, revealing the notational centricity that was always implicit in attempts to discover 'musical' content in concrete sound (Schaeffer: 'to discover the instinctive paths that lead from the purely "sonorous" to the purely "musical" ... to put in front of us the sonorous and its musical "possibility"' (Schaeffer 1966, p.81)). According to Smalley, 'spectromorphological ideas can help perceivers to focus on the imagination and craft of the composer' (Smalley 1997). This can be interpreted to suggest that the proper way to listen to music is to appreciate the virtuosity of the person behind it. More specifically 'we detect the humanity behind [sounds] by deducing gestural activity'.

The romantic period is useful to reference as epitomizing certain ideas, but the notion of romanticism relevant to this thesis is not simply that of a historical period, rather it is a useful term tying the above characteristics together and very broadly defining an approach to art. As Honour argues, 'romantic' tendencies can be shown to exist since antiquity, and they of course exist no less today than in the romantic period. Rock music for instance often embodies a very clear continuation of the tradition of music as an expressive medium, with corresponding focus on the personality of the artist, notions of artistic genius and so on. '[Romanticism's] concepts of authenticity, integrity and inner truth remain relevant. They are fundamental to our concept, not only of art, but also ourselves' (Brown 2001).

Richard Coyne describes a romanticism specifically relevant to the digital age, which he calls 'technoromanticism'—IT narratives that 'attempt to transcend the material realm'; 'narratives that develop the claims that we can transcend the constraints of the embodied world toward unity through the power of information technology' (Coyne 2001). We will see an example of an approach like this in chapter two. Coyne is critical of the romanticism in this approach to technology, claiming that 'it is easy to show how romanticism encourages inflated expectations, diminishes tangible concerns with equipment and embodiment, promotes the heroism of the digital entrepreneur, and dresses conservative thinking in the guise of radicalism' (Coyne 2001).

These issues have also been identified previously in new musicology, generally in relation to emancipatory issues, such as McClary's assertion that music is 'too important a cultural force to be shrouded by mystified notions of Romantic transcendence' (Brett et al. 2006), and against idealism there is the idea that music existing as notation encourages 'reification: the score comes to be seen as 'the music', or perhaps the music in an ideal form' (Middleton 1990). Much of this musicology however does not move beyond discussion of the traditional western canon or the occasional inclusion of popular music, often contradictorily analyzed notationally.

I will use the word 'idealist' to refer to artworks in which the material form of the work is seen only as a pointer, to something immaterial; in classicism this is ideal form and universal harmony, and in romanticism the soul, the sacred, the infinite etc. These are fundamentally works of representation. A.W. Schlegel in defining romanticism stated clearly that '[beauty] is a symbolical representation of the infinite' (Bonds 1997). Abrams' mirror and lamp metaphors, for classicism and romanticism respectively, neatly encapsulate the representative nature of each; both kinds of artform exist to indicate

something else beyond themselves, by reflection on the one hand or illumination on the other (Abrams 1971). Art as a reflection of reality, or art as an illumination of reality; both options retain the idea that 'reality' is the object of interest, and that art is somehow separate to this reality. Dewey provides an effective metaphor to dispel this idea:

> Mountain peaks do not float unsupported; they do not even just rest
> upon the earth. They *are* the earth in one of its manifest operations.
> It is the business of those who are concerned with the theory of the
> earth, geographers and geologists, to make this fact evident in its
> various implications. The theorist who would deal philosophically
> with fine art has a like task to accomplish. (Dewey 2009)

The representative conception of art is also manifest in the notion of 'content'. Sontag's *Against Interpretation* is of great relevance here. She saw art in the west as persistently emphasizing content over material form; beginning with the idea of art as mimesis with Plato, which in essence continues in the more recent idea of art as expression:

> Even in modern times, when most artists and critics have discarded
> the theory of art as representation of an outer reality in favor of the
> theory of art as subjective expression, the main feature of the
> mimetic theory persists. Whether we conceive of the work of art on
> the model of a picture (art as a picture of reality) or on the model of
> a statement (art as the statement of the artist), content still comes
> first. The content may have changed. It may now be less figurative,
> less lucidly realistic. But it is still assumed that a work of art is its
> content. Or, as it's usually put today, that a work of art by definition
> says something. ('What X is saying is . . . ,' 'What X is trying to say
> is . . .,' 'What X said is . . .' etc., etc.) (Sontag 2001)

Aesthetics that problematize representation

So can there be an artform that is neither mimetic *nor* expressive? Issues to do with representation are of primary importance to aesthetics—what is the nature of the artwork? Is it a depiction? Does it rely on metaphor? If artistic practice is at all reflective, it seems inevitable that it will lead to a questioning of its own representative nature, through attempts to either avoid representation, or 'play' with representational processes in order to make them more apparent. There are a number of historical precedents in this area giving us an eclectic range of examples from other disciplines that it will be beneficial to draw on.

This is partly a case of cherry-picking and borrowing aspects of theory which have no equivalent in musicology, in order to avoid starting from scratch. But it also has the effect of illuminating the concept to a greater degree, highlighting the various issues at stake by contemplating them from a number of different viewpoints.

The most obvious precedent is what has been referred to as 'literalism' in the plastic arts, which found its fullest articulation in American minimalism in the 60s and 70s. This was a move away from depiction (including the depiction of abstractions, i.e. a reaction to abstract expressionism), to create pieces that are perceived as objects themselves rather than as a window into something else. Joanna Demers has recently argued for the link between literalism and contemporary sound art and experimental electronic music (Demers 2010). The idea is to avoid the view of art or music as a container of meaning. Demers claims that 'conceptualisations of sound as blank, meaningless objects are deserving of continued study, especially since so much of the scholarship devoted to electronic and electroacoustic music theorises the communicative abilities of music and sound' (Demers 2009). She references (Emmerson 2007), (Smalley 1996) and (Wishart 1986) as examples of the latter.

Other relevant precedents are found in writing on architecture ('truth to materials', machine aesthetics, brutalism), film (particularly structuralist/materialist film), and some aspects of literary theory. The history of Marxist aesthetics is of particular interest, being characterized by debates centered around the intersection of ontology, aesthetics and politics—trying to determine what a materialist aesthetic might be (or indeed if materialist aesthetic is actually a contradiction in terms (see for example Eagleton 1990). To clarify, materialism in the widest sense is an ontology that asserts the existence of a real world 'external' to mind or phenomena, or more specifically asserting that the material world is the *only* thing that exists—ideas are just a result of material interactions, and crucially represent an abstraction from the material world, therefore sharing its contingency and arbitrariness. Althusser describes it thus: 'For us, the 'real' is not a theoretical slogan; the real is the real object that exists independently of its knowledge—but which can only be defined by its knowledge' (Althusser 1969).

This is not so different from a Kantian position. Kant understood Hume as stating that 'no objects can be represented through pure concepts of understanding, apart from the conditions of sensibility' (Kant 1855). Kant, rather than taking this as an argument for empiricism, as Hume intended it, focused on the latter part of the statement: the apparent pre-requisite of an understanding of the conditions of sensibility, leading him to conclude

that *a priori* knowledge is not only possible but of fundamental importance. Knowledge, in the Aristotolian tradition, is split into analytic judgement (essentially tautologous, e.g. 'blue is blue') and synthetic judgement (determining complex facts, e.g. 'the sky is blue'). The latter seems clearly *a posteriori*, it relies on observation; *a priori* knowledge was thought exclusively to belong to analytic judgement. But Kant extended the realm of *a priori* thought to include synthetic judgement, for instance holding the whole of pure mathematics as an *a priori* truth, claiming that '5 + 7 = 12' is both *a priori* and synthetic.

The concept of *a priori* knowledge is clearly ideal—as an object of pure contemplation it exists prior to sense data and independently of the 'external' (or 'noumenal') object world. As such Kant ultimately asserts that the noumenal world is unknowable. The phenomenal world that *is* knowable, is only appearance, representation— it does not give access to 'things in themselves'.

'Transcendental idealism' is the term Kant applies to this position: the objects of transcendental knowledge (*a priori* knowledge, pure reason regarding the conditions of experience) are not real but merely ideal. Space, time and causation cannot be shown to exist independently of thought. He claimed, however, that transcendental idealism was necessary for an 'empirical realism'. The objects of empirical knowledge *do* exist, and it is the understanding made possible by pure reason that allows us to make such a claim. Causation and substance are basic categories of the understanding, ideal and transcendental. Thus the unknowability of 'things in themselves' does not prevent the attribution of a *cause* to the appearance in sense data of a representation, via *a priori* synthetic judgement.

For a materialist however, there is no *a priori* at all, the understanding of what Kant thought of as fundamental categories of the understanding are empirically derived like anything else (a type of derivation that does not require rational concepts on which to build because it is precisely *not* a rational process). The distinction is thus epistemological as well as ontological, but this is unavoidably linked with aesthetic, ethical and political issues.

In 20th century pragmatism, the rejection of metaphysics is a general theme. Materialism, although basically consisting of a speculative metaphysical statement, results in a similar position: the statement is that there is only the physical, the metaphysical is itself physical. This leads to a rejection of absolutes; in ontology and consequently in ethics and aesthetics etc. The aforementioned escapism of idealist or romantic approaches to art is often seen in Marxist aesthetics as a distraction from material reality, a means of

suppressing political thought and activity. The conclusions are very pragmatic, in the tradition of Marxist materialist philosophy there is a strong emphasis on 'a philosophy of praxis' (Gramsci 1998), beginning perhaps with the famous 11th thesis on Feuerbach: 'Philosophers have only interpreted the world, in various ways; the point is to change it' (Engels & Marx 2009). This point in the context of Feuerbach's materialism is that a metaphysical/spiritual unity or teleology provides comfort but ultimately downplays agency and promotes fatalism. But in its absence, pragmatism, acting in the world and increasing material well-being, becomes primary. It also demonstrates the idea that theory is not prior to or even separate from practice, but is itself a type of practice. Philosophy and art are not separate from the world (they should not be thought of as faithful and truthful reflections of the world) but as themselves part of the world. This is very much in line with the arguments of pragmatists later such as Dewey:

> The traditional theory in both its empiricist and rationalistic forms amounts to holding that all propositions are purely declaratory or enunciative of what antecedently exists or subsists, and that this declarative office is complete and final in itself. The position here taken holds, on the contrary, that declarative propositions ... are intermediary means or instruments ... of effecting the controlled transformation of subject-matter. ... All controlled inquiry and all institution of grounded assertion necessarily contains a practical factor; an activity of doing and making which reshapes antecedent existential material. (Dewey 2007)

As an example in Marxist aesthetics, although Lukács' realism saw art and literature as essentially mimetic, as a pragmatic political imperative he understood their function as the faithful reflection of material reality—social structures and class relations. As such he attacked expressionism for its failure to do this; precisely on the grounds of its idealistic character, its aim to represent the nature of 'bourgois' subjectivity. But similarly, the idealism of his own aesthetic is manifest in the concept of mimesis; his belief in the possibility of faithfully and objectively representing the nature of society. Adorno, Marcuse, and various others favoured a more dialectic approach than this, but one of the most interesting approaches in the history of Marxist aesthetics is the materialism of the London Film-Makers' Co-op.

Unlike Lukács' realism, materialist film (as theorized and practiced by Peter Gidal, Malcolm LeGrice, Lis Rhodes and others) in general attempted to *problematize*

representation. It seems a logical progression: the aim is initially to faithfully represent reality, but this is followed by the recognition that representation is itself reality. Materialist film generally aimed to make the viewer aware of the representational apparatus; including conceptual apparatus—the language of cinema, its ideological basis and so on. The techniques for achieving this are varied but tend to involve a disruption of conventional forms that are taken to be natural in cinema. The idea of anything taken as natural is anathema to a materialist approach: 'since everything is constructed, no 'nature' pre-existent ... meanings can be recognized as arbitrary' (Gidal 1989). Arbitrariness is repeatedly emphasized. We ultimately see again a reaction against the artform as a medium for the communication of predetermined and naturalized meaning; rejecting notions of identification, narrative and anything that can be described as illusionistic. Illusionism is seen to be the primary form of dominant cinema by theorists like Gidal.

Georgina Born describes a similar situation in music. Seeing music as a more-or-less arbitrary sign, she describes the way in which meaning in music proceeds via metaphor:

> It is at the level of connotation that music is particularly subject to
> extramusical meaning through its extraordinary evocative power.
> The signifieds that music connotes are of many kinds: visual,
> sensual, emotional, and intellectual—such as theories, domains of
> knowledge. All are metaphors ... metaphors may be motivated,
> distorted, yet naturalized or organized into a pseudocoherence for
> purposes of irrefutability. (Born 1995)

This emphasizes the ideological quality of music:

> The essential point, however, is that the relation of these
> extramusical connotations to music as signifier is cultural and
> historical. Yet they are experienced as 'immanent in' the music by a
> process of projection of the connotations onto the musical sound
> object. It is this process of projection that achieves the 'naturalizing'
> effect—the connotations appear natural and universal when they are
> conventional—and that makes it apt to describe them as ideology.
> (Born 1995)

Certain musical practices appear to operate primarily on this level, on the level of the construction of meaning; the artist wishes to communicate extramusical ideas, and manipulates musical materials to give the right connotations. A practice centered around

the linear communication of meaning therefore almost by definition must work with *existing* connotations, further entrenching them, and further naturalizing dominant ideological structures (for example the self-expression of rock or other gestural musics could quite easily be linked to individualism in politics).

However a practice can perhaps work closer to the level of musical material prior to signification. The attitude discussed previously in relation to technology, in which it is seen in a means-ends manner generally as an inconvenient but necessary imperfect medium, can be applied to semiology in general (or as Dewey might have it: semiology *is* technological). Coyne explains this in relation to Derrida:

> One of Derrida's major themes is his identification of the tendency
> within conventional language theories to subordinate the signifier
> (word or language event) to the signified (the meaning or the entity
> referred to). The signifier exists to give access to the signified and
> is subordinate to the concept or meaning it communicates. Within
> this regime of thinking, the task of interpretation is always to get
> back to what is meant in any language situation. The words are
> obviously important but sometimes get in the way ... Derrida
> argues for a reversal of this priority. (Coyne 1995)

This brings us to a recurring theme in the thesis: there are two possible ways we could describe the effect of a musical practice that attempts a reversal like this and prioritizes the signifier.

1. It is less prescriptive in its connotations. It therefore opens up a space for new connotations to be formed.
   Or more radically:
2. It strives toward the ideal of the 'empty signifier'. The focus is shifted to the signifier itself, its materiality, in the absence of anything signified.

These two possibilities will be explored throughout the course of the thesis.

Sontag describes how critics generally see their task as interpretive, essentially a task of translation—taking the content of the artwork and re-presenting its meaning in the form of writing. But if a recurring conclusion here is that the music exemplified by Mego is not concerned with communicating meaning, this presents a problem for the critic— there is nothing to interpret:

It is always the case that interpretation of this type indicates a dissatisfaction (conscious or unconscious) with the work, a wish to replace it by something else ... What would criticism look like that would serve the work of art, not usurp its place? What is needed, first, is more attention to form in art ... The best criticism, and it is uncommon, is of this sort that dissolves considerations of content into those of form. (Sontag 2001)

I therefore primarily consider the ways in which the technological approach creates music that affords apprehension on the level of material form, rather than discussing any notion of content.

Interpretation, based on the highly dubious theory that a work of art is composed of items of content, violates art. It makes art into an article for use, for arrangement into a mental scheme of categories ... Our task is not to find the maximum amount of content in a work of art, much less to squeeze more content out of the work than is already there. Our task is to cut back content so that we can see the thing at all. (Sontag 2001)

Mego

Towards the end of 1994, Ramon Bauer, Peter Meininger, Andi Pieper and Peter Rehberg formed Mego, driven largely by a general dissatisfaction with the current status quo in Austrian music. Rehberg describes Vienna as a 'cultural wasteland' at that time, with the music scene dominated by imitations of Anglo-American pop/rock. However they did have an interest in techno, which was seen as more european centric and its model of dissemination as independent from the mainstram of popular music. Techno was heavily influential on the formation of Mego: Bauer and Pieper were previously involved in the running of the techno label Mainframe, and Rehberg cites the second wave of Detroit techno—Underground Resistance in particular—as an influence. Despite this, techno was ultimately, for them, not fulfilling its experimental or challenging potential. Rehberg therefore describes the basic concept of Mego as taking the model of techno but applying it to music with a more experimental approach [1].

Rehberg was DJing at the time in the 'chill out' room at the U4 club in Vienna, next door to Bauer and Pieper's studio. In May 1994 they played what could be considered the first Mego performance. By running cables through the wall, Bauer and Pieper were

playing on one side using studio equipment, and Rehberg on the other using CD decks and outboard effects, loops and so on; 'extending the DJ format' [1]. In the same year, the word 'Mego' was first mentioned as a label name ('chosen because it did not mean anything' [2]), and Rehberg, Bauer and Pieper started to make recordings by putting microphones in various different fridges, which would later become the sole source of sounds for the *Fridge Trax* 12' (MEGO 001).

*Fridge Trax* was released in May 1995, along with *Die Mondlandung* (MEGO 002) and *UFO Beobachtungen 93-95* (MEGO 003) by Bauer and Pieper (General Magic) and Alex Müller (Elin/Stützpunkt Wien 12) respectively. By this point, Peter Meininger had left the project despite, according to Rehberg, being predominantly responsible for the genesis of the label.

There is an overt techno influence in *Die Mondlandung* to some extent, and *UFO Beobachtungen 93-95* more so, with its minimal arrangement of 4/4 kick drum and hi hat patterns over pulsing bass parts. *Fridge Trax* however (recently re-issued as FLAC download) consists predominantly of drones, and slowly repeating fragments of recordings; it is more representative of the kind of work Mego would later become known for.

The distribution for these records was handled by a German techno distributor called Neuton who, according to Rehberg, 'tried to sell them with descriptions like "pumping, driving tracks"' [1], the inappropriateness of which (in the case of *Fridge Trax* and *Die Mondlandung* at least) highlights the departure from techno that Mego represented, at the same time as an initial reliance on the infrastructure and audience created by it.

The same was true of other comparable labels at the time. Tommi Grönlund's Sahko label was founded a year earlier, releasing Mika Vainio's *Kvantti* and *Rontgen* EPs in 1993, and his first full length album *Metri* in 1994. Although Sahko would go on to experiment with less rhythmic material in later releases, Metri owed something to techno genre conventions, making it less of a break from techno and more like an offshoot; beginning what journalists dubbed minimal techno. Also by this time Autechre had released Incunabula, Amber, and Anti EP; Oval's Systemisch was released on Mille Plateaux; and so on. Mego was formed in the context of various contemporary precedents for experimentation in commercial electronic music. According to Rehberg such contemporary influences were combined in Mego with various interests in industrial music, post-punk and synth pop, ultimately resulting in an aesthetic more eclectic than these other labels.

There was also a conviction that it could be taken to more of an extreme—the *Artificial Intelligence* series on Warp for instance was for Rehberg 'hyped as being experimental music, but was just another form of techno … it was a good idea, but wasn't enough, it could *really* be experimental' [1]. In addition Rehberg states that the concept was to move away from the paradigm of techno records with a white label and no cover, to more unusual packaging with interesting artwork (by designers like like Tina Frank). It was intended to be a cross-media coming together of artists, graphic designers, programmers.

By word of mouth alone, various like-minded artists in Vienna had contacted Mego before any records were released. Christian Fennesz approached them in April 1995, and Farmers Manual sent a demo at around the same time, resulting in Fennesz' seminal heavy guitar processing in the *Instrument* 12' (MEGO 004) and eventually the first Farmers Manual album *No Backup* (MEGO 008). Additionally, the internet and email at this time began to enable the creation of a larger network of people working in similar directions, acting as a catalyst for non-institutional experimental computer music globally. Bauer and Pieper, at the same time as running Mego, ran a web design company with Tina Frank called URL. This helped with distribution since Mego was very quickly able to set up its internet mail order shop MDOS, in 1996.

1996 also saw the release of Rehberg's first solo album (as Pita) *Seven Tons for Free* (MEGO 009) which, along with *No Backup,* began to define the sound that characterizes much of the Mego catalogue. Rehberg sees the influence of Russell Haswell as important from this point. Although Haswell's first *Live Salvage* album wasn't released until 2001, he was present in Vienna much of the time from the inception of Mego, socializing and playing in the same venues. Through him there was an influence from Japanese noise music; explicitly manifest in the Masimi Akita (Merzbow) / Haswell collaboration *Ich Schnitt Mich In Den Finger* (MEGO 022).

In 1997 and 1998, the debut albums of General Magic (*Frantz!*, MEGO 010), Fennesz (*Hotel Paral.lel*, MEGO 016), and Florian Hecker (*IT ISO161975*, MEGO 014), followed by a number of Mego tours began to result in international media recognition. The Wire magazine devoted an issue to the Vienna electronica scene in August 1997, citing the 1995 Phonotaktik festival as the event initially drawing attention to labels like Mego, and claiming that the most productive period for the scene had already passed.

There was a tendency in these days of burgeoning international recognition for Mego artists to find themselves playing in unusual venues, creating a confrontational atmosphere (as might be expected in the reception of any formal innovation). For instance

a performance at a typography conference in San Francisco in 1998 called FUSE was described in one review as 'an unbearably loud and hardly structured techno show ... with pointlessly shrill high frequencies way above pain level. Most held their ears shut; many left the audience. Apparently adolescent technical overkill' (Muller-Lance 1998). These situations, according to Rehberg, were not intentionally sought out (they were 'mostly because of bad booking agents' [1]), but at the same time they were not avoided, and were generally seen as a positive thing by the artists involved.

Most Mego artists were originally using typical techno hardware in the production of their music—samplers, drum machines, sequencers and so on. The move to laptop production and performance, that they would later become known for, was initially made for entirely pragmatic reasons. To play an increasing number of international shows, carrying numerous large pieces of equipment became impractical. The release of the G3 PowerBook in 1997 was roughly the point at which it became possible (and affordable) to do the same kind of audio processing on something a fraction of the size and weight. As a side-effect of this development, there was a fundamental change in the kind of sound being created.

Supercollider became the software environment of choice, with the occasional use of institutionally developed programs such as Steim's LiSa. Andy Pieper (previously a programmer), began creating software in Supercollider, that started to be adopted by other Mego artists. This led to a kind of communal iterative patch development; Pieper experimenting with various ideas, and Rehberg and Bauer suggesting changes or new features. Farmers Manual (Mathias Gmachl, Stefan Posert, Oswald Berthold and Gert Brantner) were also programmers, and used the algorithmic possibilities of the computer in *Explorers_We* (OR 1998, SQUISH 4) and the majority of the live performances on their *Recent Live Archive* (MEGO 777).

1999 and 2000 saw further international recognition, with tours in Japan and Australia widening the audience. Rehberg claims that Australia remains the biggest market for the label to date [1]. There was also further critical acclaim, with Rehberg and Fennesz winning a Prix Ars Electronica distinction in digital musics, for *Seven Tons For Free* and *Hotel Paral.lel* respectively. This success was complimented by the release of *The Magic Sound Of Fenn O'Berg* (MEGO 031), a collaboration between Rehberg, Fennesz and Jim O'Rourke presenting a fragmented collection of live recordings in which an eclectic bank of soundfiles (including a recognizable John Barry theme from a James Bond film) are distorted and processed. The second Pita album *Get Out* (MEGO 029) is often considered a

benchmark in the 'laptop' genre, evidenced by descriptions such as 'a milestone in early laptop music' (Sohns 2008) or 'the first major musical laptop statement' (Keenan 2008). It follows a similar compositional process to the Fenn O'Berg album; a highlight being eleven minutes of looping a reversed Ennio Morricone sample, distorted in various ways.

Also released around this time, but occupying a very different sonic territory, was *Principio* (MEGO 18) by Roc Jiménez de Cisneros and Miguel Ferré as Evol. It consists of high pitched short envelope sounds from a drum machine, arranged and edited into complex but sparse patterns using a minidisk editing station. This release was the result of a meeting between Rehberg and Jiménez de Cisneros at the Barcelona Sonar Festival in 1996. Jiménez de Cisneros cites exposure to the work of other Mego artists—Rehberg and Farmers Manual in particular ('somehow extreme and accessible at the same time' [3])—as the main influence that led to an involvement in computer music from previous interest in metal and hardcore. In particular, he considers *Seven Tons for Free* as a major influence and turning point, referring to this emerging scene as 'post-techno'. According to Jiménez de Cisneros the experimental computer music of the mid to late 90s would not have been possible without techno, in the sense that it prepared an audience (and artists) for electronic sounds presented in anti-expressive machine-like ways [3]. Techno has often been described as the antithesis of a traditional human centric, emotional or expressive music. 'Detroit Techno refutes the past ... it prefers tomorrow's technology to yesterday's heroes. Techno is a post-soul sound ... For the young black underground in Detroit, emotion crumbles at the feet of technology' (Cosgrove 1988). For more on this aspect of techno see (Pope 2011) or (Reynolds 1998).

Despite the vague 'post-techno' focus, throughout the history of Mego there has been an attempt to avoid restricting the label to one style; the aim is to make the label uncategorisable. There is an influence here from labels such as Mute and Factory, and an obsession for Rehberg in following release series and catalogue numbers. For instance STUMM 4 on Mute was 'the Black Album' by Boyd Rice (NON), which was followed by Depeche Mode's *Speak & Spell* as STUMM 5. The hugely eclectic nature of this series was a point of fascination for Rehberg. Interestingly, the influence from these labels provides another link with techno; according to Cosgrove: 'strange as it may seem, the techno scene looked to Europe, to Heaven 17, Depeche Mode and the Human League for its inspiration' (Cosgrove 1988).

In 1999 the sublabel fals.ch was founded, to be run by Oswald Berthold (of Farmers Manual), and Florian Hecker. Fals.ch was one of the first online only labels; a 'netlabel'.

The catalogue consists of MP3 downloads only, there were no physical releases other than the retrospective *Fals.ch* and *Fals.ch 02* mini-CD compilations.

Consistently the biggest selling release in the Mego catalogue [1], Fennesz's *Endless Summer* (MEGO 035), was released in 2001. This was followed by a Jim O'Rourke solo album, *I'm Happy, And I'm Singing, And A 1, 2, 3, 4* (MEGO 050); the eventual release of Haswell's *Live Salvage 1997-2000* (MEGO 012); Kevin Drumm's Sheer Hellish Miasma (MEGO 053), which became very influential on a burgeoning electronic noise scene in the US; as well as (amongst others) releases by CoH (Ivan Pavlov), Sluta Leta (a 'Swedish' pseudonym for Ramon Bauer and Andi Pieper), Tujiko Noriko, and a collaboration between Hecker and Yasunao Tone.

This productive period was threatened by various factors. Some major distributers for the label went out of business, due to a general drop in sales usually linked to the rise of MP3 downloads. Bauer left the company, and in 2005 Mego and MDos ceased to exist. But in 2006 Rehberg restructured the organization to run with no office and no staff, instead outsourcing when necessary. He rebranded the label as Editions Mego, the concept was to reissue items from the back catalogue as well as continuing to release new material.

This music could be placed in the context of discourses in Western art music, but this could be misleading, since the music, though perhaps sharing some superficial similarities, appears to have almost no roots in such a discourse. Most of its practitioners seem to have no interest in this discourse, and their musical influences come from entirely different traditions. Where comparisons between the two kinds of music have been made (usually simply because the comparison is interesting) I have tried to maintain the sense that this is a comparison between two categorically different kinds of music, the comparison is for the purposes of shedding light on certain aspects of the music by defining it negatively. It should not imply that there is much of a relationship of influence between the two.

There are some exceptions to this: artists such as Russell Haswell show a strong interest in the academic tradition of computer music, but, as will be explained in more detail later, this is not so much a continuation of that theory and practice, but rather a quite unique 'curatorial' practice that takes this history as just one of many objects of fascination. In a different way, Jiménez de Cisneros has a knowledge and interest in the 20th century avant-garde, but the parallels between this and his own work only became apparent to him when he had already been a professional artist for some time [3]. Again, therefore, this does not represent a continuation of that practice. Similarly, Peter Rehberg says of the

institutional tradition: 'when I was a teenager we didn't have access to any of the academic music—things like Stockhausen and Pierre Schaeffer. We hadn't heard of that, we didn't know what it was ... but I probably would have been interested' [4].

In contrast to institutional musics, Mego sustains itself commercially, unsubsidized. Rehberg is critical of publicly funded music, claiming: 'if you put a record out you should have enough confidence in it that money will come back in' [1].

In relation to notions of postmodernism, it is interesting to note that this music does not merely 'borrow from' or 'reference' popular culture, it is itself situated *within* popular culture, if we take popular culture to be those aspects of culture that are commodified and regulated by the market. But note that the term 'popular culture' is perhaps misleading in an age of such diffuse cultural dissemination. If a music sustains itself commercially, this does not necessarily mean it is 'popular' music. The scene in question appears to consist of a small but committed audience, organized internationally (in a way that was not possible before the internet).

Chapter Summaries

In the following chapters I will ground the discussion in specific musical examples that demonstrate the theory introduced above. Each chapter focusses on one or a few particular works, using them to connect with different themes.

Chapter 2 introduces the relationship between technology and aesthetics, by comparing two different approaches, as found in Ryoji Ikeda's +/- on the one hand, and Pita's *Seven Tons For Free* on the other. I explore the theory of machine aesthetics and high-tech aesthetics, specifically in relation to notions of materialism and literalism. Donald Judd's essay *Specific Objects* and Michael Fried's *Art and Objecthood* are discussed in order to explain this concept of literalism. Judd and Fried's writing constitutes an exchange providing perhaps the clearest expression of a split between materialist and idealist approaches to art. It provides a useful starting point for the theory that will be developed. I also link this to Heidegger's thought regarding art.

In Chapter 3 I compare Haswell & Hecker's *Blackest Ever Black*, made using Xenakis' UPIC machine, to Xenakis' own music made with the UPIC. Their approaches are contrasted, and I begin to use Dewey's philosophy to describe a pragmatic approach to technology, which is exemplified in *Blackest Ever Black*; an approach that is experimental, in contrast to one in which technology is seen as a medium for channeling an abstract musical idea.

Chapter 4 takes a piece of software as its focus—Andy Pieper's 'apPatch' SuperCollider patch, used in a number of early Mego releases. The idea of a transparent medium is discussed, using the 'digital audio workstation' concept as an example. In contrast, the limitations and inherent affordances of the apPatch software are highlighted, and shown in relation to examples of music made using it, thus examining the extent to which the technology is implicated in the music. I argue that using the arbitrary contingency of technological affordances acts as a means of getting away from making decisions based on existing ideas of musicality.

Chapter 5 is based around Roc Jiménez de Cisneros' Evol project, using various examples of Evol releases, which tend to have a large element of algorithmic composition. I review the existing literature on algorithmic composition in relation to the theory developed so far, and compare this to the Evol approach. I emphasize the potential for algorithmic techniques to take the music to places that would remain otherwise undiscovered, i.e. getting away from existing notions of musicality. Algorithmic composition can be thought of in this way—as one particular method of using technological affordances to determine the music.

Chapter 6 also touches on algorithmic composition, this time in relation to Farmers Manual, specifically the album *Explorers_We*. It returns to the notion of materialist aesthetics, via ideas to do with 'glitch', comparing this to the 'splice' in materialist film. I develop a theory of noise music, drawing on theory from the previous chapters, in which noise is defined as something that does not contain meaning (and is therefore 'literal').

Finally, chapter 7 looks to some more recent Editions Mego releases: *Returnal* by Oneohtrix Point Never, and *A New Way To Pay Old Debts* by Bill Orcutt. Both appear to be in some way backwards looking, to have some special focus on the past, supported by claims to this effect in their critical reception. I explore these claims and come to the conclusion that although superficially quite different to the rest of the Mego catalogue, they in fact share similar approaches in the creative process and resulting 'noise' aesthetic.

Digital technology and the high tech aesthetic:
Seven Tons For Free and +/-

Rehberg's first solo album *Seven Tons For Free* (Mego 009, 1996) was released some
months before Ryoji Ikeda's +/- (Touch TO:30, 1996). Both are often cited retrospectively
as seminal works or archetypes in the following highly active period in computer music,
especially in marketing copy:

> *Seven Tons for Free* was quickly realised to be an experimental
> electronic classic and paved the way for the whole glitchy minimal
> scene we would see erupt from labels such as Mille Plateaux,
> Raster Noton and 12k. (Boomkat 2007)

And:

> when it was first released, +/- came like a bolt out of the white ...
> Ryoji Ikeda has progressively refined and enhanced the distinctive
> sonic fields and microsounds that have strongly influenced post-
> digital composition[3]. (Touch 2001)

As well as being contextually similar, these albums superficially share a lot aesthetically;
they focus on experimentation with digital technology, they have a similar palette of
sounds (very short pops and clicks, drones) and both result from what appears to be a
rejection of existing musical vocabularies. However a more detailed comparison of these
two albums will highlight the differences between them and reveal the distinctiveness of
the aesthetic that was being established by Mego at this time.

By 1996, Sahko was already well established, with the Mika Vainio EPs *Kvantti*
and *Röntgen* released in 1993, and the album *Metri* in 1994. This, along with Wolfgang
Voigt's work as Studio 1 in 1995, epitomize a 'minimal techno' sound comparable to *Seven
Tons For Free* and +/-. One suggestion that the material from +/- was not intended to be
played in clubs, distancing it from any techno scene, is that it received no release on vinyl.
Accordingly it has very little of what might be called 'danceable' content. This was not lost
on journalists at the time: '[+/-] opens with three tracks of jittery machine-rhythm, dropping
any pretence of danceability in favour of a more disruptive aesthetic' (Duguid 1997).

Likewise, *Seven Tons For Free* opens with six minutes of metronomically repeating
clicks at 896 beats per minute interspersed with lower frequency pops, like a mutilation of

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3   'Post-digital' is a term coined by Kim Cascone, to describe a music that embraces 'failures' of digital
    technology. (Cascone 2000)

the standard techno hi hats and kick pattern, taken to extremes of tempo and timbre and divorced from a coherent rhythmic relationship. Thus despite demonstrating a relationship to techno, both albums represent a significant shift away from any dance music function. Instead, there appears to be an interest in the extremes made possible by digital technology; single-sample impulses, near-instantaneous envelopes, the precise manipulation of waveforms, and extremes such as the +/- title track, consisting only of a sine wave at 16kHz (generally taken to be the upper limit of human hearing for the average adult).

The digital technology which facilitated the exploration of such extremes became widely available to artists who were not affiliated or associated with academic institutions at around this time—home computers or laptops became affordable and powerful enough to work with sound at the sample level, with possibilities for experimentation in digital synthesis. Algorithmic sequencing also became more of a possibility. Rehberg and Ikeda's work seems to demonstrate a desire to explore the limits of this newly available technology (or at least a desire *to be seen* to be doing this, as will be discussed below).

+/-

The opening three tracks of +/-, *Headphonics* 0/0, 0/1 and 1/1 are built around a single sine wave in what might conventionally be called rapid panning—from hard-left to hard-right of the stereo audio field. It soon becomes clear that 'hard' is the only kind of panning used throughout the work—a sound is placed in the left channel, the right channel, both channels or neither channel. This strictly speaking is not panning, it exhibits instead an approach to spatial audio that lays bare the technology used in reproducing the music. Panning can be thought of as an illusory trick. By playing the same sound from both speakers at the same time and adjusting their relative levels, it can appear to come from anywhere in the stereo field—creating the illusion of a 'panorama', a sound world occupying the space between the speakers. But contrary to the creation of an illusory uninterrupted screen of audio, if sounds are *exclusively* placed in the left channel or right channel only, then we perceive the two discrete separate sound sources that are actually there (the speakers), rather than a stereo field. It thus appears that the music is not intended to represent something above and beyond its own sound, it simply results from material processes that are foregrounded, and illusion or representation are avoided. Of course, the same technique can function in different ways in different pieces, it is not the case that panning is always an idealist technique, compared to a materialist shunning of spatialization. But in this instance, in combination with the structure and the sounds used, it

can be argued that it emphasizes the literal aspect of the piece (the sound making equipment).

In what we could refer to as a 'digital aesthetic', one of the most fundamental characteristics, implied by the term, is that things are either on or off, binary, discrete, rather than based on continuous change. But this is of course also possible with analogue technology, and we should therefore question whether this is actually an innate characteristic of digital technology, or just something that is associated with it on a symbolic level.

Ikeda's earlier work, although not released until after +/-, as *1000 fragments* (CCI Recordings CCD23001, 1995), includes a track titled *This Is A Recording* featuring the words 'left' and 'right' spoken, placed in their respective channels followed by another voice stating 'this is a recording'. We could call this a proto-materialist approach, the idea being that the work documents itself, that the production is revealed, laid bare. Peter Gidal takes issue with this approach in relation to materialist film: 'the point here is that not every procedure should be "there" on film, exposed or explained, as that is merely another level of documentation, "seeing what is 'really' taking place"' (Gidal 1989). This kind of 'pseudo-documentary' is ultimately *more* illusionist than a work of straightforward representation, because its representational nature is obscured by an apparent exposition of its representational nature. In attempting adequate documentation, it is ironically more effectively illusionistic than the normative use of basic illusionistic techniques.

The work-as-documentation line of thought was followed in materialist film, and apparently in the work of Ikeda, by the realization that the work does not need to be a faithful representation of reality (in this case the reality of its own production), because the process of representation is itself already real, and can be made the focus of attention. So the proto-materialism of *This Is A Recording* is refined in +/- where ideas to do with transparency (the work documenting its own creation) are replaced with a more subtle fidelity to the technology, allowing traces of process to be foregrounded. Where such processes concern digital technology, we have a convenient definition of a materialist 'digital aesthetic'.

This idea of a digital aesthetic is in fact central to the rhetoric surrounding such releases as +/-. Ikeda is often described in biographies and press releases as a pioneer (see (Forma 2011), or (Ikeda 2011)), with +/- cited as the starting point of his pioneering activities. Since then, he has continued to maintain an impression of being on the cutting edge of digital technology, pushing it to its limits. The 'Dataplex' CD (Raster-Noton R-

N068, 2005) has a sticker on the front stating: 'This CD contains specific waveform data that performs a data-read test for optical drives. The last track will cause some CD players to experience playback errors'. And similarly on 'Test Pattern' (Raster-Noton R-N093, 2008): 'Caution! This CD contains specific waveform, impulse and burst data that perform a response test for loudspeakers and headphones. High volume listening of the last track may cause damage to equipment and eardrums'. The hyperbolic nature of these statements beg the question: to what extent is the adoption of this digital experimentation merely rhetorical, designed to sell records? We will see below that there are indeed aspects of +/- that undermine my previous claim that it might represent a materialist approach.
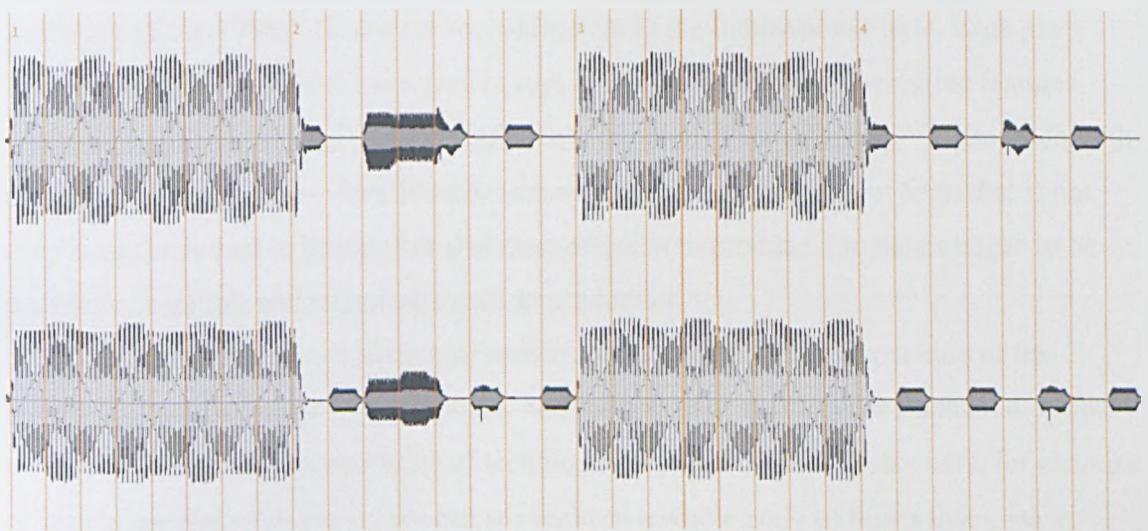
Figure 1:   *Headphonics 0/0* detail (+/-, Ryoji Ikeda)

A typical example of the mechanical rigidity of the sequencing in +/- is shown in figure 1. The piece proceeds with a 4/4 structure around which various elements are placed as if with perfect quantization: a 1kHz sine wave alternately in the left and right channels on each 1/32 measure, a 50Hz pulse lasting exactly a 1/4 measure on each down beat, and a 13kHz tone and clicks on 1/8 measures. In the precision of the realization of these rhythms, the implication is that this is a technological music; quantization is something only a machine can do with this accuracy. In listening the sound immediately brings to mind high-tech machinery, in its inhuman precise repetition. Could we consider this a machine aesthetic?

Machine Aesthetics

In retrospective writing surrounding the modernist machine aesthetic (Banham 1980), the

starting point tends to be Louis Sullivan's phrase 'form follows function', implying not so much that form is subservient to function, but that consideration of function results in the best formal properties. Beauty derives from efficiently functional forms. Taking nature as the archetype for beauty he uses various analogies to make his point—'the sweeping eagle in his flight or the open apple blossom, the toiling work horse, the blithe swan, the branching oak, the winding stream at its base, the drifting clouds, over all the coursing sun, form ever follows function, and this is the law' (Sullivan & Twombly 1988).

This principle had various consequences for modern architecture. The most notable aspect was a drive towards 'efficiency' of form. Ornamentation was seen as the antithesis of good design, anathema to technological modernity (see for example Adolf Loos' *Ornament and crime* (Loos 1998)). Hence we see, ultimately in the International style, large plain elementary shapes combined in a way to suggest a minimization of decorative features, emphasizing the basic form of their composition instead. This 'efficiency' is also to do with efficiency of *production*—functionalism extends to the consideration of form that is not only most functional in its use, but also most efficient to produce. Emphasis began to be put on the materials and techniques used in production.

In Auguste Choisy's *History of architecture*, we find a clear exposition of the mantra 'truth to materials' in architecture, and the approach that Reyner Banham describes as 'form as the logical consequence of technique' (Banham 1980). Choisy says, for example of iron in the *Halles de Paris*: 'we can see realized a whole body of forms that arise naturally from the material employed'. And on modular proportions he states 'we have observed that they result, as an inevitable consequence, from the use of brick' (Banham 1980). Even in gothic architecture, Choisy sees the style not primarily as an aesthetic development, but as a consequence of the development of buttresses, ridged vaults and their exposed rib-work, and so on. He was interested in the concept of the architect-as-engineer, an architect concerned with the material reality of construction. According to Banham, this was in contrast to the prevailing Beaux Arts concept: 'design first, structure afterwards'—the architect working in abstract forms that are to be realized later.

This 'truth to materials' approach is appealing and perhaps applicable in all art forms (it is relevant to all types of 'making'). We can also find it prior to Choisy in the writing of John Ruskin—his second 'lamp' of architecture (Ruskin 2009), where it is generally taken to be an inspiration for the arts and crafts movement. Later, the Russian constructivists used the word *faktura* to describe the idea that an art object should, in its own materiality, exhibit its means of production; there should be no attempt to hide the

properties of the materials that were used to make it (incidentally *faktura* has already been linked to electronic music, see (Battier 2003)). The Bauhaus also took the idea, and, like the constructivists divorced it from the associated distrust of industrialization and mechanical technology found in the English arts and crafts. But despite their interest in mass production and modern technology, the focus in the Bauhaus is still very much on craftsmanship; the artist as someone whose skill is based in the reality of making, understanding the material and working with it in a way that is suitable to its affordances and limitations. The point at which modern technology is combined with the idea of a fidelity to materials is where we begin to see the 'machine aesthetic' emerge.

There is a subtle mutation of the motivation, from a desire to create functional (and therefore beautiful) forms based on an understanding of the material employed, to a desire to make a statement *about* functional form. The important thing is that objects *look* as though they are prioritizing function. This is perhaps politically motivated. In the Deutscher Werkbund, and later in the Bauhaus, we begin to see the idea of aesthetic standardization as a virtue (Banham 1980). Forms that were efficient in a way that made them suitable for mass production (in architecture, but also particularly in furniture design) were seen as democratizing aesthetics, making aesthetic objects available to everyone where previously they were the domain of an elite.

Regardless of its motivation, the elevation of efficiency of 'function', which finds its apotheosis in engineering, means that what begins in the arguments of Ruskin and then Sullivan as a romanticization of nature easily becomes a romanticization of technology. We start to see this in Choisy's theory, and then realized in the Bauhaus. There is a fascination with the look of technological, machine produced forms; it becomes an aesthetic consideration. So although it appears that form is following function, the impetus for a technological aesthetic often actually results in a form *less* functional. For instance, Rietveld's chairs are an economy of form, straight lines without decoration, simple materials etc. The form appears to be entirely functional, and yet it is somehow (arguably) less comfortable to sit on than it should be—its primary function. The machine aesthetic involves a much more complex relationship between function and form, in which technological style is preferred over technological functionality.

Rather than bringing technology and aesthetics together then, the machine aesthetic separates them, with a technological look or feel abstracted away from any actual instrumentality or function. Technology is understood in a rationalist way as a means to an end, but since the focus now is on the technology, the 'means' is abstracted from its 'end'

and therefore becomes an end in itself, becoming once again non-instrumental, bringing the non-rational back into the equation. We have the paradox of a non-instrumental instrumentality. This is what R. L. Rutsky calls the myth of functional form (Rutsky 1999), it is a paradox. The apparent inescapability of this situation became clear in the split between productivism and constructivism in the 1920s. The productivists found the only solution to it was a retreat from art, to work instead in design, textiles, ceramics, furniture, propaganda etc. The constructivists, however, worked with the paradox in what rightly can be called a machine *aesthetic*, embracing the myth of functional form.

High Tech

Rutsky traces the development of the machine aesthetic into the more extreme 'high tech' aesthetic with the advent of electronic and especially digital technology. In the high tech aesthetic, technology is fetishized to such a degree that the reproduction of its style becomes entirely the point, function is almost an aside. As the physical appearance of technology tends towards the invisible, we're left only with images, data. But, as we began to see in the machine aesthetic, the interest remains rooted in *signifiers of the technology*, not the technology itself. We could say that Ikeda's work actually epitomizes this high tech aesthetic rather than the materialist aesthetic it first appeared to, through a combination of the precisely ordered nature of the sequencing and the sound materials chosen. It has a glossy veneer and a feeling of science fiction—this is, in reality, not necessarily what digital technology sounds like (unaltered, uninterpreted), but it's what we *expect* digital technology, or more specifically, 'data', to sound like. It is simulacral, a representation of digital technology. Digital glitches can be intentionally added (for example at the beginning of the track +.) to achieve this signification of new-ness, in the same way that a film director might intentionally add a certain kind of grainyness to the image to signify old-ness.

Thierry Chaput describes the 'aesthetic of the microchip' as an aesthetic of complexity. Its underlying logic has become too complex for any one person to understand in its entirety, giving it a 'secret aesthetic' of its own (Chaput 1988). We are left in awe of this complexity, and can only engage with it at a higher level of abstraction. This is a hallmark of the high tech style—a sleek minimalist exterior which acts as a signifier for a hugely complex interior. +/- is minimal on certain levels, but in signifying the flow of data it evokes a sense of overwhelming complexity, a technological sublime. What does the data represent? The implication in its presentation is that it doesn't matter: freed from its

instrumental bonds it becomes the object of pure aesthetics instead. But of course the data is in fact composed only for the record itself. So it attempts to evoke something like 'the secret aesthetic' of the microchip, while in fact being a work of straight-forward composition. It uses one set of technologies (sequencer or sampler or audio editor etc.) to make something that attempts to evoke a different set of, possibly science fictional, technologies (networks and flowing data etc., as if they had a sound).

This relates to another 20th century precedent: the futurist fascination and fetishization of technology. Russolo's *Art of Noises*, as with most futurist work appears to be inspired by a fascination with the modern city: 'we find far more enjoyment in the combination of the noises of trams, backfiring motors, carriages and bawling crowds than in rehearsing, for example, the *Eroica* or the *Pastoral*. He states that 'although it is characteristic of noise to recall us brutally to real life, the art of noise must not limit itself to imitative reproduction' (Russolo 1987). Yet despite this, the programme for Russolo and Marinetti's first concert consisted of pieces titled: *Awakening of Capital*, *Meeting of cars and aeroplanes*, *Dining on the terrace of the Casino* and *Skirmish in the oasis*. All clearly pointed towards a narrative depiction involving signifiers of modernity. The 'intonarumori' are used to mimic the sounds of the city, the sounds of war and so on. In this obsession with the modern world developing around them, there is a utopianism and faith in technological progress. Yet rather than actually participating in this technological progress and making use of modern technology for its own sake in music, they used it merely in a representational aesthetic, to *depict* the idea of technological progress.

Following on from a traditional aesthetics concerned with wholeness and unity, the first machine aesthetic was, according to Rutsky, an attempt to aestheticize society as a whole, using the 'aura' of art. As already mentioned, politically, an industrial or mass produced style was associated with democratization. The idea was to change society not through the content of art, but by changing the way it functions. In the Bauhaus it was thought that returning to an emphasis on craftsmanship would remove the boundaries between high and low art, which embody a class division. But as discussed, as soon as this becomes a machine *aesthetic*, content once again becomes the focus—it is less important if an artifact does or does not achieve a particular function, and more important that it looks as though it does.

In a high tech aesthetic, Rutsky states that we see a return to an even more obvious emphasis on content. +/- is more a work *about* technology, than it is a work *of* technology. This statement requires some justification, since clearly +/- in every aspect of its

production could not have been created without digital technologies (including CD pressing and so on). However, its content is compositional, gestural, and 'science-fictional' to such a degree that it functions on a representational rather than material level. In the process the modernist politics of a machine aesthetic are turned upside down—replaced by a technological *style* which is associated with expensive gadgets and exclusivity instead.

The influence of technology in aesthetics is an opportunity to yield to the fragmentation and contingency of the material world, but there remains a temptation to maintain an idealist aesthetic, particularly in music. As Ikeda himself concedes: 'the form, style and way of representation will be endlessly transformed by technological trends ... but I am more interested in thinking about what will not change—I naively believe that the essentials of music will never change'. This thing that never changes, universal and immutable behind the material of the music itself, is for Ikeda 'the deepest aesthetics between math and art' (Eubank 2008). Rhetoric steeped in idealism tends to conceal or distract from the material and symbolic relations the work is actually engaged in, in this case what Rutsky refers to as the fetishization of late capitalist technologies.

Commodity fetishism, in Marx's terms, involves the reification of the values an object represents. Values, instead of being seen as something that people have in relation to an object, are seen as inherent in the object. This means use-value is detached from exchange-value. In the case of high tech we can see this very clearly. In high tech design, something auxiliary—the style of technological (functional) items—is the object of fascination. Style is abstracted. Certain values are associated with objects that have this style: they are exclusive status symbols, the domain of an elite, a privileged few on the 'cutting edge'. Rutsky sees this as the avant-garde replaced by a corporate vanguardism, comparing the idea of a 'cutting edge' or 'state of the art' with imperial 'pioneering' or 'trailblazing'. A utopian view of technology tends to conceal these circumstances (cf. Coyne's 'technoromanticism' (Coyne 2001)).

Through a kind of mathematical idealism in particular, a utopian view of technology is constructed. As Rutsky puts it: 'the mathematical and formal aspects of science and technology are seen as reflecting an eternal perfection and harmony'. Technology in its ability to allow the precise ordering of materials is approached as an enabling medium; enabling the expression of pure form. The technology mediates between the sensible world and an ideal world, allowing some kind of transcendence. This spiritual aspect is something we also see in the modern architecture discussed previously. Apparently at odds with the implications of a machine aesthetic, Hermann Muthesius

(founder of the Werkbund) claimed that 'far higher than the material is the spiritual; far higher than function, material and technique, stands Form' (quoted in Banham 1980).

So there are various potentially contradictory rhetorics at play, throughout thought on machine aesthetics. The adoption of a machine aesthetic or a high tech aesthetic exhibits a fascination with technology, initially implying a materialist approach, in which the materials and processes of production are the focus. However this is undermined first by the realization that it is not so much a fascination with technology but a fascination with the aesthetics of technology, and second by a confusion in which it is claimed technological advances are being used to get closer to pure abstract expression ('what will not change' in music, or 'the spiritual' that is far higher than 'the material'). Perhaps this means the adoption of signifiers of technology is accidental, the intention is in fact to *transcend* material limitations (to use technology to transcend technology!) When technology is seen as an enabling medium in this way, the ideal technology, the technology we are striving for is in a manner of speaking invisible, in that it should have no effect on the idea being communicated through abstract form.

If we look at +/- in light of Ikeda's comments on the universality of music/math/art, there seems to be an obsession with purity and unity; also particularly conspicuous in his recent work reminiscent of Speer's Cathedral of Light ('Spectra' at 'Nuit Blanche' in Paris, 2008). This feeling of purity is perhaps 'the deepest aesthetics between math and art', approached via a certain type of minimalism. A very limited set of sounds and compositional strategies are taken, to create an incredibly unified work.

The rigorously ordered minimalism in +/- could be seen as the result of approaching composition in a rationalist way. Ikeda reduces sound to the smallest possible elements, followed by a strict ordering. If the basic tenet of the machine aesthetic was to approach art as an engineer, in Ikeda's high tech aesthetic, audio composition is approached as something like a programmer (this re-emphasizes its simulacral status—it is constituted by a *representation* of technology, *signifying* function. It has nothing much to do with software engineering per se). This kind of reification of rationalism in high tech can be thought of as, in Rutsky's words, 'an extension of modernity's tendency to technologize or instrumentalize the world, to abstract and reduce it into ever more minimal, more controllable forms' (Rutsky 1999). Minimalism in this sense is a strategy to assert control and bring order from the arbitrary and chaotic material world, or in this case from the complex world of data which is otherwise beyond understanding.

The structure of the album shows a definite and rigorous imposition of order onto

sound materials exemplifying an additive approach, with the step by step addition and layering of new parts. This is what is generally understood by the term composition (dictionary definition: 'the act of combining parts to make a whole'; i.e. the arrangement of different elements in relation to each other)—a *human* imposition of form onto materials. 'My job as an artist is to compose elements. Composition is the key. So any elements, which are brushed up carefully, are the subjects to be composed. I compose sounds. I compose visuals. I compose materials.' (Eubank 2008)

Perhaps due to this emphasis on composition, despite its technological feel and mathematical rhetoric, +/- actually depends heavily on compositional clichés, largely from pop/rock/blues or house/techno structures: a multiple of 4 counts of a repetitive phrase, after which a bass part is introduced followed by various rhythmic elements, forming a kind of counterpoint to the initial phrase and so on. Not only the macro arrangement of these sounds, but also the gestural nature of the phrasing attests to their composedness—like the bursts of white noise mimicking hi hat patterns in *headphonics 0/1*, or the kick drum patterns in +.. To summarize so far,

1. on the surface '+/-' appears to be a work exploring digital technology, or is at least the result of a fetishism and fascination with signifiers of that technology and specifically its 'soulless' nature. But,

2. the idealism of the mathematical rhetoric supporting the work begins to undermine this, pointing instead to an understanding of technology as merely enabling the communication of an ideal, eternal, universal aesthetic wholeness or unity. And moreover,

3. the composed and often gestural nature of the work reasserts a kind of patriarchal, rationalist control and domination of technology, of human will over the contingency of the object world.

Engagement with the technology is paradoxically avoided, despite its evocation of technological style. It is in fact used merely as a tool, to do something that is seen as non-technological—to access the universal essentials of music. With the approach to panning (or lack of panning) mentioned at the start of this chapter, it seems fair to say that this is very much a foregrounding of an actual arbitrary material aspect of the work, but with respect to the sound materials and structure of the album, it is more accurate to say that it employs depiction or representation: a depiction or representation of digital technology.

Although nothing much to do with the actual material of digital technology, it is a caricature of what we expect something digital to sound like. It is hard to say where such expectations come from, but there is certainly a relationship to science fiction (compare the style of *The Matrix* (2009) to Ikeda's recent work in the *Datamatics* series (2006-2011)). Hence the claim that it actually functions on a symbolic level, rather than the material level suggested initially.

Buckminster Fuller attacked the international style on the grounds that the plain facade often hides brickwork or other materials. So in attempting to remove ornate facades, the resulting 'quasi-simplicity' is still decoration, merely a different kind of decoration. The technological or functional style remains a facade, rather than a stripping of ornamentation it becomes itself ornamental; nothing has really changed. He also complained of the illusionism of 'hidden steel frames' supporting motif walls. In general, he claimed there was a lack of engagement with technological progress in what we might call a machine aesthetic:

> The Bauhaus and International used standard plumbing fixtures and
> only ventured so far as to persuade the manufacturers to modify the
> surface of the valve handles and spigots, and the colour, size, and
> arrangements of the tiles. The International Bauhaus never went
> back of the wall-surface to look at the plumbing ... they never
> enquired into the overall problem of sanitary fittings themselves ...
> In short they only looked at problems of modifications of the
> surface of end-products, which end-products were inherently sub-
> functions of a technically obsolete world. (Banham 1980)

'+/-' uses the existing techniques and language of music but adopts a facade based on signifiers of digital technology. This will be contrasted in the next section with an approach in music that does 'go behind the wall-surface to look at the plumbing' and engages in technological enquiry that does not take the fundamentals of musical production as a given.

Rutsky contends that the modernist attempt to technologize aesthetics amounted to a disavowal of the 'spirit' or 'soul' of traditional aesthetics—Benjamin's concept of the 'aura' of art (Benjamin 1968). Something inherently 'living' in art succumbs to the dead, inorganic and inhuman realm of technology. Modernism can be seen on the one hand as this drive to remove the aura of art *using* technology, the 'technologization of aesthetics' (Benjamin 2008), or alternatively as an attempt to bring the aura of art and aesthetics *to* technology, the 'aestheticization of technology'. My claim is that the +/- high tech aesthetic

embodies this worldview that, in attempting to bring technology and aesthetics together somehow, ensures their separation by defining each negatively in terms of the other: the aesthetic realm, it is implied, is not reducible to the material or mechanical, and likewise technology and science has no place for the spiritual or non-material; in this view the two arbitrary, constructed categories must instead be forced together.

In seeing technology as something 'other', this represents a pervasive awe/fear of technology. A machine brought to life through the spirit of art or through its own reproductive logic, i.e. something material that has moved beyond human control and domination, is inevitably seen as a dystopian monstrosity. In a discussion on algorithmic composition, Nierhaus quotes Garry Kasparov regarding his match against the IBM computer Deep Blue: 'to some extent, this match is a defense of the whole human race. Computers play such a huge role in society. They are everywhere. But there is a frontier that they must not cross. They must not cross into the area of human creativity. It would threaten the existence of human control in such areas as art, literature and music' (Nierhaus 2008). There is a clear threat to the subject posed by an uncanny technological other. It can only be suppressed through its instrumental use as merely the means to an end, rather than existing as an end in itself.

For Rutsky, 'high technē' contains the possibility of a fundamental ontological shift, it moves beyond the utopian/dystopian positioning of technology and begins to replace the hardened Cartesian subject with a more fluid dissolving the boundaries of the self (in accord with Harroway's cyborg manifesto (Harroway 2000)). But in doing so he dismisses the simulacral nature of the aesthetic and its elitist ideological underpinning. As we can see in '+/-', it actually represents the continuation of some very traditional beliefs about our relationship to technology and its utopian/dystopian nature. Namely, its elevation to a romanticized exotic other (the 'technological sublime'), swiftly followed by its subordination to a rationalist technique of control.

Seven Tons For Free

Structurally, *Seven Tons For Free* alternates between two types of track. *I*, *II* and *III* are interspersed with *~-*, *Boiler*, *Fehler* (translating as 'Error') and *Seven Tons Revised*. Most of the transitions between tracks are sudden, timplying that they are arbitrarily selected fragments of a continuous output. Particularly in the untitled pieces, there is barely any development throughout each track, and certainly no narrative trajectory leading to tension or climax. The opening track 'I' simply repeats

a pattern of roughly one second 57 times, with a quick fade from and to silence at the beginning and end. As with all the untitled tracks its sound materials consist of high frequency clicks, very high frequency drones (inharmonic, akin to aliasing), and lower frequency pops.

The pattern repeated in *II* is more complex, and varies slightly with each repetition, in a manner that gives the sense of a generative process rather than manually composed development. The pops this time coincide with a change in the 'aliasing' sound, it disappears momentarily (like a compressor sidechain 'ducking' effect) then finds a new resonance before returning to its original frequency. Likewise the clicks are affected by increased activity in the other 'parts'. The sounds appear to be tightly integrated into a system, it is problematic to consider them separate elements merely composed by addition.

Literalism

Donald Judd wrote about composition in artwork, being interested in pieces that do not attempt to create meaning *within* the work, but are simply to do with the presence of the work. He claimed that any work that is made by addition, 'composed', was concerned with this kind of prescribed meaning. The relationships between parts is where 'meaning' is created, in the sense of what he calls anthropomorphism: 'A beam thrusts; a piece of iron follows a gesture; together they form a naturalistic and anthropomorphic image' (Fried 2002). This description is resonant with the situation in some music theory; in electro-acoustic music for example, the concept of gesture is commonly referred to. As mentioned in the introduction, part of the motivation my research comes from the feeling that this is an entirely inappropriate way to understand or talk about computer music like *Seven Tons For Free*, a different way of thinking about music is required.

In opposition to the creation of an 'anthropomorphic image', Judd focussed on the literal aspect of painting and sculpture, pointing out for example that the rectangle of a painting is a shape itself. In various previous and contemporary painting he saw the beginning of an emphasis of this shape. In the work of Pollock, Rothko, Still, Newman, Reinhardt and Noland, he says 'the elements inside the rectangle are broad and simple and correspond closely to the rectangle' (Judd 2002). The plane of the shape is also emphasized with such broad elements: 'two colors on the same surface almost always lie on different depths'. This is working towards an art that is literal, one that does not attempt to depict something other than itself.

Avoiding composition focusses the work on the presence of the object itself and its context, its effect on the people encountering it. Judd states that 'the big problem is that anything that is not absolutely plain begins to have parts in some way' (Fried 2002). So it is precisely because of this desire to avoid composition that the work ends up being minimal; not a stripping down to reveal some kind of essence or purity. The point is not minimalism as such, but minimalism is required for these other criteria which are to do with literalism, hence the aversion of most of these artists (Judd, Morris, Stella) to the term minimalist.

It was in Michael Fried's essay *Art and Objecthood* in 1967 that this kind of art was first described as 'literalist', as a criticism and response to Judd's and Robert Morris' writing on their own work (Fried 2002). The theory he formulated in order to do this provides a clear and comprehensive description of an anti-representational approach to art in general. Literalism is actually a much more appropriate term than minimalism to describe what these artists were doing; the term 'specific objects' (coined by Judd in 1965) suggests essentially the same idea. Fried describes a split between the 'literal' and the 'depicted', or literal shape and depicted shape, where the literal is the shape of what he calls the support, the canvas a painting is painted on and the paint itself, and the depicted is whatever it's a picture *of*. But they cannot be separated this neatly because of course the depicted always relies on or is always constituted by the literal, the depiction wouldn't exist otherwise. And in this way the literal has primacy. Depiction relies on some kind of illusionism— portraying depth that does not exist in the flatness of the support for instance. The depicted is therefore crucially not real, not material, it's an illusion of something beyond or within the literal.

To clarify, this is not the same thing as the difference between abstract and non-abstract approaches to art, because an abstract painting can still be considered a depiction, it just happens to be a depiction of something abstract. It can still have a sense of depth for example, so illusionism remains involved. If a painting is 'expressionist' then it most certainly is a depiction: of an abstract form which is thought to somehow express an idea or a feeling. And vice versa, a realist or some other kind of non-abstract painting still has literal elements to it, like the way it is framed, or the relief of the paint. 'Depiction as a mode seems primitive because it involves implicitly asserting forms as being prior to substances' (Morris 2002).

Artists described as 'literalist' were striving towards an ideal where nothing is depicted at all, focussing on the physical, material thing itself. Judd's plain cuboids are presented on a wall like paintings, but take the leap into three dimensions so that any

perceived depth is actual depth, not an illusion of depth. Stella's various aluminium and copper stripe pieces put the properties of the material on show as central to the work. Morris' steel sculptures are closer to (functionless) architecture than representational sculpture. These pieces may still have symbolic associations but they are *emphasizing* the literal over the depicted, and asserting its primacy, by not accepting depiction as the underlying impetus to make art.

Judd's main concern was the idea of credibility; acknowledging literal reality rather than treating art as an escape or idealization, which is how the 'high modernists' at the time saw it—such as Fried and his precursor Clement Greenberg (Fried 2002). They resisted this movement away from abstract expressionism towards what Greenberg called 'non-art', in a way that highlights the fundamental philosophical split between materialism and idealism. Their position was that (true, modernist) art must suspend it's 'objecthood', such that the *object itself* is not perceived, and instead provides a transcendent experience—the literal becomes invisible and only the depicted is experienced. The 'condition of non-art' then, is one in which the literal object is perceived and fully present—the condition of any object other than 'art'. Emphasizing either the literal or the depicted are two fundamentally different ways of approaching aesthetics. Literalism can be characterized as a materialist approach, and depiction as being concerned with transcending the material world to a realm of *ideai*.

Judd's criticism of the idealism of depiction leads to a solution based on plainness and lack of component parts. But this is not without its problems: 'it is not hard to see a wider idealism governing much of this process of reduction' (Harrison & Wood 2002). He was trying to create a unity and wholeness in his specific objects. However, 'in the hands of Morris and others ... a materialism focused on the processing of mute stuff ... turned towards making: a concern with processes of manipulation of materials, rather than their constitution into some object'. A focus on process turned out to be a more effective technique for the foregrounding of materiality than contriving the unity of an object.

There is understandably a deeply entrenched idea of music as a composed structure, structure as the composition and ordering of different elements in time, which can be contrasted to the approach in *Seven Tons For Free* where structure appears to be a duration in which a mostly automated process is allowed to take its course. As with literalist art, the important aspect of this is not the achievement of some kind of unity (or purity or essence), but simply managing to avoid a compositional approach, and the repetition of existing accepted signifiers. Music that is a result of this approach, almost by definition, relies on

familiarity and cliché.

Music that does not rely on ordering events in time is, with unfortunate recourse to metaphor based on the layout of a score or arrangement in a sequencer, sometimes referred to as 'vertical' composition (Kramer 1988). However, the implication here is clearly that the piece is still composed, an arrangement of various elements, but in a vertical domain (frequency, timbre) rather than in time. Composition of both the horizontal and vertical kind, can be avoided in computer music by focusing on a process, making its experience closer to Kramer's 'moment time'. Algorithmic or repetitive music is a way of avoiding human-centric imposition of form (the 'human condition' and its expression as natural, universal); analogous to the materialist film concept of a 'machined-stare' replacing the usual cinematic gaze, for example placing the camera not at the conventional human height.

Importantly this is <u>not</u> the same as attempts to remove the composer or the self from the work, or to remove human decision making or agency. The composer (for want of a better word) still makes all decisions regarding choices of process and sound materials, what the end result will sound like, censorship of undesirable output and so on. The emphasis on process rather than composition just shifts the work away from ideas to do with the expression or communication of pre-conceived ideas or feelings thought to be absolute, to a more open, *specific*, and material appreciation based in reality of the sound reproduction instead. It creates an arbitrary technological separation such that the decision making involved is one step removed from the result, potentially taking the music in a direction (away from the human-centric) which would have remained undiscovered if a more direct channeling of the composer's will was possible.

Note that algorithmic techniques are not the only way to achieve this. An un-edited sound recording for instance works in the same way, with the recordist fully in control of where and what to record, but making the decision to avoid composition (to re-iterate: the arranging of different parts within the piece) by presenting the recording as a single entity. Of course, there are likely to be different parts to the single recording, but again, these are not composed, it is the multiple output of a single process—the process of a sound recording, presented as such—presented *as a sound recording*, not a composition created from sound recordings. See for example Russell Haswell's *Wild Tracks* (Mego 099, 2009).

Joanna Demers relates field recordings to literalism, claiming that the work of recordists such as Toshiya Tsunoda and Francisco López is closer to the category of sound art than it is to music (Demers 2009). Commentators on sound-art such as Alan Licht and

Brandon LaBelle are concerned with defining sound art as a category, and in particular determining what separates it from music (Licht 2007), (LaBelle 2006). Their conclusions are generally that sound art is site specific in some sense and is therefore immersive, whereas music is narrative, the work is self-contained, and therefore not site specific.

Music can be thought of in precisely this way, as an abstract narrative structure (narrative in a very broad sense of the word); and sound-art could be considered its antithesis, in that it does away with the communicative aspect of sound as a means of presenting temporal structures. If we were to use these definitions, then the central point of this thesis would be that the music of Mego is not in fact music at all, and it quite specifically represents an attempt to retreat from the concept of music. But I do not consider this a useful distinction; works that do not fit this definition of music are still in most cases considered music. There are plenty of other precedents for non-narrative musics, for instance Simon Reynolds describes the difference between rock and rave: 'rave music represents a fundamental break with rock, or at least the dominant English Lit and socialist realist paradigms of rock criticism, which focuses on songs and storytelling. Where rock relates an experience (autobiographical or imaginary), rave constructs an experience' (Reynolds 1999).

It is in the absence of narrative elements that works are left more open—creating an experience rather than relating an experience. In the absence of content, context is more important, the material reality in which the work is situated. Site-specificity in its broadest sense can refer to this totally contextual and specific aspect of a work, opposed to the idea of a work as universal, contained for example in a recording or in a score. Demers draws on this to argue that certain types of field recording works, even when presented as a CD release, are site-specific. It is a type of work 'whereby materials refuse to be encased within a frame and instead confront the observer as integral objects' (Demers 2009).

This happens when sounds manage to become 'autonomous objects free of residual associations'. Although the sound in a field recording clearly has a direct physical cause, the idea in some cases is for the listener to hear the sound as pure sound, divorced from its source. Demers' evidence that this is in fact what artists such as Tsunoda and López are striving for is convincing. Tsunoda:

> I do not intend to recreate the atmosphere of a location; and I am
> not interested in recording special situations of historical incidents
> … I do not record for the sake of making music or simply
> discovering interesting acoustics. I am also not interested in

analysing these sounds scientifically. (Demers 2009)

And López:

> There can only be a documentary or communicative reason to keep
> the cause-object relationship in the work with soundscapes, never
> an artistic/musical one. Actually, I am convinced that the more this
> relationship is kept, the less musical the work will be (which is
> rooted in my belief that the idea of absolute music and that of objet
> sonore are among the most relevant and revolutionary in the history
> of music). (Demers 2009)

Following López' comments, the temptation at this point is to equate literalism in music with absolute music, completely free from symbolic association: 'an ideal of 'pure' music independent of words, drama or representational meaning ... objective structure without expressive content' (Grove & Sadie 1988); or the Schaefferian ideal of reduced listening, in which sound is perceived as entirely abstract (abstracted from its source) (Schaeffer 1966). Demers in fact argues for an affinity between literalism and reduced listening. However quite the opposite is true—in literalist art (and in music such as Seven Tons For Free) the point, as Fried rightly claims, is precisely that the perceiver is not subjected to transcendence into abstraction. Demers herself points out that 'minimalist works ... assailed the boundaries separating the art work from the world around it', contradicted later by her statement that 'objecthood [calls] on the observer to accept materials uncritically, to reflect only on their role within the art work rather than the world at large' (Demers 2009). This latter statement is applicable to reduced listening, and is a familiar criticism of it, but it does not extend to the concept of literalism.

Schaeffer's idea of acousmatic listening could be said to be the result of a fascination with radio and recording technology, when such technology was new and held some mystery. The idea is that radio or tape acts like the Pythagorean curtain, hiding the source of the sound. But it ultimately disregards the fact that the playback equipment is itself now the source of the sound. In general, when someone listens to a radio or tape they are quite aware that the radio or tape machine is the sound producing entity.

Schaeffer was influenced by Husserl in describing *objets sonores* as the result of object-directed intentionality, hence he can claim contrary to the above that 'the sonorous object is not the magnetic tape' (Schaeffer 1966). He claims that this approximates a 'phenomenological reduction' in that it allows the phenomena of objects determined subjectively to be separated from their noumenal source. However this is surely a

misconception of phenomenology; the idea of phenomenological reduction is the bracketing out of noumenal concerns *in philosophy*. It does not imply that we can bracket out certain phenomena such as memory, to leave a purely experiential mode of listening (hearing a sound without associating it with its known, or imagined, source). Memory, and therefore cultural associations and so on, are inextricable parts of phenomenological experience. 'Reduced listening perpetuates the fallacy that there is one universal listening experience untouched by culture' (Demers 2009). It implies that there is a base mode of listening that we can reduce down to.

Confirming these theoretical points, the experience of listening to *Seven Tons For Free* is indeed quite different to the 'pure listening' that Schaeffer describes. Following his statement that 'we seek to devote ourselves entirely and exclusively to listening, to discover the instinctive paths that lead from the purely "sonorous" to the purely "musical"', musique concrète indeed took this direction, utilizing forms amenable to object determination and therefore traditional composition—events can be ordered in time, phrased, they can approximate gestures. The enjoyment of such music supposedly lies in the appreciation of abstract formal patterns. But the material in *Seven Tons For Free* is not generally arranged such that it can be heard this way. Rather, I claim, it utilizes a kind of boredom or anxiety that makes the listener very aware of the materiality of the sound, of its existence as a recording.

Fried's contention was that literalism fails because it shifts the experience external to the work, and doesn't provide the transcendent experience he considered necessary for art. According to his theory, art should suspend its objecthood—the perception of the object itself rather than the thing it is depicting. Literalism of course does precisely the opposite and projects its objecthood. A lot of music is like the former in its suspension of objecthood or materiality, based on the idea that the essence of music is some kind of meaning or expression *behind* the music, or contained *within* it. The experimental computer music that is the subject of this thesis has more in common with literalist art as Fried describes it, because it does not attempt to suspend its materiality. Music often described as 'glitch' or 'post-digital' is better explained as an extension of this literalism. The sounds and structures the technology suggests are put at the front of the work, rather than using the technology to try to express something immaterial.

Seven Tons For Free again

The final untitled track *III* has a sparser, much slower pattern. The intricacies of the

relationships between various elements of the system are more distinct. A click coincides with distortion in the aliasing sound, and there follows some activity in the lower frequencies corresponding to a drop in activity in a repeating high frequency metronome, and a drone in the left channel distorting and almost disappearing altogether before the next lower frequency pop. As in +/-, there is no conventional panning here, but neither are the left and right channel treated as separate. They are clearly related, each receiving output from different parts of the same process, responding to the problem posed by stereo in an unconventional way.

Returning to the opening track *I*, figure 2 shows one iteration of the repeating pattern. When compared to the track from +/- in figure 1, it becomes apparent there are rhythmic structures more resistant to reductive analysis. A metronomic high frequency pulse repeats 15 times before the pattern begins again. A similar pulse repeats at a slower rate, out of phase (labelled 'a'). The lower frequency pops (labelled 'b') occur twice in time with the main pulses, and once out of time. At the points marked '/' the audio is discontinuous and timings of certain elements are presumably interrupted. There is no common measure between these events.
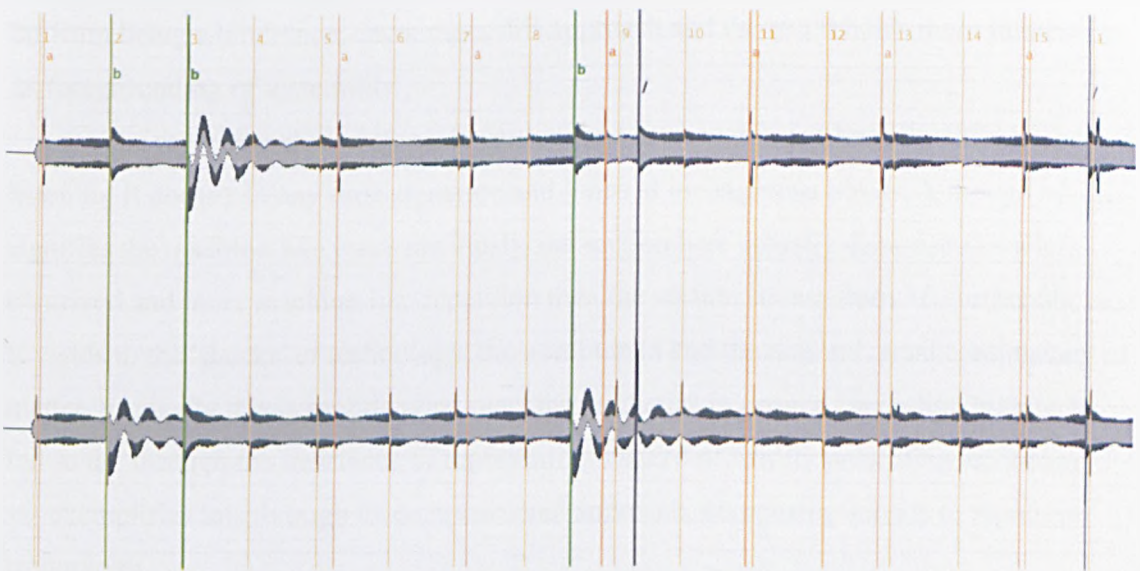
Figure 2:   *I* detail (*Seven Tons For Free*, Pita)

It is hard to find a human rationale behind the organization of the material, based on gesture, compositional norms etc. +/- on the contrary has exactly this rationale. Rehberg's work manages to make a break from it, partly through a willful disregard for traditional musical theory. For example the music is not restricted to certain notes: 'I don't even know

what the notes are' [4]. Instead of the traditional rationale, Seven Tons For Free displays an approach to computer music in which there is an openness to the rationale of the technology.

Coming before the proliferation of laptops capable of DSP, these tracks were made using sounds from a test tone CD, loaded onto an Akai S1000 sampler (allowing looping, truncating, sample merging, pitch shifting, filtering, envelopes and so on). Despite clearly not fitting into what is usually meant by the term algorithmic composition—the selection of various algorithms, and the mapping from their output to sound parameters and so on— Seven Tons For Free does in fact appear to result from an approach in which the composer is once removed from decisions regarding the result, via systemic, aleatory processes. Although the composer is strictly speaking in control of such systems and processes, the imitation of existing music is not the goal. It instead builds upon and follows what is suggested by the technology at hand.

Conventional and familiar forms are thus avoided through unexpected results from processes suggesting new ways to organize material. The sampler is used in a way that results in a mangled, distorted cut-up of the source sounds. It is full of discontinuities, rapid splices that mark the character of digital sampled sound. The crudeness of the S1000, far from being a hindrance, encourages this approach and the result holds more interest in its foregrounding of materiality.

The repetition shown above is unusual and seems arbitrary, initially difficult to listen to. It doesn't fit any time signature and loops at incongruous points. Although +/- signifies the machine-like more obviously, the section here actually demonstrates a less contrived and more machine-like repetition than the section shown from +/- further above. It yields to the 'shocks' of technology, the non-human and the non-universal contingency of matter. Ironically this is exactly what machine aesthetics in general (including high tech) fail to do, through the insistence of representing instead of merely presenting technology. +/- exemplifies this through its compositional approach, composing sounds to represent technology.

In Rutsky's estimation, the 'shocks of the modern city' that Benjamin identified are most directly transferred to art through montage or collage (Rutsky 1999, p.27). For instance of montage, Benjamin writes, 'the spectator's process of association in view of these images is indeed interrupted by their constant, sudden change. This constitutes the shock effect of the film, which, like all shocks, should be cushioned by heightened presence of mind' (Benjamin 2008). This is particularly exploited in materialist film, where

filmic techniques like the splice are intentionally used to create a 'heightened presence of mind', which can be thought of as the alternative to identification and illusion.

Seven Tons For Free certainly has a montage/collage structure: fragmented, pieced together arbitrary sections of repeating patterns, again, avoiding composition in the traditional sense. The artist sets semi-autonomous processes in motion and makes aesthetic judgements in selecting and presenting audio output, not *controlling* technology to make music that sounds *like* technology but allowing a participation in technological processes to become the primary mode of creation. This is an approach that avoids a model based on domination or control.

In this music there is no implication of functionality, no associated rhetoric to do with, for example, sonifying 'data'. It may be a machine aesthetic of sorts, but the 'myth of functional form' (Rutsky 1999) is not propagated in any way. Another result of this approach is the removal of any veiled mysticism or romance in relation to technology. Technology is perhaps beyond human control but is essentially inert, neither distrusted or held in reverence. The utopian/dystopian binary positioning of technology begins to seem irrelevant in this context.

As discussed previously, there is a link between digital aesthetics and materialist ontology. The music goes some way to stepping outside of a representational aesthetic if it avoids representing concepts or universal form, by focussing instead on its own conditions of production. It presents itself as non-figurative, science-fictional notions of what digital technology sounds like are absent. It is precisely because *Seven Tons For Free* is not superficially such a 'digital' sound (signifier of digital-ness), that it is in fact more faithful to a digital aesthetic and side-steps the trappings of a 'high tech' aesthetic. Rather than adopting a machine aesthetic in the traditional sense, it is closer to the Industrial Records maxim 'industrial music for industrial people'—a music of its time, both technically and culturally, that nonetheless manages to avoid simplistic reference to 'industrial' (or in the case of *Seven Tons For Free*, 'digital') technologies and sounds. Rehberg in fact cites Industrial as a major influence in his work and for Mego in general [4].

This is a music which becomes very difficult to describe, since it has no visual analogue allowing source bonding (because it does not 'evoke' a factory, or 'evoke' dataflow etc.) The use of metaphors such as 'grains', 'dust' and so on, or resorting to a reification of 'data', as if data itself makes a sound, is inadequate. The interpretation of data may result in sound, but this sound could have any one of infinite characteristics depending on the interpretation. The music ultimately depicts none of these things, it is merely the

sound of sound making equipment, engaged in various processes. It is literal; forms are avoided which might allow narrative or symbolic meaning to be inferred through metaphor. The musical object is presented as a physical entity itself, not as carrier or medium for abstract content.

Techne

For Rutsky the high tech aesthetic represents a return to something closer to Heidegger's conception of *techne* (hence his phrase 'high-techne'). But what does Heidegger mean by *techne*? He describes it in relation to *poiesis*—artistic production, which he defines as a revealing of 'being'; it is concerned with the 'truth' of being (Heidegger 1993). *Techne* is traditionally defined in opposition to *poiesis*, as a kind of making that is not artistic. Heidegger comes to a different conclusion, however, that *techne* is the knowledge required for *poiesis*[4]. He considers the 'essence' of technology, beginning with the idea that technology is functional or instrumental, i.e. a means to an end. He claims that although this is correct for instances of technology, searching deeper, instrumentality is more fundamentally to do with causation—changing the world, and therefore revealing some aspect of it that was previously concealed. It is, like *poiesis*, a revealing or 'bringing-forth' of being. This essence of technology, although a corollary of its instrumentality, is not itself instrumental. He therefore paradoxically proclaims a non-technological essence of technology. We should only *superficially* regard technology as a means to an end.

While the *poietic* aspect of *techne*, for Heidegger, 'unsecures' the world (being is revealed through constant productive change), he goes on to claim that modern technology based on science creates a type of revealing that actually 'enframes' the world and fixes it in place. It secures the world in instrumental terms. Rutsky's claim is that high tech presents a return to an unsecuring non-instrumental techne, because it outgrows instrumentality. Function becomes secondary and it is almost autonomous in the reproduction of its own style (in his taxonomy of philosophies of technology, Borgman refers to this type of position as 'substantive' (Borgmann 1987), it to some extent reifies technology, treating it as an autonomous entity somehow separated from human activity). But as we have seen, high tech is laden with latent meaning. As such it represents a potentially dangerous process of enframing: it secures the world in terms of elitism (high

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4   As will be discussed in later chapters, Dewey even more radically collapsed the ancient Greek divisions of types of knowledge; for him, everything was *techne*. Theoretical knowledge is merely a special type of practical knowledge, and practical knowledge is nothing if divorced from actual production. Furthermore the artifacts produced by *techne* are not limited to tangible objects—scientific or philosophical inquiry produces theories, for example.

tech products as status symbols), control (the subject mastering and dominating the object world) and so on. In relation to +/- I described this as a result of its representational nature, standing *symbolically* for cutting edge technology.

Heidegger famously summarizes an anti-mimetic, anti-depictive approach to art by exemplifying a Greek temple that 'portrays nothing' (Heidegger 1993). So bringing-forth happens here not through interpretation (intended in a work of representation) but through a literal aesthetic. In Heideggerian terms then, a work such as *Seven Tons For Free* provides this bringing-forth, a revealing of the 'truth' of its being, as a result of *techne*—an engagement with the essence of technology.

Blackest Ever Black: The institutional and brute facts of UPIC

Russell Haswell and Florian Hecker, after a number of releases separately, mainly on Mego —*Ich Schnitt Mich In Den Finger* (Mego 022, 1997), *IT ISO161975* (Mego 014, 1998), *Live Salvage* (Mego 012, 2001), *Sun Pandämonium* (Mego 044, 2003), *PV Trecks* (Hec2, 2004)—began working together in 2004, on a project based around Xenakis' UPIC machine. They were able to secure a residency at CCMIX in Paris (thanks to an endorsement from Curtis Roads) where they recorded material that has since been used for *Blackest Ever Black* (Warner Classics and Jazz, 2007), *UPIC Warp Tracks* (Warp WAP239CD, 2008), and various live multichannel diffusion sessions.

The point is often made that the availability of certain kinds of technology enabled the scene represented by labels like Mego, technology that was previously only available to institutions and academics (Cox & Warner 2004, Cascone 2000). However this generally refers to the potentially restrictive cost of computing power, and new (often commercial) software—sequencers, software synthesizers, and so on. *Blackest Ever Black* is interesting in that it was the result of an opportunity to work specifically with the same technology that was once considered the domain of institutions and academics (this is ironic in the case of UPIC—it was intended as a pedagogical tool, to democratize music creation, but never succeeded in this aim, only seven were ever built). As such it allows a fairly direct comparison between the way it was used by its creator, Xenakis, and the way it was used by Haswell and Hecker thirty years later.

Haswell and Hecker

A curatorial impulse is central to Haswell's practice. Projects like *Or Some Computer Music* have brought together figures that are important in the development of electronic music, and placed them in a contemporary context. Pieces by Trevor Wishart, Curtis Roads and Stephen Travis Pope sit alongside Aphex Twin, Kevin Drumm, Jim O'Rourke, Farmers Manual and General Magic. He was also, for example, instrumental in organizing the supporting acts for Autechre's 2001 tour, which included Curtis Roads in Los Angeles; demonstrating a similar approach to curation that he developed in the *Disobey* series of experimental club nights. These things bring together what could be seen as two separate worlds: institutional or academic electronic music and the commercially sustained experimental electronic music that became widespread in the 1990s. Haswell's interest here is in curation that he describes as 'multi-faceted' [5]; curation that looks beyond the choices

that appear obvious, to draw parallels and contrasts between work that previously may not even have been considered related in any way. This is a major part of his work: 'I realise that I spend a lot of time trying to make things happen, rather than necessarily always fabricating pieces of work' (Haswell 2007).

In his own practice, Haswell tends to use disparate pieces of equipment, sometimes new, but sometimes obscure or assumed to be outdated (for instance playlist editors, analogue synth modules etc.), exploring their possibilities and limitations, as will be discussed below in relation to the UPIC. He has stressed the importance of his artistic development in Coventry, with its legacy of conceptual art and early computer art, particularly in the Art and Language movement (Howard 2009). His interest in the history of electronic music and its tools and theory, can also be traced back to this period, where he encountered technology such as the GRM tools (from Schaeffer's Groupe de Recherches Musicales) at the Mute records studio. His background in plastic and conceptual art is an important factor in his approach to computer music; he has stated a desire of 'not wanting to be restricted by the categorization "music"' (Haswell 2007). The term computer musician is perhaps not appropriate, he could instead be thought of as an artist who takes computer music as his subject.

Since *Blackest Ever Black*, Hecker has released the album *Acid In The Style Of David Tudor* (eMEGO 094, 2009), the title of which plays on bringing what are seen as two separate worlds together; the western art music tradition exemplified by David Tudor, and the commercial experimental electronic music that owes some influence to acid house and the associated underground rave scene of the late '80s and early '90s. Similarly, the release of *Blackest Ever Black*, which might be termed noise music[5], on Warner Classics and Jazz, represents two very different worlds colliding. This also reiterates the point that an integral part of Haswell's practice is in 'making things happen'—disseminating the work in interesting ways, in an attempt to build an audience that extends beyond existing followers of this kind of work [5].

Hecker's *Acid In The Style Of David Tudor* shares similar sound material with his *Rotating Psychoacoustic Tuning Curves* for Matthew Ritchie's 48 speaker sculpture *The Morning Line* (TBA21, 2008). This piece, according to Hecker's programme notes, includes 'an "improved" version of the Xenakian technique of dynamic stochastic

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5 Although, as Haswell says of 'noise' in general: 'I wouldn't even consider it noise, it's the most beautiful sound I've ever heard in my life' [6]. This seems to be an opinion shared by other 'noise' artists; Masami Akita (Merzbow): 'there is no difference between noise and music in my work. I have no idea what you term "music" and "noise". It's different depending on each person. If noise means uncomfortable sound, then pop music is noise to me' (Keenan 2000).

synthesis', and also 'threshold equalising noise'—based on a technique in psycho-acoustics (Moore et al. 2000). Adding to the eclecticism of influences, the spatialization is determined by tracing an ambisonic panning trajectory over Heinrich Klüver's 'form constants'—geometric patterns that occur during hallucinations (Klüver 1966). These forms certainly cannot be 'seen' by listening to the spatialization, yet their inclusion is clearly important to Hecker's practice.

This approach that disinters old or obscure techniques, technologies or research, fundamentally seems to involve a misuse or deviation from the intended function of the objects. Translating Klüver's form constants to traced spatial trajectories of sounds deviates from their original purpose by translating between different media in a very contrived way (from static image to movement and duration). A similar kind of deviation from intended function is seen in other kinds of technology in Haswell and Hecker's practice, such as taking psycho-acoustic research tools out of the context of psycho-acoustics, and instead emphasizing their aesthetic value. I will argue that this is the result of an approach that treats technology in a literal way, as what it physically is, rather than coming to it with preconceptions of its function. For example 'DAT feedbacks ... just finding out that those things happened and using them consequently as a source. It was about bastardising stuff' [6]. The use of the UPIC in *Blackest Ever Black* is another case that supports this claim, but for comparison we must first understand Xenakis' intention for the UPIC, and its use in his own compositional practice.

UPIC and *Mycenae Alpha*

Xenakis formed CEMAMu (Centre d'Études de Mathématique et Automatique Musicales) in 1972, with the aim of 'making it possible for composers directly to transplant scientific thought and mathematics into music' (Varga 2003). The UPIC (Unité Polyagogique Informatique du CEMAMu), completed in 1977, was created to realize this aim. It consists of an electromagnetic drawing table connected to a computer. Users can draw onto the table in various modes, creating waveforms (pressure against time), or trajectories for pitch (frequency against time) and dynamics (amplitude against time).

Metastaseis was Xenakis' first major work that made the breakthrough of working mainly with glissandi. After this, the desire to create a machine like the UPIC is understandable. The score for Metastaseis is the depiction of ideal forms, ready to be translated into sound. The orchestra can only be seen as an imperfect but necessary medium for this. As mentioned above, Xenakis' aim is to *directly* transplant mathematics

into music (as quoted above, in Varga 2003).

According to Xenakis, the UPIC 'makes it possible to establish direct contact with music, without any programming and notation' (Varga 2003). The implication is that 'music' is something we do not ordinarily have direct contact with. It must be abstract or metaphysical; pure form. Xenakis in fact makes explicit his conception of the immateriality of music by stating that 'music is basically outside time and time only serves for it to manifest itself' (Varga 2003). But if we accept that this is what music is, then why does the UPIC constitute direct contact? Surely the drawing is a representation of the abstract music, in the same way as the sound is. The drawing serves the same function as any other notation. It is then translated to a different medium (sound) through a convoluted process of mappings between various parameters. So despite Xenakis' desire to move away from the notation of the Western musical tradition, a notational centricity remains—it is merely a different kind of notation. The score is still reified, in the sense that it is seen as the music, and sound merely as a way of making it physical. The isomorphy Xenakis sees between architecture and music also points towards this belief; neither the architecture or the sound physically are the object of contemplation, but the abstract forms that they share. It is reminiscent of the well known Schelling quote 'architecture is frozen music' (and the anonymous (possibly Zappa) rebuttal: 'you can't dance to architecture').

The first piece Xenakis created exclusively on the UPIC system was *Mycenae Alpha*, for his *Polytope de Mycenes* in Greece. The score is a series of dense groupings of frequencies, that often slide together to a single frequency, resulting in an oscillation from various noise timbres to sustained notes and back again. These transitions are sometimes sudden, but often gradual. *Mycenae Alpha* has striking similarities to *Metastaseis* in this movement from stable single notes through glissandi to chaotic dissonance. Xenakis here has composed on the UPIC in much the same way as he previously composed *Metastaseis* on paper. The UPIC is therefore seen very much as an enabling medium, in much the same way as the orchestra before it, but presumably with less imperfections, hence a 'direct' channeling.

Xenakis once claimed that 'music is a domain where the most profound questions of philosophy, thought, behaviour, and the theory of the universe ought to pose themselves to the composer' (Lohner 1986). Pieces like *Mycenae Alpha* and *Metastaseis* communicate such ideas at a very abstract level. The music is a representation of abstract forms which communicate on a figurative level, the *concept of* movement between chaos and order, or continuity and discontinuity; the movement between high-level states, as the title

Metastaseis suggests.

This idea of musical activity as a channeling of abstract ideas finds its most comprehensive and revealing description in Denis Smalley's spectromorphology. Xenakis is not associated with this thinking, but there are certainly similarities; Smalley claims that the music of Xenakis 'can be approached spectromorphologically' (Smalley 1997), and others have seen works like *Mycanae Alpha* as fundamentally morphological in character (Squibbs 1996). Smalley describes gesture as the fundamental means by which psychological experience is communicated in music, 'using the sense of touch or an implement to apply energy to a sounding body'. Why then should the same theory be applied in music that does not rely on a human application of energy to sounding bodies? Smalley suggests that 'sound-making is linked to more comprehensive sensorimotor and psychological experience', and in such sounds 'we detect the humanity behind them by deducing gestural activity'. There appears to be an anxiety associated with the incomprehensibility of music which does not provide this reassuring link with other areas of human experience (i.e. when one cannot detect the humanity behind the sounds (Smalley 1997)). Computer music is in fact particularly suited to creating this incomprehensibiliy, asserting the material nature of music.

According to Smalley, 'spectromorphological ideas can help perceivers to focus on the imagination and craft of the composer'. This is predicated on a model of music as transcendent communication of 'intrinsic meaning' with 'some shared experiential basis both inside and behind the music'. It also implies that we only properly appreciate the music if we appreciate the virtuosity behind its production.

The real purpose of spectromorphology is as an aid in listening, and Smalley describes a process of abstraction in which a score or graphical analysis is produced by deciding what is perceptually 'pertinent'. Analysis is in fact necessarily reductive, but it is interesting to look at what the analyst chooses to reduce *to*, and consider what this tells us about the music on which the analytic technique is being applied. In the case of spectromorphology, what Smalley is claiming is perceived in a practical sense (what is pertinent) are the gestural, 'human' forms being notated, this is where the music is located in spectromorphological theory. It begs the question: what's the point of all the other detail in the sound that is not 'pertinent' for analysis? Sound is understood only as a medium for music, music being the more pure and abstract forms that the sound roughly corresponds to.

This is compounded by his skepticism of 'technological listening', which 'occurs

when a listener 'perceives' the technology or technique behind the music rather than *the music itself*, perhaps to such an extent that true musical meaning is blocked'. (italics mine) But Smalley concedes that musical meaning must ultimately rely on extrinsic reference. Why then is 'it sounds like something falling' preferable to 'it sounds like a filter sweep'? The former is an illusory layer of depiction obscuring the reality of sound production. 'The music itself' is actually nothing more than the result of technological processes, not necessarily a channeling of narrative meaning. Contrary to this, Smalley explicitly states that 'ideally the technology should be transparent', in line with acousmatic performance in which 'the sources and causes of the sounds are invisible ... [becoming] blurred even further in a CD recording where everything becomes invisible' (except presumably the CD player, amplifier and loud speakers), leaving pure 'intrinsic' symbolic meaning. Likewise with the UPIC, to be a 'direct' interface to 'the music itself', it must be a 'transparent' medium. The impetus here is best summarized by Schaeffer's statement: 'what we are aiming at ... is the most general musical situation that exists' (Schaeffer 1966).

The UPIC is described by Xenakis as a pedagogical tool (or more precisely 'polygogical' (Varga 2003)). It was an effort to break away from the elitisms of avant-garde music at the time, providing, instead of complex theory and rigorous systems, a certain kind of freedom and a more universally understandable interface ('everybody can understand a line' (Lohner 1986)). By providing what was intended to be a blank sonic canvas, allowing a student of music to start from scratch without preconceptions of how to compose, the UPIC would in theory induce a kind of auto-pedagogy, in which the student discovers for his or herself what is musical. This utopian intention is commendable, and would be the UPICs strongest aspect if it weren't for a surprisingly fundamental misconception of the nature of music. If the music is seen as an abstract entity, existing outside of time, it engenders precisely this desire for technology that can act as a medium, allowing direct access to the music; the composer can have a musical idea, and immediately transcribe it. But this does not allow for the fact that the medium constitutes a material process, a material process that not only 'has an effect on' (distorts) the composers idea, but is actually the source of the idea itself. In this case, the UPIC encourages the composition of music as a series of lines and trajectories, glissandi of various basic parameters.

Philosophies of technology

For some, technology is seen fundamentally as a means to an end, functionality in fact

being almost synonymous with technology. In Borgmann's taxonomy of philosophies of technology, this view is referred to as instrumentalist (Borgmann 1987). It could be argued that the approach typified by both Xenakis and Smalley is instrumentalist in this sense. An 'end' is defined (for Xenakis the direct translation of a mathematical idea into sound, and for Smalley the communication of intrinsic meaning), and *then* some 'technology' is employed to achieve these goals. 'Technology' in this context refers to tools with a well defined function.

Dewey's understanding of technology provides an alternative view of this process. Confusing matters, Dewey refers to his own position as instrumentalist. But as argued by Hickman, it is far removed from Borgmann's definition of naïve instrumentalism, and is perhaps better labelled as a pragmatism (Hickman 1990). Dewey sees technology not merely as a means to an end, but as an ongoing type of inquiry in which 'ends-in-view' appear *from* the material means. Therefore, insofar as means and ends are separable at all, they are characterized by a constant interplay. For Dewey, means and ends are really part of an analytical exercise that takes place *after* technological production. This analysis, itself a kind of technology, then feeds into later inquiry, forming new ends-in-view or projected ends. Ends-in-view are also referred to by Dewey as ideas in certain contexts, i.e. an idea does not come from nowhere, it is never a pure metaphysical entity without grounding in the world, but rather a technological abstraction from the world.

Implications follow from this regarding the perceived value neutrality of technology. If the ideas we have when using a technology in fact derive *from* the technology, then there is certainly no such thing as a transparent medium. All technology is, according to Dewey, laden with values. This means that any use of technology will have political or ethical implications. Certain technologies, for example democracy, are obviously very explicit in their values. A gun on the other hand, can be used equally effectively by a fascist or a communist. But of course this is not to say that a gun does not also have values embedded in its function, it certainly affords a particular kind of action in the world.

It is important to note that such values are not inherent in the physical object itself, but in its functional properties. Searle calls such properties observer relative; they are not intrinsic to the object, they are socially, or using terminology he takes from Gertrude Anscombe, 'institutionally', constructed (Searle 1996). It is these extrinsic properties that make a gun a gun, and not just a mass of metal in a particular form. Therefore it only exists as a gun to an observer who understands it as such—devoid of any observers, it *is* merely a

mass of metal. However, Searle argues not for a universal (strong) constructionism—i.e. reality as far as it can ever be experienced is entirely socially (or institutionally) constructed—but for a weak constructionism in which constructed facts rely ultimately on 'brute' facts, objective aspects of reality:

> It could not be the case, as some have maintained, that all facts are
> institutional facts, that there are no brute facts, because the structure
> of institutional facts reveals that they are logically dependent on
> brute facts. To suppose that all facts are institutional would produce
> an infinite regress or circularity in the account of institutional facts.
> In order that some facts be institutional, there must be other facts
> that are brute. This is the consequence of the logical structure of
> institutional facts. (Searle 1996)

The functions assigned to objects in general belong to that category of things that *are* institutional constructs, but the brute facts of the world are still a determining factor. Searle distinguishes between a number of different basic types of function assignment. The type we are interested in here are 'causal agentive functions', that is, functions that are assigned to an object that was deliberately intended for such use (hence agentive), which is useful specifically because of its physical properties (there is a causal relationship between function and brute facts regarding the object). Such objects are often referred to as technical objects. The point is that we could not arbitrarily decide that any object is a gun, or conversely, use a gun as a car.

Regardless of this, since function *is* constructed, there exists the possibility for an artist to find new ways to make an object function, a different way of understanding its brute facts. This is not as trivial as it first sounds; institutional facts regarding the function of technical objects become very quickly entrenched—a CD player is clearly for playing back CDs, a drum machine is for making drum sounds—it is the exception rather than the rule to experiment and find new functions. This brings to mind Yasunao Tone's concept of 'paramedia':

> You have to deviate. I call that kind of art *paramedia*. The
> manufacturers always force on us to use a product their way. A
> medium always has some *telos*; however, people occasionally find
> a way to deviate from the original purpose of the medium and
> develop a totally new field. Photographic technology had *telos* to
> make the image solid, to make shadow and light solid, so the

> photograph was invented and it's constantly being refined in order
> to be as accurate as possible. But, artists do not want to just imitate
> nature. When Man Ray invented solarization, it was a failure in the
> view of photographic technology, but of course artistically it's much
> more interesting. Or, musique concrete. As soon as the tape
> recorder was invented, people like Pierre Schaeffer found that by
> splicing tape and changing its order he could get a different sound
> than what was originally recorded. So, it's natural for artists to
> deviate. (Marclay & Tone 1994)

A medium or technology that is seen to have some *telos*, is used in a way that deviates from this original function. Tone often achieves this by translating between different media, from text to image to sound for example, to complicate the process of representation to such a degree that the original purpose of transparent representation or communication is lost. In *Musica Simulacra*, he draws Chinese characters from *Man'yōshū* (the oldest surviving book of Japanese poetry), and also intermittently substitutes them for etymologically related photographs, depicting their pictographic origins. These photographs are then projected onto a screen with light sensors, that control parameters in a synthesis algorithm. Any meaning in the original text surely has no bearing on the resulting sound after this process.

This deviation of media technology amounts to a new way of seeing and using it, it is not a case of breaking the technology (Tone has expressed a disagreement over the categorization of his music as 'glitch', c.f. for example, (Sangild 2004a) and (Prior 2008)). He refers to it instead as a 'disavowal of representation'—in his practice he is primarily interested in dispelling the view of technology as a representational medium. This is a disavowal of simple mimetic representation ('artists do not want to just imitate nature' (Marclay & Tone 1994)) but also of almost *any* kind of communication through representation in his artistic practice ('what I have disavowed is [that] the work works like language-as-signs, means of communication' (Davis 2008)).

In a residency conducted as part of the New Aesthetics in Computer Music project, Tone developed a system for the disruption of MP3 files. Interestingly this revealed that not only was fidelity to the original audio disrupted by introducing errors, but in addition any kind of fidelity to the actual errors produced was also somewhat disrupted (Blake et al. 2010). A work faithfully representing a process of error introduction to a format would still have been a work of representation, perhaps communicating some conceptual aspect.

Against communication, he has stated: 'my whole principle is, I don't want to represent *myself* in sound' (Friedman 1998).

The relationship between representation and repetition is important for Tone in this context:

> A sign which would take place but 'once' would not be a sign.
> When I use words as signs I must operate within a structure of
> repetition whose basic element can only be representative. For me,
> that means the work is an event, an irreplaceable and irreversible
> empirical particular. So, disavowal of representation also entails
> disavowal of repetition. My strong tendency to avoid repetition is
> also rooted in this context. Even use of language can be disavowal
> of representation if the language in use is a material without
> signification. That is the case [when] Chinese characters are
> converted [to] pictorial images—decoding the character is return to
> a phenomenon from a sign. (Davis 2008)

Tone thus defines signification in opposition to phenomenon. We are able to experience something on a phenomenal level when we do not experience it as representation. Rather than perceiving what a thing stands for symbolically (i.e. what it means), we see/hear the thing itself. Brandon LaBelle draws similar conclusions from Tone's work:

> As Tone proposes, the text is now no longer about delivering a
> message but about producing an addition, for 'when you play the
> CD what you receive is not images as messages, but sound which is
> simply an excess'. This excess functions to strip away the original
> referent (text) so as to arrive at pure noise, for there is no longer
> any message ... The play with pure noise for Tone is always in
> relation to information, messages, codes, and meaning—in essence
> to the hierarchy of language that values message over material,
> communication over noise, meaning over code ... Tone's
> disinforming projects harness noise as a potential for other forms of
> communication, not of messages but of pure drive, not of content
> but of form ... Recalling Tone's involvement with Group Ongaku in
> the late 1950s and 1960s, along with his surrealistic leanings, noise
> may be paralleled with methods of collage, which break
> conventional readings of images, words, and objects. Here,

techniques of 'making strange' the familiar leads to rupturing the
seemingly natural world of signs. (LaBelle 2006)

An interesting reference point for discussing the importance of an approach like this is found in the work of the Russian formalists. Theorists like Shklovsky defined literature as a process of continuous 'defamiliarization', making reality strange by subverting the dominant codes and conventions of the time (Bennett 2003). A work of literature is therefore primarily a formal innovation, 'content' follows technique. As new techniques quickly become familiar, so for further defamiliarization new forms are then needed to again overturn the previous ones. This leads to an ongoing 'negation of the negation' type of process. Tony Bennett, discussing Schlovsky, summarizes this: 'at the risk of simplification, literature might be thus construed as a mode of discourse that constantly maintains "No, the world is not like that" in relation to dominant forms of discourses which maintain that it is' (Bennett 2003). Dominant ('sub-literary') forms are concerned with 'recognizing'—the repetition of well understood devices and signifiers, where literature (as the formalists conceived it) is concerned with 'seeing'—becoming more acutely aware of certain aspects of reality by showing them in an unfamiliar way. More to the point, on a formal level, literary techniques themselves can be defamiliarized, thus creating an awareness of modes of representation that have become naturalized. We 'see' the work itself (as part of reality), having been made strange, rather than merely seeing a strange depiction of reality.

Though the distinction between high and low culture (literature and sub-literature) may be questionable, the similarities between this aspect of literary formalism and the description of Tone's work above are clear. Defamiliarization appears to be of fundamental importance not just in literature but in artistic practice in general. It could be seen as a basic artistic impetus—to induce seeing the world in a different way to our ordinary experience of it. This can be done on the level of representation, by *depicting* the world in a new way. But perhaps more radical is to do it *literally*, engaging with the world in a new way, formal innovation, subverting the tools of representation. For example in Tone's *Wounded CD*, CDs are prepared by making small holes in them, or sticking small pieces of tape on them. They are then played in specific models of CD player that have a particular kind of error correction algorithm, which alters the output drastically. So the CD and CD player are seen not as a devices for the faithful playback of previously recorded sound material, but as a means of creating new sound material. The aleatoric process combining error correction algorithms with prepared CDs results in a reorganization of the sound that

is characteristic of the CD player itself (or more precisely, its error correction software). Of course, since Tone first performed *Wounded CD* in 1985, the CD skipping sound has become more commonly incorporated into electronic music (even if it is not actually the result of a CD skipping, see for example Oval's *Systemisch*, or *Before I Leave* by Fennesz, or *Djed* by Tortoise) to the point where it is a 'known' technique and functions on the level of recognition, losing to some extent its subversive aspect.

Despite the possibility to side-step the 'institutional' use of an object, the implication is not total freedom from the constraints of the technology, i.e. a transparency of the medium. Quite the opposite—the re-assignment of an object's function requires a sophisticated understanding of its 'brute facts', its physical properties. As shown in the majority of examples throughout this thesis, this normally requires an experimental approach in which the constraints of the technology are explored. In accordance with Dewey's conception of 'ideas' as ends-in-view, in Tone's work the ideas come from the (brute, material) means, and moreover it constitutes a response to those means that refuses acquiescence to its institutionally accepted function.

In contrast, the institutionalized use of most mediums is to approach them as if they *are* ideally transparent—as representational devices; as in dominant film practice, television, everyday use of communication technology and so on, and also as discussed earlier in relation to the UPIC. The UPIC makes a very specific kind of music (in its institutional use it has inherent values regarding the nature of music) but is positioned as a totalizing general music composition system. This perhaps contributed to its failure to catch on as a pedagogical tool.

Blackest Ever Black

Haswell & Hecker's use of the UPIC in *Blackest Ever Black* however, does not appear to share such contradictions. They approached the UPIC as a found object, and experimented with its innate physical characteristics and limitations. Nine hours of audio material was generated in this process to be evaluated and edited later, immediately suggesting a very different method to the intended 'direct' transcription of musical ideas.

The experimentation consisted of processes such as tracing pictures onto the UPIC's drawing surface. Source material for tracing included erotica, the mushroom cloud of an atomic bomb, photographs of the Madrid train bombing, of food (kebabs, French desserts), and close-ups of molecular structures, including the molecular structure of nickel-phosphorous developed by the National Physics Laboratory to be the blackest ever black

material, from which the album takes its name. However the pictures themselves are in a sense arbitrary, aesthetic judgement takes precedence: 'there's pictures we put in that sounded shit, there's pictures we put in and went 'fucking great' ... if you did the sonograms you would end up seeing that there's only a small piece [of the picture], because we've taken all that other bit away because we didn't actually like what it sounded like. So you can't actually do a sonogram and see all the pictures, that's not there. That's why in a way it doesn't matter what the pictures are' [6]. More abstract techniques were also used, such as 'the Surrealist technique of real-time automatic drawing' (Roads 2007). The judgement on whether to keep or discard any given material is described as being based on two criteria: a) 'not having heard that before from other existing UPIC material', and b) simply 'that pleases my ear, I like the sound of that' [6].

The entire album consists of two tracks of audio, split to left and right channels with no panning, again treating the two channels of audio offered as literal. 'You click on the arcs and then you can say this is left or right ... so you consciously have to do that ... we can throw the right channel around and we can throw the left channel around and so even if they start going around together, following each other there's actually different things going on. But you can still listen to it in stereo, so it was trying to do something that could exist in stereo but could also be taken away and used in a different way' [6]. There was also no overdubbing. Working in this way reduces the temptation of composerly expression; the material gathered cannot so easily be built into narrative structures[6].

The album is split into four movements. As Curtis Roads describes in the sleeve notes: 'From the onset, the sound palette of the UPIC is singular, and *Blackest Ever Black* is a celebration of Xenakis' sonic universe. Movement 1 explores the melodic and harmonic eccentricities of the UPIC, where the glissando is the rule, not the exception' (Roads 2007). It begins with near silence, low volume slices of high pitched glissandi separated by gaps of a few seconds. After 1:45 of this, the material is suddenly at a higher volume and slices of output are longer, with immensely varied types of sound: long glissandi converging and diverging in pitch, sustained tones, short punctuated inharmonic tones, narrow-band noise, intricately complex rapid patterns of modulating pitches,

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6   I use the word narrative in the broadest possible sense; Byron Almén describes narrative trajectory as an unfolding of relationships between 'musical agents'—themes and motives. Narrative is present in an abstract sense, even in entirely non-programmatic music; the balance of change and repetition, structures that build tension or lead to a climax, metaphorical and dramatic constructs. Musical narrative is often seen as merely reflecting literary narrative, with its referential specificity removed. But Almén argues that narrativity should not be restricted to its literary sense, it is an abstract concept that can be seen in most music. (Almén 2008)

rhythmic chattering impulses, low-frequency textural rumbling and harsh waveforms with pronounced higher harmonics. Although the output of the machine is characteristic and singular (it is limited—most sounds are in practical terms impossible to make on it), it still nonetheless offers (technically) infinite possibilities within its limited sound set. The range of sounds is far greater in *Blackest Ever Black* than in pieces such as *Mycenae Alpha*, and it presents these sounds in a fragmented structure. Sections often sound as if they are beginning to develop in a narrative manner, only to be cut short and interrupted by silence or very different section in juxtaposition.
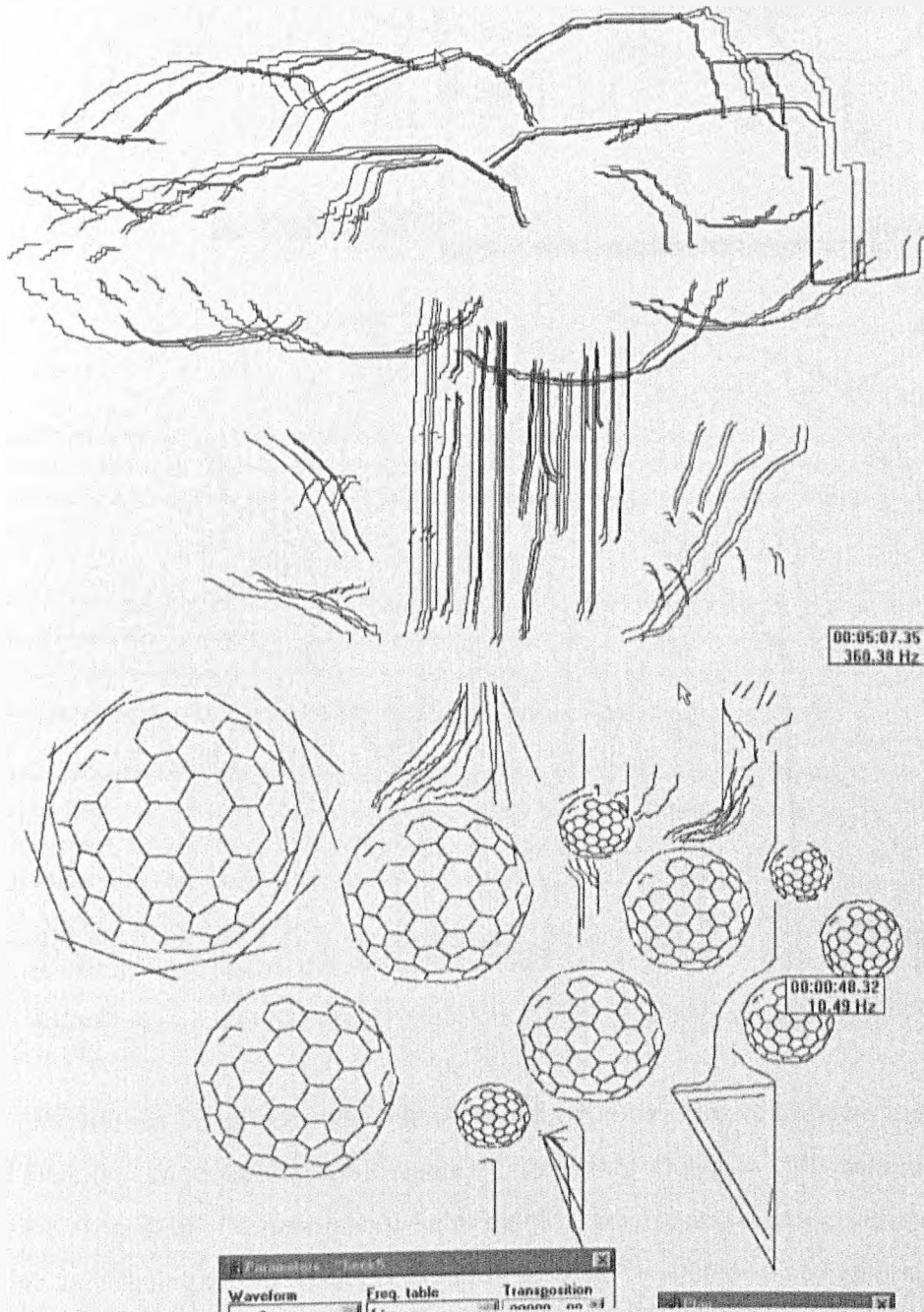
Figure 3:   Haswell and Hecker UPIC screens (used with permission)
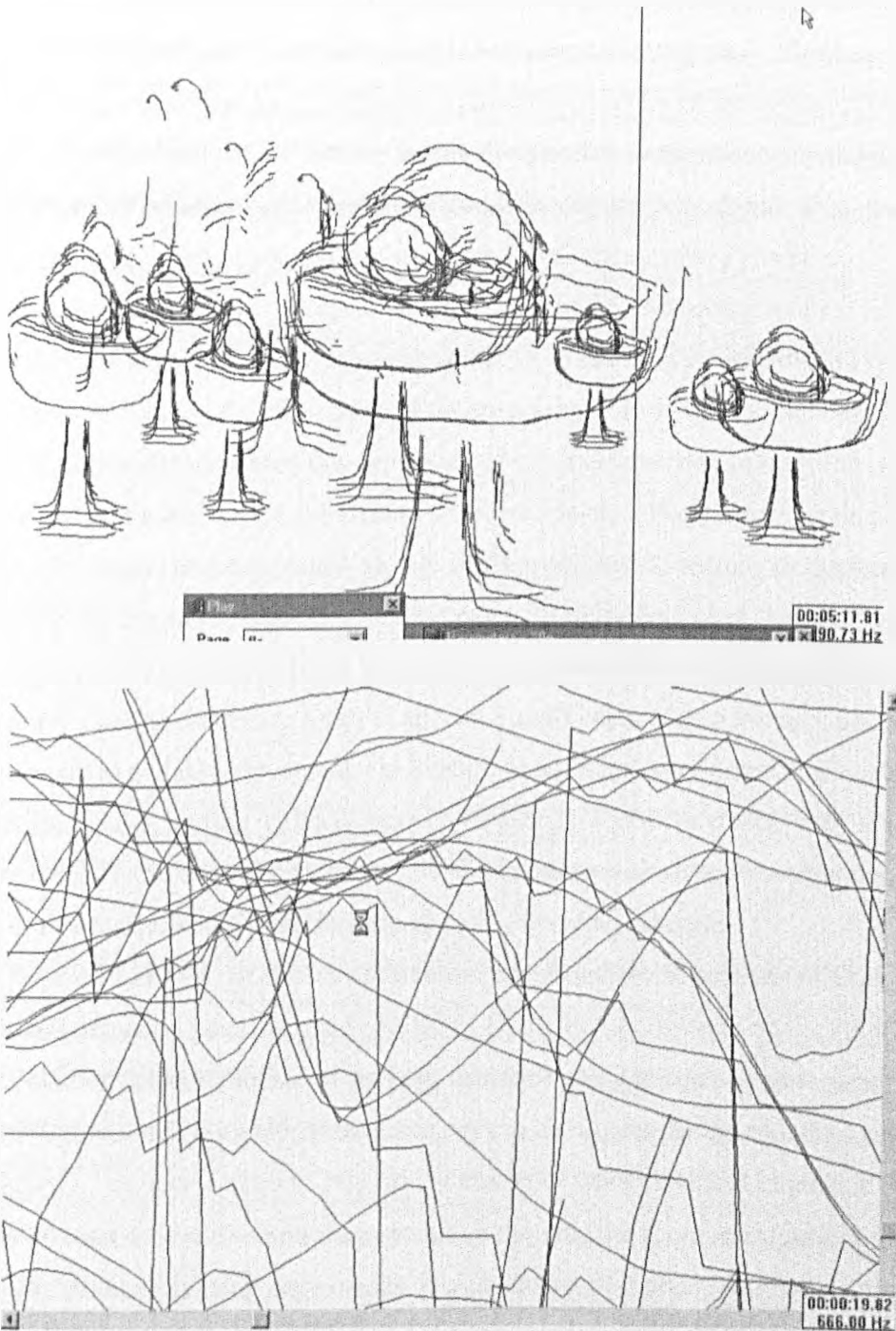
Figure 4:   Haswell and Hecker UPIC screens (used with permission)

Movement 2 continues with a more deliberate contrasting of different behaviors and sound materials. In particular, stable states are contrasted with apparently chaotic states. Being the exposition of different sections of output from experimentation with the machine, in listening this accordingly does not seem to function on a metaphorical level. *Mycenae Alpha* contains the same kind of contrast but presented in a flowing, narrative

manner, implying that it is a piece *about* the relationship between stability and chaos (narrativity is inherently representational). The fragmented structure of *Blackest Ever Black* could also of course be described as a narrative structure (a splice could be seen as a gestural, compositional device like any other). However the experience of listening to it confounds such a reading—the interruptions and incongruity of materials continually frustrate and undermine any attempt at narrative identification, there can be no comprehension of an overall structure that has direction or is revealing themes and patterns. The listener cannot find meaning within this noise and is therefore at every turn jolted into awareness of the physicality of the sound rather than its semiotic content.

As if to undermine even the semblance of coherent structure in fragmentation (consistency in inconsistency), movement 3 features much slower, longer sections of UPIC output, with gradual development. A slowly shifting pattern of medium length tones occasionally sliding in pitch build to a dense mass before falling apart. Then a fluctuating sine is punctuated by distorted noise bursts. The (by now familiar) glissandi follow, close in frequency causing difference tones to appear. Finally rapid high frequency patterns bring the movement to a close. Movement 4 is a return to the strikingly contrasting sections of movements 1 and 2, ending with a plateau of very dense chaotic material, it 'expounds a joyful mayhem' as Roads puts it (Roads 2007). The abruptness of this material coming to an end is almost comical, feeling like a parody of climactic structure.

Haswell sums up the difference between *Blackest Ever Black* and UPIC pieces by Xenakis and others by pointing out a particular detail: 'he's drawing these things and where the lines kind of finish at the end of the page he's then going to start the next page at the same point ... and he's drawing these things *before*; it's almost like he actually made the score *before* ... we just wanted to experiment more, we wanted to kind of push it' [6]. The institutional use (in Searle's terms) is to continue drawing the score attempting to ignore page breaks. But recognizing page breaks as a fundamental characteristic of the machine, Haswell and Hecker treat each page as an entirely separate entity. Another characteristic feature of the machine is the ability to copy and paste images. This makes the multiplied, offset patterns seen in figure 3, and was a technique adopted by Haswell and Hecker to create interesting combinations of tones at set harmonic intervals (shifting in the Y axis) and delays (shifting in the X axis), and also to simply generate busier material. "Draw as many lines as you can' and 'can we draw three thousand lines in the box?' There were these kind of experiments going on' [6].

Befitting the focus on process and technology, the album closes with an 'appendix';

a recording of the physical machine itself, 'the sound of the UPIC synthesis hardware processing a particularly dense page' (Roads 2007). Again, a deviation of function—the sound of interest is supposed to be its audio output not its acoustic properties. 'Once there was the notion that we're in the studio and we're using the UPIC, I had no fixed or closed ideas. I was prepared to try anything on it and do anything with it to try and create a sound and then, when you hear it back, do we like it?' [6]. Calling this track an appendix also suggests a desire to document. Again this is a kind of curation concerned with the history of computer music—preserving aspects of the UPIC while it still exists. It is already being superseded by a software version which does not require the specialist hardware and therefore does not make this sound.

The approach is experimental in a very literal sense of the word; trying a multitude of different things, and simply keeping the results that sound interesting. As in Tone's work, using the technology as a found object treats it as itself (reducing to its 'brute facts'), and explores its possibilities. This avoids the unimaginative approach of working with a pre-conceived idea of its function (its 'institutional' use). The UPIC epitomizes an attempt to make a generalized music system. In line with Xenakis' central interest in formalization, it formalizes music by parameterizing it and providing a framework for its realization.

If it were possible to make a totally general music system, it would in theory be more or less useless. It would allow the reproduction of any existing forms, but itself could offer nothing new. One cannot work with pure form, simply because form is always material, it is defined by the materials and technology shaping it. Haswell and Hecker show that UPIC *is* useful, but specifically because it is *not* general. Its output is characteristic and limited, most tracks made with the UPIC are clearly identifiable as being such. Limitations are productive, not restrictive, as will be explored further in chapter 4.

Due to the nature of the UPIC, the same kind of sonic material is found in *Blackest Ever Black* as in pieces such as *Mycenea Alpha*. They share similar trajectory/gestural information in some form. However this does not imply something like a spectromorphological approach in *Blackest Ever Black*; it is difficult to imagine Haswell and Hecker channeling a musical idea in the process described—what is the musical idea when a picture of a kebab is traced? There *is* an idea, perhaps, in Dewey's sense of the word: it is the idea of a process, informed by a technological inquiry based on a given set of materials. It is a process that is clearly suggested by the UPIC, its interface being a drawing table (evidenced in an interesting way by the fact that this is the approach a child tends to take when confronted with the UPIC, as Xenakis describes: 'we're visited regularly

by schoolchildren of seven or eight years of age, accompanied by their teachers. They draw fish, houses, trees—and you can hear the result.' (Varga 2003)). The idea is thus not conceived prior to the technological inquiry, it is a response to the means available.

Haswell's background in the visual arts rather than in music is a contributing factor to the approach in *Blackest Ever Black*. It provides a different way of looking at musical production. Prior to their own residency, Haswell notes that contrary to Xenakis' polygogical intention, 'everyone that was going to CCMIX was conservatory educated'. For Haswell 'that didn't matter, why shouldn't I get to use it? ... I could go and destroy things' [6].

Process

The approach is something like Process art, in which Haswell has previously shown an interest in his practice; influenced by Richard Serra and Fischli/Weiss among others [6]. Serra's *Splash Piece* (1969) is archetypical of this kind of process based work, in which he threw molten lead against the walls and floor of a gallery space. In Serra's words: 'the evidence of the process can become part of the content. Not that it is the content, but it is discernible for anyone who wants to be involved with that aspect' (Serra 2002). Traces of the process fundamentally constitute the work; this is more or less true by definition—what is the finished work other than the result of the process of its creation? Process art comprises various techniques for the emphasis of these traces, however what they signify is not itself the point of the work—eschewing the idea of a piece documenting its own creation.

Works like Splash Piece of course owe something to action painting, or superficially perhaps even abstract expressionism. But both the 'abstract' and 'expressionism' aspects of abstract expressionism are absent. The work is focussed on the material used and on industrial processes, in later pieces sometimes involving many different people: 'I rely upon the industrial sector to build my work, upon structural and civil engineers, upon surveyors, laborers, transporters, riggers, construction workers, etcetera'. The potential for gestural expression is therefore reduced. 'The fact that the technological process is revealed depersonalizes and demythologizes the idealization of the sculptor's craft' (Serra 2002).

Similarly, overtly geometric shapes are avoided in this kind of work. Robert Morris claimed that in the 1960s 'it [was] not especially surprising that art driving towards greater concreteness and away from the illusory would fasten on the essentially idealistic imagery

of the geometric' (Morris 2002). We see this for example in De Stijl—a radical break from figurative or mimetic art, which nonetheless remains representational in a neo-platonic way. The idea is that there is an ultimate reality behind accidental appearance; Mondrian's paintings, in his own words, 'unfold to us a world of *universal* beauty' (Banham 1980). Morris saw process art as a development that works towards the removal of this remaining idealism, where 'the method of working does not demand pre-thought images ... pre-thought images are neither necessary or possible. Alongside this approach is chance, contingency, indeterminacy—in short, the entire area of process' (Morris 2002).

Haswell refers to his *The Brutal Truth* (2002, for David Falconer's *Frass* exhibition at the UBS Bullion Vault in London) as a process based piece owing something to this tradition. He placed live cockroaches on large sheets of paper and painted them with top-of-the-range Chanel nail varnish. They then left trails of their route and eventually suffocated as the varnish dried. The end result is a panel with dead cockroaches and various trails of nail varnish, but this object is described by Haswell as a 'byproduct' [6]. He also made a film of the process. Both the film and the finished panel are essentially documents of an event. Much the same could be said of his *Live Salvage* releases on Mego, being entirely comprised of found recordings by others of his live performances.

Haswell's live work has a similar focus on process, using the laptop as a means to do this, with an intentional disregard for overloading the CPU causing glitches and audio dropouts. The computer could ultimately even determine the length of performances; often he simply played until the laptop crashed. 'Silence occurs when the computer breaks' (Haswell 2007), 'sometimes I did a reboot and then there would be the reboot sound, everybody would laugh' [6]. The technology therefore imparts its own specific and peculiar character on the event in much the same way as discussed with the UPIC. This perhaps goes some way to explain the fascination in Haswell's practice with legacy technology; because it is often more peculiar in its characteristics (it is less effectively 'transparent'), it offers more scope for experimentation. In a fundamental way then, material process is allowed to pervade every aspect of the work.

However for Haswell (perhaps in contrast to Morris) this is not to say that the process is somehow more 'important' than the end product. It provides aleatoric elements, opening up the form of the finished work to complete contingency. In contrast to what we could call a contrived aleatory in music—random numbers and stochastic techniques; the intentional use of randomness in composition (Xenakian stochasticism for example)—process art is based on the realization that this is unnecessary in the face of the absolute

contingency of matter. To return again to Tone briefly, he has stated a dislike for the word 'randomness', and refers instead to 'indeterminacy' in his work [7]. This rather enigmatic polarization of what are usually taken to be synonyms is perhaps explained by the above contrast. He is not interested in using high level, planned stochastic techniques, and yet he does base his work around processes that introduce immensely complex indeterminate elements simply through the basic materiality of their operation.

Contingency

Contingency refers to the state of a given situation's dependence on other things; it carries with it an implication of arbitrariness in such relationships, and as such is useful in describing artistic processes which are not random in a probabilistic way (limited to certain outcomes), but embrace a more radical indeterminacy by allowing this arbitrariness to participate in the work.

The same distinction has been made in contemporary philosophy: 'The ideologies of probability and of chance ... hallucinate a universe in which—at least—the *parameters* within which events may take place can be circumscribed. But an event, real contingency, is precisely something that overflows this compartmentalization and management' (MacKay et al. 2011). Contingency cannot be planned for or controlled, 'it is an event that happens *to* us, that comes from outside'. In light of this development in materialist philosophy, literalism in art is understood as the response to an increasing awareness of contingency:

> [Figures of contingency] signal the impossibility of a certain
> conception of the work of art: the work as a block of matter ordered
> and organized to present an autonomous, intentional, controlled
> experience. Artists were able at one time to maintain the illusion of
> confining the audience's attention entirely *within* the representative
> space of the work; subsequently, they became, let us say, painfully
> aware of the contingent nature of the material supports of painting
> and sculpture, thematized these traditional supports and exhibited to
> us their limited lifespan. At the dawn of contemporary art, the
> recognition that these formats were historical artifacts, contingent
> factors, finally caused the work to explode beyond them, or rather,
> to acknowledge its always already having been complicit in with
> what fell outside of them. The work opened up explicitly and

radically to new materials. (MacKay et al. 2011)

Reza Negarestani's concept of 'complicity with contingency' takes the theory one step further. I have been arguing that an openness to materials and a focus on their affordances is the way to engage with contingency. But Negarestani claims that this is precisely what propagates a 'restricted concept of materiality':

>'What is common to those artists who embrace the contingency of the materials they work with?' The link between such artists is their 'complicity' with contingent materials. It might be thought that 'complicity' is synonymous with an 'openness' to contingent materials. But this is not the case. For if we consider art as a material-driven process of production, these anonymous materials enjoy an autonomy of their own; and such autonomy continuously interferes with the artwork itself regardless of the decisions of the artist—that is, whether or not the artist determines to be 'open' to their influence. In other words, the contingency of the artist's materials cannot be the strict subject of the artist's openness. Contingent materials cannot be directly embraced. (Negarestani 2011)

The concept of contingency is to some extent reified here, as an autonomous force that acts on the artist as subject ('it is an event that happens *to* us, that comes from outside'). Negaristani determines that the most effective way to be complicit with such a force is, in contrast to the aforementioned openness, to attempt a total 'closure' of the artwork. Since contingency has its way regardless of any openness towards it, it is at its most effective and noticeable when the artist attempts to close it off. The artist in this approach is thus secretly in league with contingency, 'complicit' in its game.

Despite its apparent anthropocentricity (contingency appears to be defined as any non-human agency), this theory is compelling. However if we consider it in relation to concrete examples of artistic practice it begins to make less sense. It could be said that any work of art prior to the development of reflexive movements in the 20th century attempts a closure in the way Negaristani describes. Such works are clearly contingent, in the sense that anything is contingent: it is this way, but 'it could have been different' (MacKay et al. 2011). And yet they are not generally taken to be foregrounding their materiality through a complicity with contingency (although it is interesting to consider them in this light). Ultimately, it seems that a certain kind of closure is very possible, and is not in fact

frustrated by contingency in most cases—perhaps contingency is not as strong a force as suggested, its most interesting effects do require an openness towards them. This can be thought of as the artist participating in contingent processes; the artist is not an entity removed from materiality who has materiality act upon them.

Since *Blackest Ever Black,* Hecker has continued this line of inquiry. As a collaboration with Robin Mackay, Elie Ayache and Quentin Meillassoux, *Speculative Solution* (eMEGO 118, 2011) states in the supporting literature that the music is constituted by 'truly "literalist" marks which have no reason to be as they are, and which could have been—and still could be, at every moment—otherwise' (MacKay 2011). As was already evident in *Blackest Ever Black* (inheriting the materialist aspects of Haswell's practice), 'with *Speculative Solution* Hecker proposes that the concepts of absolute contingency and hyperchaos offer a rigorous new alternative to the employment of chance and randomness in avant-garde composition' (Mego 2011).

Xenakis famously used stochastic techniques, but also noted the indeterminacy inherent in the movement of the hand (Varga 2003). This is a concession that although the hand may be 'the organ of the body that is closest to the brain' (Lohner 1986), it cannot act as a perfectly transparent medium in the expression of an idea. The artist's own body is itself a medium of contingency. Movements of the hand, even when unintentional, could be seen as expressive and gestural, as bestowing the work a human 'warmth' (as opposed to the 'cold' perfection of a machine). But this does not constitute expression, it just happens to be an aspect of the material process. The careful tracing of pictures in particular plays any expressive or communicative aspect down.

Materiality and Presence

Hans Ulrich Gumbrecht's work in literary theory is based around questioning the dominance of a 'meta-physical' approach to aesthetics, by which is meant the interpretation of meaning in analyzing a text (Gumbrecht 2004). One of the starting points for this is Derrida's claim that logo-centrism begins with the denial of 'the exteriority of the signifier'—whatever is external to symbolic meaning (the actual material that makes up the words on a page, the paper, the ink and so on). Gumbrecht's interest is in how different media or different 'materialities' affect the meaning that they carry, which avoids the 'meta-physical' view because it does not conceive of meaning as something separable from material form. We can begin to see how this theory allows for the way in which technology is entirely implicated in art. That technology is responsible for a work of art or music

ending up how it ends up may seem obvious, but the previous discussion of Xenakis, and particularly spectromorphology, demonstrate the opposing viewpoint; a view of technology as merely enabling, providing a smooth uninterrupted channel from the composer's imagination to a musical result—the utopian dream of a technology capable of creating 'any sound you can imagine' (Theberge 1997).

This desire for a technology which does not interfere or is transparent, ultimately battles or works against the technology. On the contrary, we are concerned here with music or art in which the characteristics of the technology and materials used are at the forefront of the work. The artist can allow this to happen, by acting in a kind of 'fidelity' to the technology; understanding its brute facts and basing the creative process around working with/against its limitations. Even if the process of creating the work is wrought and difficult, the materiality of this process can remain the focus in this approach, not the making-invisible of technological aspects to create a transcendent experience. This way of thinking about technology begins with the understanding of music or art as material. There is not a pre-existing idea in the artist's mind that needs to be communicated but the work is something resulting from material conditions. The most important aspect in the development of new aesthetics is therefore found in the relationship to technology.

Haswell has stated that his main aim is to create 'physical qualities' (Haswell 2007). Referring to his live shows as 'temporary public sculpture', he attempts to create sound that feels like 'a physical presence, like there was some fucking piece of steel in the room that was going to drop on you' [6]. The influence here is Serra again—a rigger was crushed to death by a steel plate during the installation of a Serra piece in 1971.

But what is meant by 'presence' in this sense? And how does it relate to physicality? Gumbrecht talks about the possibility of 'presence effects' in opposition to 'meaning effects'. Note that this could be confused with Derrida's 'metaphysics of presence' in logocentrism—the search for a transcendental signified—but this is not the sense in which Gumbrecht uses the word. Presence is precisely something that is not meaning; this perhaps retains a certain kind of transcendentalism, but it is not a search for any kind of signified, rather the absence of signification.

It could be seen as an opportunity for the construction of new meaning, and it is important that meaning is seen as a construction in order to do this. As with Searle's construction of technological function, nothing is natural or inherent or pre-given. The construction of meaning, however, is secondary to the experience itself according to Gumbrecht. With reference to Heidegger, he describes the experience of a work of art as an

unconcealment of being, which specifically 'is not something spiritual or something conceptual. Being is not a meaning. Being belongs to the dimension of things' (Gumbrecht 2004).

The 'thingness' of something, its being, though, is no longer being once it is perceived; it becomes interpreted meaning instead. Thus this experience is liminal, we can only perceive being as a constant 'bringing forth' and 'withdrawing' from this threshold. Crucially, this can only happen when we 'abandon any transcending imagination and projection'. It is not to do with any interpretation of the world, but of being in the world. This brings us again to Heidegger's Greek temple that 'portrays nothing' (Heidegger 1993); its presence brings forth its materiality, and the materiality of the situation of the encounter. This could be seen as the state that literalist art aspires to. Instead of a depicted expression of universal meaning, experience is kept in the 'real' world, open and specific. Because, 'unlike the Platonic ideas, Being is not supposed to be something general or something metahistorical 'below' or 'behind' a world of surfaces' (Gumbrecht 2004).

The material recorded for *Blackest Ever Black* was also used later in *UPIC Warp Tracks* (Warp 2008, WAP239CD). The sleeve notes by Dave Falconer describe the effect of art as entrancement: 'thought hooked on a vibration'—excited matter. '[Art] is an involuting of complication: a fixation on the material 'in-itself', letting matter 'be".

apPatch and *Get Down*

In 1999-2000, Andy Pieper developed a series of modules for sequencing, synthesis and processing in SuperCollider 2 (McCartney 1996), running on Mac OS9. A patch called apPatch brings these modules together and allows dynamic routing between them. This patch became the primary tool not only in Pieper's own work with Ramon Bauer as General Magic and Sluta Leta, but also in Peter Rehberg's work at the time. Albums involving its use include *Rechenkönig* by General Magic (MEGO 032, 2000), *Showroom Dummies* by Rehberg and Tujiko Noriko as DACM (MEGO 056, 2002), *Semi Peterson* by Sluta Leta (MEGO 073, 2003), and Pita's *Get Down* (MEGO 049, 2002) and *Get Off* (Häpna H19, 2004). Rehberg also continued to use it occasionally in later works, including his collaboration with Stephen O'Malley as KTL, for instance in the bass line of *Paratrooper* (*IV*, eMEGO 089, 2008).

In interrogating the relationship between music and its means of production, this patch is of particular interest because we can observe the similarities between a small but well defined set of works that were created in the same software environment. The creation of the software environment itself is also of interest. Pieper and Rehberg describe the patch as the result of an iterative development process, with continuous experimentation by users leading to suggestions feeding back into modifications or the development of new modules [1]. Pieper describes the impulse behind its development:

> I wanted to answer the question of 'how does digital sound sound like?' Most of the professional plugins at that time tried to simulate old hardware while removing limits like number of oscillators, ability to store settings, removing awkward sequence programming etc., eventually ruining it. It was rare to find something that sounded and felt genuinely 'digital'. [8]

The desire for something 'that sounded and felt *genuinely* "digital"' is perhaps a desire to get away from the symbolic high tech aesthetic discussed in chapter 2.

Superficially the development of the patch appears to place it at the intersection of the two fundamentally different approaches to music discussed throughout this thesis—it has elements of an idealist approach ('I want to do X, so I will make or find technology that makes X possible'), and a materialist approach ('I have this technology, what can I do with it?'). By examining the music created with it, we will see how the former is misleading, and that this description of the process as sitting between binary opposites can be replaced

by an understanding of pragmatic philosophy.

apPatch

First the functionality of the patch should be analyzed in some detail. On its execution, a
window displays all of the available modules, and number boxes for the user to select how
many of each module they want to create (figure 5). The modules are divided into three
types: a sequencer, lfo and 'dust trigger' send triggers and control messages to various
parameters; an oscillator, sample player and so on generate sound; and effects modules
(shaper, comber and resonix) process sound. SuperCollider distinguishes between control
rate data and audio rate data, so the first type of module has a control rate output, the
second type has a control rate input and audio rate output, and the third type has audio rate
input and output. This allows easy routing between modules, by allowing any parameter in
a module in the second group to be linked to any module from the first group, and inputs to
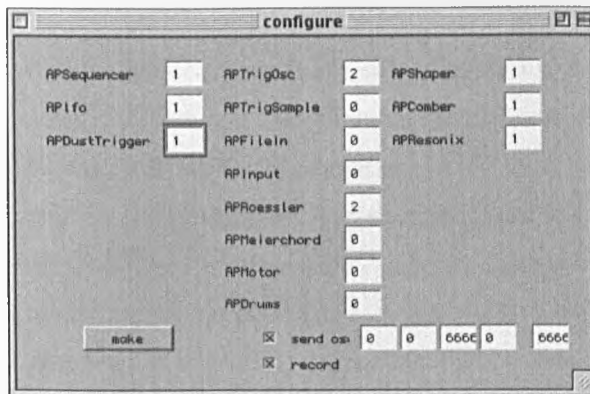the third group of modules to be any combination of outputs from the second group.

Figure 5:   apPatch initialization

Figure 6 shows a typical configuration of modules, including:

- Sequencer: an 8-step sequencer outputting triggers and pitch/amplitude values, with
  a variable portamento. The bottom row of numeric values sets the number of
  triggers in that step, so a '3' would make three equally spaced triggers in the space
  of one beat—in this way simple combinations of odd numbers lead to very
  rhythmically complex patterns. In addition, the length of the overall sequence can
  be set in the two number boxes above the steps such that, for example, only the first
  five steps are looped. Changing this dynamically can again lead to very unusual

rhythmic patterns. The speed is set in relation to a tempo that is global to all sequencer modules (i.e. '1' means play at the global tempo, '0.5' means play at half the global tempo). Patterns across multiple sequencers can be moved in or out of phase with each other by changing these speeds. There are various options for altering the pattern as a whole, such as shifting pitch values up or down, and rotating, reversing or scrambling the sequence steps. Sequence steps can also be played in a random order rather than linearly.

- LFO: a basic low frequency oscillator with its frequency, as with the sequencer, set in relation to the global tempo. This is one of a number of modules that uses the wavetable editor in the top right of the window; selecting 'edit waveform' links the displayed wavetable to the LFO, which can then be edited in a number of ways. The wave can be directly drawn, or it can be generated by setting frequency domain values for the phase and amplitude of each individual bin. It can also be filled with white noise, shifted up or down for 0Hz offsets, and broken into segments by inserting random short gaps of silence.

- DustTrigger: the dust trigger is based on a SuperCollider 'unit generator' called dust, that generates randomly spaced impulses, with a parameter controlling the density of impulses. This module converts these impulses into triggers for the TrigOsc and TrigSample modules.

- TrigOsc: an oscillator with an envelope that can be triggered by one of the control modules. The oscillator wave can be set using the wavetable editing functions, as can the amplitude envelope, with the length of the envelope set by the length parameter. It also has a simple filter. Pitch values and filter cutoff values can be controlled by different control module outputs to the triggering; for example, a dust trigger could randomly trigger notes, but with the pitch values set by a sequencer pattern.

- TrigSample: much the same as TrigOsc, but with an audio file instead of the wavetable. The audio file is selected when the patch is first initialized and cannot be changed dynamically.

- Roessler: this is a chaotic algorithm noise generator, generally creating bass drones. It is based on a Rössler attractor (Rössler 1976). This again is essentially an interface to an existing SuperCollider unit generator, called Rossler. It creates three of these generators, and each has one parameter called chaosParam, which

represents the variable c in the Rössler attractor equations:

rate of change of $x = -y - z$

rate of change of $y = x + ay$

rate of change of $z = b + z (x - c)$

The standard bifurcation analysis of the Rössler attractor uses a and b set to 0.1, and varies c. Low values of c produce periodic behaviour, but it quickly becomes chaotic as c is increased. The choatic behavior is within a limited range though, so the result is pitched, like narrow-band noise. Changing the value of c changes the perceived pitch of the sound. This is combined with pitch values from a control module for each attractor, to create chaotic oscillations around a given pitch.

- Shaper: combines a delay, comb delay, granular pitch shifter, and waveshaper. The waveshaping can be edited with the wavetable functions.

- Comber: also has a waveshaper, followed by a reverb and a compressor/expander/limiter/gate (a SuperCollider unit generator called 'compander').

- Resonix: a waveshaper and delay again, this time combined with a large bank of resonators creating very 'musical' resonances. This is a result of note values for the frequencies of the resonators hardcoded into the patch, at octaves, fourths and fifths and so on.

Global functions include a single band EQ on the final audio output, and a random parameter walk. The latter takes the radical action of sporadically picking random parameters across *all* modules at a regularity determined by the 'task probability value', and makes alterations within a range set by the 'random range' value, with very unpredictable results.

The modules were introduced by Pieper based on his own experimentation in SuperCollider, but also on requests from other artists: "'we want a sequencer and something that plays a file" ... very basic ideas' [1]. The reasons for decisions such as making the sequencer 8-step, rather than 16 or 32 for example, were generally due to technical limitations; too CPU intensive, taking too much of the screen and so on. These limitations would turn out to be important. There are a also a lot of failed experiments remaining available within the patch—'APMeierChord', 'APDrums'—modules that did not end up being used on any releases (therefore not discussed in detail here). This is compelling evidence of the experimental nature of the development process. When development began, there was no overall design. Tellingly, the unused modules are the

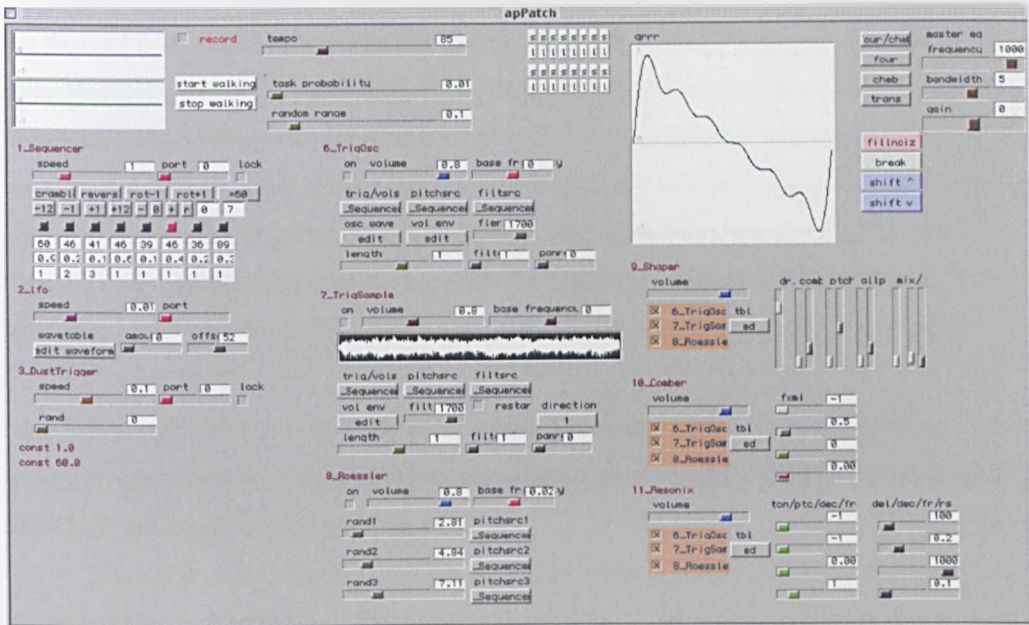more complex modules that attempt to do more than the low level DSP that SuperCollider immediately affords.

Figure 6:   apPatch

In the modules that were actually used in releases, the vast majority of the controls are direct manifestations of the parameters available in SuperCollider unit generators, giving a very 'raw' interface to the possibilities offered by the various DSP and sequencing functions on offer. There is little distinction between the underlying system and the patch interface; the interface does not for the most part abstract to provide higher level control. It should also be noted that all control parameters are immediately visible on one screen. The exception to this rule is the wavetable in the top right, for which a separate window can be opened displaying an editable frequency domain representation of the waveform, with sliders for each phase and amplitude bin. Other than this, after selecting the modules, an entire piece is determined by a single screen of parameters. This may seem superficially very limiting, but I will argue that such explicit limitations are necessary to create a space for experimentation, as opposed to a goal driven teleological decision making process.

DAWs

If it were possible to create an audio production system without limitations or particular characteristics and affordances, as discussed in relation to the UPIC, this is what would be

referred to as a 'transparent' medium. In this theoretical situation there is no experimentation to be done—empirical investigation is impossible without something to investigate. We are left only with the possibility of a rationalist approach in which ideas are not derived from sense data but exist *a priori*. Hence the link between a desire for technological transparency and rationalist, idealist approaches to composition, which are necessarily goal driven. However, this ideal system is nothing more than theoretical. If we consider the infinite ways to create audio, it is impossible to imagine a system that covers all possibilities equally without prejudice or favour. Certain systems, such as advanced digital audio workstations, initially appear to be general, without favouring any particular sounds or structures, but in fact represent a very specific way of thinking about music (derived originally from the concept of a score—graphic representations of time moving from left to right, and so on). This has of course become naturalized and is generally taken to be universal—music *is* a series of events ordered on a timeline. The perceived generality of a DAW is a result of this naturalization.

The apPatch interface in contrast cannot be seen as general or universal, it offers unequivocally limited choices. The routing is very basic—it is not possible to route a signal through more than one effect module in series; the inputs to effect modules are simply represented by a series of checkboxes to select which sound generator module outputs should be used. Similarly, the control inputs for sound generator modules are selected with a dropdown box. The user is explicitly given a choice between two or three options for each input. However, it is precisely this limitation that gives it a tendency to create interesting results. For example, in two mouse clicks the possibility exists to switch the routing for a generator module to the output of a sequencer, for setting either its pitch or triggering, while the sequencer in question is simultaneously used for an entirely different purpose, controlling a separate generator module. This kind of sharing of control modules is in fact a necessity in many cases, since only two or three control modules are generally available due to limited screen space and processing power.

Experimenting with a different option in a routing dropdown box often results in radical and unexpected changes to the sound and patterns produced. My claim is that in instances like this it would not have otherwise occurred to the composer to link elements in that way. I.e. *it is not something anyone would be likely to do in a DAW*, even if it is technically possible. A DAW has its own particular affordances, the fact that it would be extremely unusual to set up this kind of triggering in Cubase (Steinberg 2011) or Logic (Apple 2011) is sufficient to justify this statement—an affordance that is negative (it does

not afford the re-use of sequenced triggers) is still an affordance, demonstrating that it has certain characteristics and is in no way transparent. Pieper explains his intention in developing the patch, and highlights the paradox of being limited by what appears to be an open and unlimited DAW:

> it's all about experiments and embracing limits. Thats one of the first things learned when working with digital media, the 'anything is possible' notion is a curse ... the patch never was meant to be used as a DAW-like tool. DAWs (at least at that time) mimic the classic multitrack studio production with non-linear editing thrown in. I found that those lend you to endlessly tweak details, lose focus and get drowned in a sea of possibilities. There was not much there in terms of supporting the 'creative process' as well, the software always got in the way. [7]

Rationalism and pragmatism

In the use of the apPatch, it does not seem to make sense to describe the process as goal driven (and though latent this is also the case in the use of a DAW). In as much as goals do exist in the process, they are not predetermined but arise from experimentation within the limitations of the system. Again, we return to Dewey's 'ends-in-view'; goals as transient tools in a process of empirical technological inquiry. The word empirical in this context could be controversial, since Dewey's project was often couched explicitly in terms of overcoming the traditional divide between empiricism and rationalism. But this is in reference to epistemology—empiricism and rationalism as fundamentally opposed descriptions of the way in which we discover truths about the world. Dewey's position, and the position of subsequent pragmatists, is that truth is not something that exists objectively in the world to be discovered. The truth of a statement or theory is better defined by its usefulness in a specific situation. This is not inconsistent with a weaker empiricism in the sense that it is used in this thesis: technological inquiry proceeds empirically, but this is not to do with discovering truth. For instance, empirical data is surely the means by which ends-in-view are formed. Webster Hood is one Dewey scholar who believes that a philosophy of technology 'requires a more comprehensive empiricism than Dewey's instrumentalism permits' (Hickman 1990). Hickman however claims that the empiricism Hood describes is in fact already part of Dewey's method—as described above, inquiry undeniably is in some aspect empirical.

So the difference appears to be merely in the terminology; Dewey avoids the word empiricism perhaps because of its baggage in the history of epistemology. But there is also a desire to avoid the implications of a naïve or total empiricism, which assumes experience to provide something like 'raw' sense-data—colours, shapes, sound as pure vibration etc.— from which all knowledge can then be derived. For Dewey, and William James before him (James 1950), sense-data can never be 'raw', because experience as it exists is due to millions of years of biological development and a lifetime's exposure to thousands of years of cultural development. This context cannot be disregarded. Sense-data is therefore already infused with more complexity than the word 'raw' would imply, *in order to be* sense-data. It only exists as something that can be called sense-data because it has been interpreted by an organism, an organism that has evolved and developed to deal with input to the senses in a particular way. The empirical basis for technological inquiry should be considered in this way; the selection of ends-in-view is informed by biological makeup and previous experience, including all of the music the composer has ever heard and so on.

The knowledge gained by this kind of empirical investigation is called 'honorific' or 'vital' by Dewey—it is not final or complete; it is not knowledge of objective truth. Inquiry based on this kind of knowledge is fundamentally experimental. 'Experience in its vital form is experimental, an effort to change the given; it is characterized by projection, by reaching forward into the unknown' (Dewey et al. 2010). Ends-in-view are therefore also referred to as projected-ends. As we will see later, this applies to the creation of the apPatch software itself, and also to the process of using it to make music.

To re-iterate an earlier point, it is the fact that goals are formed in this way that leads to the conclusion that technology can never be transparent. As Hickman describes: 'Dewey did not treat tools and instruments as value-neutral but rather as teeming with values and potentialities that form the basis for intelligent selection of ends-in-view, or things to be done' (Hickman 1990). Due to the impossibility of the ideal transparent technological medium, a final goal driven approach can only be a fantasy. Nevertheless the implied neutrality of DAW-like systems suggest that a composer should proceed as if they *are* engaged in such a process. A question then arises: where do the ideas or goals 'come from' that are to be communicated via the transparent medium? Received wisdom might describe it as 'inspiration', pure creativity. But according to the arguments outlined above, the process is better described as one in which the ideas the composer has are in fact a product of continuous technological inquiry, iterative feedback from empirical investigation. If the composer is unaware of this, there is a danger that, while using a DAW

for example, the technology is in fact surreptitiously determining many characteristics of the music. In a system that purports to be general, these characteristics will be related to the previously mentioned naturalizations. For instance a composer might begin arranging events on a timeline, layering different elements and so on, without considering any alternative approaches. So although the perceived process is one in which the composer is free from constraints, the result is likely to be only the repetition of previous or existing forms.

Coyne makes this point regarding information technology as a whole: '[information technologies] promote the illusion of differentiation, choice, and freedom, thereby masking their promotion of conformity. This is evident in the promotion of the computer as a universal machine, able to do our bidding when instructed through the medium of programming. At best the computer only calculates and so further instills the primacy of its own logic and organization, while outwardly promoting a sense of control' (Coyne 1995). This 'sense of control'—domination and mastery—is important; the rationalist approach by definition involves objects yielding to the will of the subject. Technology is seen as an 'empty container', responding to the user. Bear in mind that we are still concerned with two different stages of technological production here—first the design and implementation of a software audio production environment, and second its use.

Coyne describes a pragmatic approach as one where the principal characteristic is an understanding that technology fundamentally alters being. He draws on Heidegger for this. Time is the essence of Heidegger's conception of being; in opposition to a Platonic ontology in which something underlying reality is eternal, being, according to Heidegger is historical and contingent. This distinction may appear inconsequential, but the alternative is an understanding of historical difference (or difference in general) as 'merely' cultural, underlying difference is a universal kind of being. This is what Coyne calls the conservative theme, it promotes the idea that human activity is only *facilitated* by technology, and activity is therefore goal driven. A given technology does not fundamentally change circumstances, it only performs its task better or worse than another technology. 'It presupposes our ability to declare needs, wants, and intentions ... technological artifacts conserve the intentions and meanings of their originators. The conservative view presumes that designers can control, and are in control of, what they produce', This can also involve 'the romantic conception of the designer as the creative individual, battling against opposition, preserving his or her creativity' (Coyne 1995).

It is clear to see how the understanding of being as eternal engenders idealism in a

field such as music. The means by which the music is being made is the facilitation of an activity which would have existed otherwise, the means can only vary in its effectiveness at performing its function—conserving the intention of the composer. A concrete example of this would be the aforementioned DAW-type software; various DAW systems exist (Logic, Cubase, Sonar etc.) and arguments rage regarding the relative merits of each. But these differences tend to be superficial, they all ultimately produce music in more-or-less the same way, i.e. arranging either sound files or notes (MIDI) on a timeline. There appears to be an underlying assumption that there exists an ideal piece of music production software which all of these instances aim to embody, with varying degrees of success. The user of such software must already know what they want to produce, and they are looking for something that will allow them to produce it.

Alternatively, Coyne explains that 'for pragmatism, design is not so much addressing needs as projecting expectations'. The choice of words shows a clear influence from Dewey. Linking this to Heidegger (he states that 'Heidegger's being is thoroughly pragmatic'), since being is historical and specific rather than eternal, projected expectations depend on the technological context in which activity is taking place. For Coyne 'technology is implicated in how we see ourselves, and therefore, in our being ... there is no underlying truth to our being beyond our seeing ourselves to be under a multiplicity of influences'. He claims, for instance, that 'the technologies of writing and print have contributed to how we see ourselves as originators and authors of ideas, as beings with minds capable of abstract thought—minds analogous to sheets of paper able to hold symbols'. If this is the case, it therefore should not be surprising that computer technology might fundamentally change our conception of what music is. Music is not a fixed concept, it is a human activity (Dodd 2007).

Once the radical specificity of technology is recognized, a design process, or technological inquiry in general, becomes the continual identification of new requirements during the process, based on exploration and a reaction to the results of experimentation with the possibilities of the material means. 'For pragmatism, design is a kind of "reflection in action"—needs are commonly identified in retrospect or during the development of the design rather than at the outset of the design process. Design is an exploration, but one that is already in progress prior to any particular design situation' (Coyne 1995).

This brings us to another important conclusion of pragmatic philosophy: theory does not come prior to practice. To a rationalist, engineering is applied science—theory is demarcated as knowledge at a general level, which is then applied in more specific

situations; a hierarchical top-down approach where experts pass on knowledge to those lower down the hierarchy. The functioning of a technological artifact is therefore already determined before it is used. Coyne gives essentially a functionalist account of rationalism; it 'affirms that the physical presence of a technology is subservient to what it contains or accomplishes'. It does not allow for the idea of 'practice as participation', of end-users participating in technological inquiry. Means are subservient to ends[7], and thus the context in which the means occur is generally not taken into account.

However to a pragmatist, the distinction between theory and practice is usually considered erroneous, theory is a type of practice. Furthermore, non-theoretical practice generally comes first. Theory is a reflection on previous practice, as a working hypothesis that acts as a tool aiding further practice. For Dewey, thought is a technology like any other. In order for theory to underpin practice, there would need to be a theory on how to apply theory to practice. But then there would need to be a theory on how to apply that theory, and so on to infinity. In the tradition of hermeneutics, following pragmatism, theory is replaced with *phronesis*—a less absolute, practical judgement.

This leaves us open to the idea that technology at all levels of inquiry cannot be defined by its theoretical function, it is always situated in a context of human praxis. Coyne uses the example of a car (Coyne 1995, p.30). It gets us from A to B, yet it clearly holds more significance than this, it is a status symbol, it represents a certain kind of freedom, and the act of driving itself is often considered pleasurable—the means of getting from A to B are an end in their own right. The means/ends dichotomy is therefore, like theory/practice, collapsed. Another example is the way in which digital technology is developed as a means for dealing with the vast amounts of data we increasingly have to deal with—it appears to be a means to an end in this sense—but digital technology itself is implicated in creating this vast amount of data in the first place!

Coyne sees the recognition of these kind of ideas reflected in a (relatively) recent 'pragmatic turn' in IT design methods, where there is only lip service paid to theory. Practice is generally made to fit theory in hindsight, for the purposes of appearing to have followed 'proper' methodology. Design methods should in fact follow this trend, he argues; they should only be loose guides that allow sensitivity to context and the specificity of the situation in which the technology will be used. This will inevitably involve an

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7 Alku's IMBÉCIL project is an interesting exploration of means and ends in software design, in an artistic context: a project for 'useless, obfuscated, surreal, pointless computing' (Alku 2002, see http://personal.ilimit.es/perkele/evol/pmwiki/pmwiki.php/Main/Imbecil). Including programs that delete themselves, games that are impossible to play, 'user-non-friendly interfaces' and so on.

intermingling of end-users and designers, or end-users *as* designers, and an openness to continually shifting requirements.

In order to follow this approach, Coyne asks: 'has [a technology] been designed with the presumption of cause and effect from designer to user, or has its design appropriated the involvement of the community that uses it? Has the design been created assuming the technologist knows best and that users should conform to some technological model of behavior, or has it been tried and adapted within the arena of situated human praxis?' In each of these questions, a DAW represents the former options (with small exceptions—perhaps the tokenistic inclusion of feedback from users suggesting minor modifications).

The apPatch in contrast is designed without distinction between user and designer, through continuous and pragmatic experimentation to find the best results. The outcome is a system which highlights the ability of technology to suggest radically new forms, rather than seeing technology as closing off and limiting 'creativity' due to its opacity.

Get Down

We can see the result of this process in Pita's *Get Down* (MEGO 049, 2002). The album opens with the track *We don't need no music* built around a low drone, making use of a frequency at the liminal point where discrete perceivable events become continuous—a rasping chain of microsounds. However each of these microsounds itself has pitch. Figure 7 shows a spectrogram of this sound. The frequency of occurrence of the sounds that are almost perceivable as separate events is a peak right at the bottom end of the spectrum, but various strands of evenly spaced harmonics, though low in amplitude, are also spread throughout. The multiple nature of these harmonic patterns means that the result, though vaguely pitched is also very noisy. The most pronounced harmonic series has a fundamental at ~38Hz, and the next most pronounced has a fundamental at ~26Hz; they are not themselves harmonically related.

Research using the apPatch reveals that sounds like this are achievable using the Roessler module. Figure 8 shows a Rössler attractor with typical parameters setting it in a chaotic state. The sonification of the attractor in SuperCollider is in fact the values of all axes summed together, with any resulting DC removed. The density of the lines shows how the attractor tends to stay in one plane, with occasional leaps into the third dimension that are often large in amplitude. With three such attractors added together, we can begin to see how this results in the periodic and pitched, yet also noisy material seen above. In

experimentation to reproduce this sound, the very low frequency rasping comes from the contribution of the axis that only occasionally sees sudden value changes.
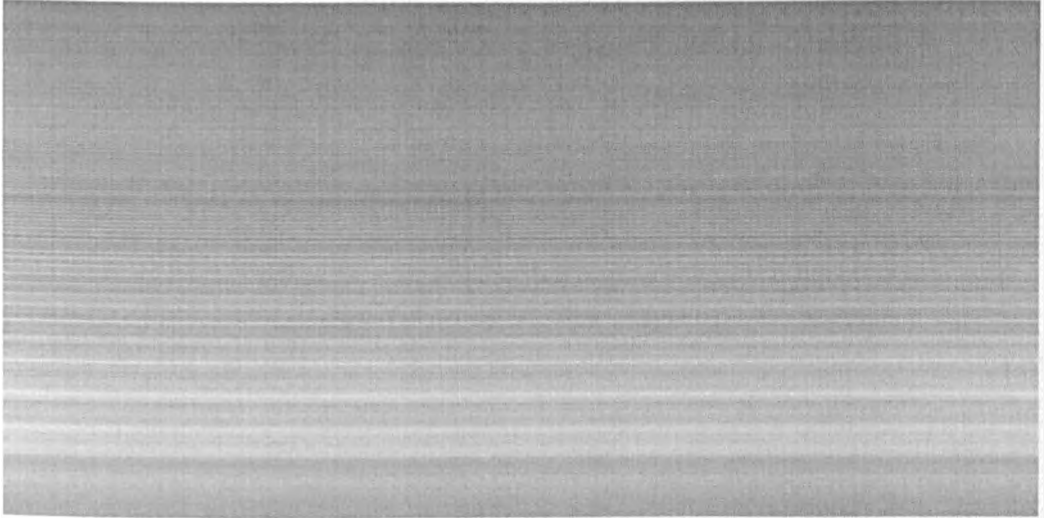
Figure 7:   Logarithmic scale frequency analysis of excerpt from
We don't need no music
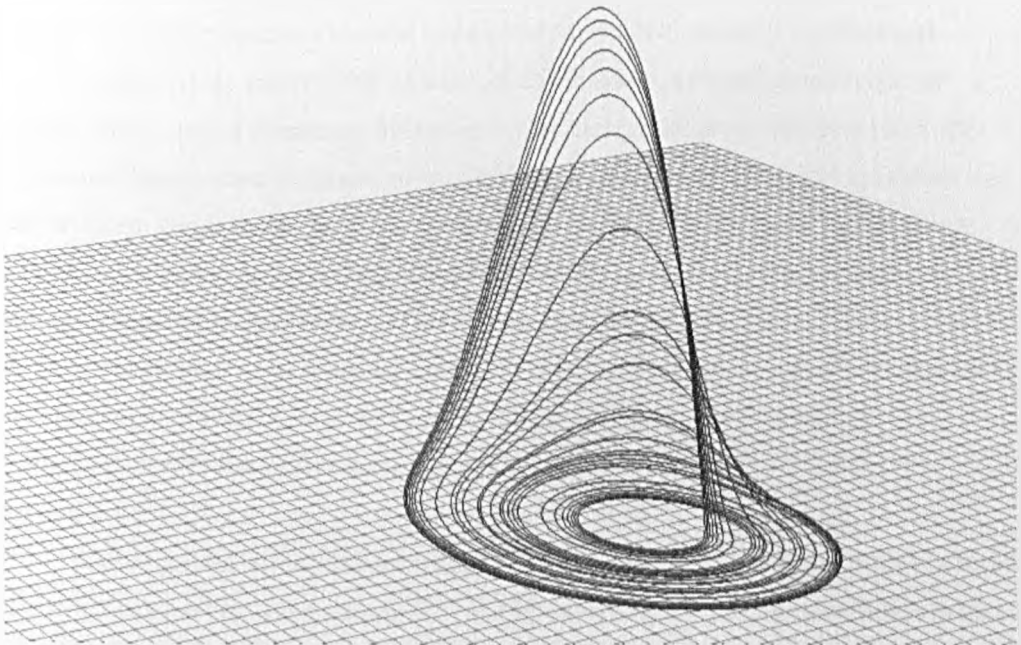
Figure 8:   Rössler attractor visualisation (generated with *3D Attractors*
(Restrepo 2011)). Parameters are set to $a = 0.2$, $b = 0.2$ and $c = 5.7$.

The interface for the roessler module provides controls that afford a kind of timbral composition that results in sounds like this. The three chaos parameters (erroneously labeled 'rand' in the interface) provide the means for an exploration, which, from research (both observation and experimentation), was found to tend towards a search for the kind of liminality discussed above. One explanation might be that such sounds are simply more interesting to listen to; putting it in terms of information theory, both pure noise and pure repetition can be shown to provide minimal entropy. I.e. huge recordings of constant white noise on the one hand or a sinewave on the other could both be losslessly compressed to almost nothing—they have very little information content. Something liminal between the two, on the edge of chaotic behaviour, cannot be reduced in such a way. It has no redundant 'information'.

An alternative interpretation in the reverse engineering of this drone sound is that it is the result of a trigosc oscillator being triggered very rapidly. A similar sound can be achieved this way. High frequency switching (high frequency in event triggering terms) between two or three pitches would also account for the spectrum in figure 7. Later in the track, the drone is replaced by a bassline sequence that has a similar quality to the drone. This could be a sudden alteration of the tempo slider in a sequencer module, from very high, where rhythm becomes texture, to a more conventional tempo for a sequencer.

Whichever its source, after 35 seconds of the drone, an arpeggiated sequence appears. The sound in contrast to the drone is very clean, a single oscillator with gentle harmonics. This is most likely one or two TrigOsc oscillators with a waveform drawn into the waveform window, and the filter reducing any harshness of the resulting harmonics. Due to the repeating nature of the phrase, it is likely to be controlled by a sequencer module. There is also portamento on the frequency changes of the sound. The sequence is sporadic and fitful, it beats a regular time and repeats in a regular way, and yet manages to avoid a kind of musicality that would allow a listener to easily count time to it. For example, no preference or emphasis is given to notes that fall on 1/1 or 1/2 or 1/4 measures.

Values for the parameters that determine the sequence are set as numbers in a series of anonymous looking text boxes, there is no higher-level graphical representation to give an overall impression of the pattern being composed. This makes it difficult to approach in a rational way since one cannot easily visualize a pattern and transcribe it. In addition, it initializes with random values, and allows re-randomization, as well as various functions for scrambling the existing pattern. These options make experimentation engaging. Such

operations give absolutely no preference to patterns that adhere to traditional musical norms, such as limiting to a key, or having any kind of tonal centre or preference in rhythms for the down beat. During this experimentation, the composer, through the formation of ends-in-view, may work towards patterns that have some resemblance to musical norms, since the composer's history of listening is a part of the way in which sense-data becomes experience and ends-in-view are formed. Yet at the same time the composer can be open to shifts in those norms suggested by the technology. Such deviations would not likely be found in the (theoretical) rational approach, since by definition, they are something unexpected or unanticipated.

Despite the randomness and unknown elements, the situation is not one in which the patch is 'out of control'. Rehberg states that he is in control of the software ('ninety percent of the time' at least [1]). It is possible not to know the exact results of any given action, but to have an intuitive feel for the type or scale of the response, learned from previous experience. The fact that the patch contains indeterminate elements does not carry the implication that this pushes the system as a whole *beyond* the user's control. Quite the opposite appears to be true—they are the elements that form the basis for interaction. They bring about a deeper, more productive type of control; interaction rather than merely action, abandoning any top-down patriarchal type of control.

This deeper relationship formed with the technology is important. Rehberg has continued to use the same software for a number of years, despite the technological advances in computing that have occurred in that time. He has emphasized the importance of mastering just a few tools, rather than immediately making use of the latest available tools [1]. Learned through years of practice, his intuitive use of the apPatch software is in many ways like the use of a traditional instrument (but in other ways very different as will be discussed later).

The majority of the tracks on Get Down make use of almost all of the modules in combination. For instance *We don't need no music*, as well as using the sequencer, trigosc and roessler modules, also makes extensive use of the effects modules. All of the sound material has a large amount of reverb throughout, from the comber module. Then towards the end of the track, all of the material together becomes subject to extreme distortion and sporadic gating. At this point we also begin to perceive the characteristic effect of the resonators from the resonix module. The sounds become gated to such a degree that they begin to approximate impulses, to which the resonators give a short pitched tail.

The second track, titled *43353*, features noisy material sequenced into repeating,

gradually shifting patterns. This could be the result of a technique often used by Rehberg, in which material originally generated by the patch is recorded, and then used as source material in the patch using the sample player. He explains that this feedback process often happens multiple times, such that he builds a vast collection of sound files that have been used and reprocessed so many times that their original source (for instance a roessler drone or a trigosc sequence) is barely recognizable [1]. This refers not only to timbral processing; any phrasing through sequencing or other kinds of triggering becomes material to be re-sequenced, creating immensely complex patterns within patterns. Extreme pitch shifting also allows rhythms to become pitches and vice-versa.

43353 begins with the random triggering of a slurred double pulse of granular-sounding harsh timbres. Assuming this is a sample, each triggered sample is shifted to what appears to be a random pitch, but is actually a repeating sequence of pitches. They appear to be random since the sequence is long enough for its repetition to not become apparent immediately, and the durations between them are sporadic. This type of pattern can be set up in the patch using no randomness at all—the sequence of pitches can be set in the sequencer, and altering the tempo parameter of the sequencer periodically, unrelated to the sequencer's base tempo, will cause every iteration of the pattern to have very different timings.

Time in the patch—or rather the various representations of time (represented by tempos, durations between events and so on)—can be slowed down, sped up, interrupted, scrambled and reversed. In contrast to a sequencer found in a DAW (inheriting from the idea of a score) which depicts or prescribes the timings of events in a given duration as a linear representation, the representation of events in time in the apPatch sequencer module bears little resemblance to the sound results that tend to come out of it. Its primary purpose is therefore not to represent time at all, along very pragmatic lines, the representation of time is seen not as fixed and immutable but as a technological tool for practical activity. Because of the technological approach then, there is no possibility of 'the reification of the score' in this music—a confusion between representation and reality (Whitehead called this 'the fallacy of misplaced concreteness' (Whitehead 1997)).

Due to the unusual approach to determining timings and pitches, the impression is one of events occurring 'accidentally'. Rather than merely being 'accidental' though, this preference for jarring rhythms and mostly atonal pitches could be linked to Rehberg's stated 'dissatisfaction with the status quo' [1]. There is a generally oppositional stance in Mego. There seems to be a desire in Rehberg's work to challenge listeners by distancing as

far as possible not only from existing musical vocabularies, but also the basic expectation that recognizable patterns will emerge.

At 1:05 into track 4, *Our pen!*, a repeating percussive rhythm becomes instantaneously distorted with the addition feedback and other extreme effects, severely changing the character of the sound. This happens suddenly at a point in the pattern that bears no relation to its perceived beginning or any whole subdivision of a measure within it. This is the manifestation of an innate characteristic of the routing in the patch—changes to the routing of signals cause large sudden transformations like this, while changes to the parameters within modules tend to be more gradual.

We can see similar structures in Rehberg's work prior to *Get Down*. In particular, the untitled third track of *Get Out* (MEGO 029, 1999) consists of a looped sample from Ennio Morricone's *Come Maddalena* from the soundtrack to the 1971 film *Maddalena*. The loop is progressively subjected to a variety of different distortions. Coming before access to software like SuperCollider, this was done with various distortion pedals, which can be turned on or off (or bypassed), giving the system a similar means of instantaneous routing switching as above. The distortions are introduced suddenly, again, at points within the loop that sound particularly 'unmusical'. I.e., in their timing they do not tie into the phrasing of the sampled sound. Coming from a separate process external to the loop, they are undisguised interventions on what has become a unified mass of material underneath.
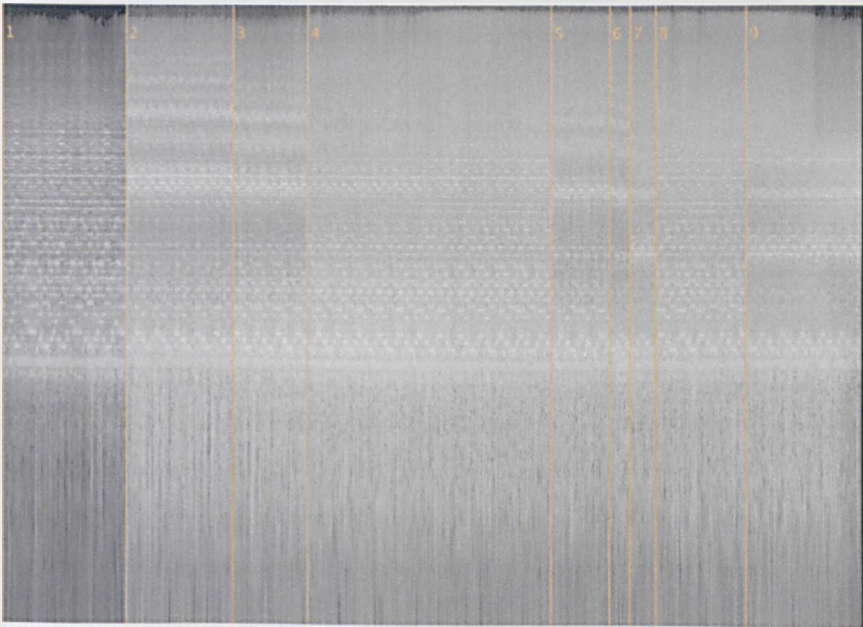
Figure 9:   *Get Out* track 3. Changes in distortion are marked with vertical lines. The distribution of harmonics is different at each change.

When patterns emerge in Rehberg's work they always retain this arbitrary feel. For instance, as *43353* progresses, the initial granular sounds become lost in a chaos of overlapping rhythms, one of which features the LFO modulation of a filter pitch, moving in and out of phase with other rhythmic and LFO-like elements. Importantly, this is without the teleology that tends to be associated with phase based pieces in the model of Steve Reich, for example. In such pieces the phase relationships are very much the point of the work, creating a tension that usually leads to an in-phase resolution (*Piano Phase, It's gonna rain* etc.). In *43353* the possibility for elements working in different timings is simply allowed to affect the result in the same way as any other characteristic of the patch; structures like this are reached through experimentation rather than the deliberate intention to compose a phase based piece.

In general, the patch makes it difficult to form clear musical intentions for the resulting sound, prior to creating that sound. This of course is paradoxical if we hold that the formation of intent is fundamentally the way in which we act in the world. But the patch very quickly forces one to abandon such models of action in favour of a playful experimentation periodically directed by transient goals and projections that tend to be fugitive. The attempt to realize them results in something very different, and the previous goal is then discarded to follow a new projection suggested by the unexpected results.

This also has consequences for the structure of pieces made with the patch. Each track in *Get Down* has some movement—from one set of materials to another, or an alteration in parameters that change the distribution of events etc.—but lacks an overall teleology, structural aspects that we might refer to as narrative. They do not tend to lead anywhere, either to a climax or a deconstruction and exposition of materials. We do sometimes glimpse moments where it feels as though this is beginning to happen though; a change will often be from a simple configuration to a more complex configuration (because this is the pattern that a session using apPatch takes, as routing complexity gradually increases). For example track 6, *Acid udon*, begins with a looping melody that builds gradually with various distortions and delays, only to be abruptly replaced at around 1:40, before it has found any kind of resolution, with a more heavily processed ambient section, perhaps using the same basic material. The transition in this instance is not so sudden that it is itself a gestural climax to the building section. It lasts about 10-20 seconds, attention is not drawn to it, leaving an unceremonious impression. This new section is then cut to silence in an arbitrary manner roughly a minute later, and an apparently completely unrelated section then lasts for the remaining one and a half

minutes.

Simplifying, one way of seeing the structure is as a series of plateaus; system states that have been found to have aesthetic value or interest. We sometimes move between these states, but the structure of the work as whole has a kind of flatness, when one track (or one state within a track) has run its course, it is turned off and the next is turned on. Movement within these plateaus is transitory—i.e. when two states are related (state B is state A with some parameter changes). The album is of course edited, so the 'turning off' and 'turning on' is in reality an edit point in most cases. Track 8, facetiously titled *Track 7*, is characterized by what sounds like slightly busier editing; introducing new behaviours fairly rapidly, and sometimes overlapping different states. It is difficult to effect such a variety of qualitative changes this rapidly using the patch in real-time.

The album in general manages to avoid referencing other kinds of music—it does not borrow from, combine, or subvert existing genres, but perhaps can be seen as their negation. This is partly a result of the aforementioned persistent contrariness regarding notions of 'musicality', since our understanding of musicality is situated in the context of existing genres. In a clear exception to this rule, *Get Down* closes with a track called *Fine swex* that evokes metal guitar sounds (prefiguring Rehberg's later work with Stephen O'Malley as KTL). Rehberg has said of metal and rock music that he was always drawn to certain formal aspects of it ('I liked the volume of it'), and wanted to do something similar but without the extra-musical aspects—the posturing and the decoration [1].

Bearing in mind the exception of *Fine swex*, the argument in this chapter is that *Get Down* is very much a result of the characteristic affordances and idiosyncrasies of the apPatch software; using these technological aspects as a means of distancing from existing music. Even in the *Fine swex* example, it is likely the case that experimentation began to suggest the metal-esque sounds, and this combined with Rehberg's knowledge of metal resulted in the formation of a goal to refine and work towards this type of sound. The point is that the music therefore does not represent non-material *ideai* that exist prior to, or separate to, technological inquiry; an inquiry in which both the material means of production and the context of the encounter (previous inquiry) are integral.

Continuing to focus on the means of production, there are three main traits that characterize the patch and therefore also characterize *Get Down*: the use of randomness, the interconnectedness of signal routing, and anti-gestural control mechanisms:

Randomness

Low-level randomness (the dust module, filling a wavetable with noise, and so on) is at a higher level perceptually predictable. It can be used in a directed way in composition, because the composer knows more or less what the result will sound like. Stochastic or aleatoric music is an example of this, the composer defines the overall structure of the piece, but details are left to statistical probabilistic processes; randomness within composed limits, as discussed previously with respect to Xenakis, and certain Cage pieces such as *Music of Changes*. This is in fact the meaning of the word 'aleatory' as Werner Meyer-Eppler defined it: randomness within controlled limits ('alea' is a latin root meaning 'dice', a die having a limited number of sides).

There are numerous examples in the use of the patch of invoking randomness within limits, with a very complex relationship between indeterminacy and control, a strange overlapping of the two: triggering from a dust module but taking pitch from a sequencer module, to create a series of randomly triggered notes which nonetheless are controlled by the composer, or routing a dust module to set the tempo of a sequencer, or using the 'r' button on a sequencer module to move randomly around a defined sequence, or a random parameter walk starting from something carefully defined.

Progressing from strategies like this, the patch allows randomness to very quickly become higher level. It is not so much a material to be composed, but a compositional strategy itself, and can be used to move away from a composed sound. Also important are strategies that do not make use of actual pseudo-random number generators, such as the contingency of running the mouse pointer over phase and magnitude bins to create a wavetable, or simply moving sliders whose function has become unclear due to immensely complex signal routing. So the higher level randomness is often necessarily built on lower level elements, which are either not random or pseudo-random, but it is also sometimes the result of more radical contingency.

Cage distinguished between 'indeterminacy with respect to composition' and 'indeterminacy with respect to performance' (Cage 1973), but in the case of this patch, the two are indistinguishable—the patch is used in the same way for creating recorded works in the studio, or playing live performances. As with Haswell and Hecker's use of the UPIC, it is also a very different kind of indeterminacy to Cage's indeterminate works which are arguably a precisely planned invocation of randomness. The indeterminacy, contingency, in question here is much more informal, it often comes from clicking around the patch interface without knowing in advance what the result will be. Another way of

understanding this is as a Bayesian model of indeterminacy—probability not as a statistical phenomenon, but a measure of knowledge regarding a situation. This gives a more holistic model of the use of indeterminacy in music, taking into account *any* unknowns in the approach taken.

The way one instinctively uses the patch evidences the way in which it encourages an approach making effective use of this holistic view of indeterminacy. But also, perhaps even more fundamentally, not just in the use of the patch but in the development of the patch itself, this approach allowed the (arbitrary, contingent) affordances of the currently available technology to determine the system and therefore the music. Most of the modules are essentially wrappers for existing SuperCollider unit generators, which are themselves in most cases the processes that most readily suggest themselves given the technology of digital signal processing. The technological approach is axiomatic.

Interconnectedness of signal routing

Even in its default state, all of the outputs from generator modules are routed to all effects modules. Parameters of effects modules can therefore be changed to affect one sound but others are affected similarly. They can of course be disconnected, but they must go through at least one effects module, there is no direct output. It is necessary in most cases for signals to share effects modules—due to the limited CPU power and screen space, it is unusual to have one or more effects modules for each output.

Likewise with regards to the control modules—the same sequencer or dust trigger module usually controls a number of different things, linking elements of the piece in surprising ways, connecting aspects that are thought of as being categorically different things. For example the values from a complicated sequencer pattern could control the chaos parameters of a Rössler drone, but at the same time also set the speed of playback in a sample player loaded with rhythmic material.

So although it may appear initially that the patch affords composition by parts (a sequencer playing an oscillator, then the introduction of a drone ... etc.) in reality the interconnectedness of the signal routing means that very quickly one ends up with a complex tightly interwoven system, in which each part affects most of the other parts. They cannot therefore be considered separate parts in a process of composition, to be added or taken away without fundamentally altering the entire system. The compositional process is more like the definition of a limited system (within a limited system), followed by an exploration of its different possible parameter states.

In addition to the user defined routing, there is also the fact that each effects module has a multitude of different processes combined into one unit, which cannot be individually turned on and off. Why not have each of these processes as a smaller module, so that they can be combined in any way the user desires? This would be much more flexible, but it would be missing the point. Flexibility does not appear to be the goal in the design of the software. The complexity of each effects module, not despite but *because of* its limitations, encourages non-rational experimentation.

Adding to the complex interconnectedness is Rehberg's technique of re-using material generated in the patch by loading it into the sample player and triggering/processing it further. This feedback is potentially infinitely recursive. It introduces another level of interconnection between parts, for instance with a sequencer-triggered pattern being re-triggered by a new sequencer.

Anti-gestural control

Nothing in the interface affords gestural control. The widgets are largely either fiddly sliders or typed values. Even if they could be moved in a gestural way, the sound result of changes to the types of parameters available is often very subtle and gradual on the one hand, or too low-level on the other. Also, the complexity which is quickly reached in the signal routing means that a parameter change has a very indirect and counter-intuitive result on the sound. Furthermore a lot of the controls are discrete, stepped.

SuperCollider

All of the above could be said to result from acquiescence to the affordances of the underlying SuperCollider framework.
- The indeterminacy results from either the use of SuperCollider unit generators that comprise a simple interface to some kind of psuedo-randomness, or unknowns that arise in the complexity of their combination.
- The signal routing mechanism is a basic representation of the way in which SuperCollider unit generators are linked, and the interconnectedness is due to limited screen space (a result of using the default SuperCollider GUI library in a straightforward way, without dynamic redrawing to hide/show different modules) and CPU power (the processing capability of SuperCollider running on specific hardware).
- The difficulty of gestural control is due to the use of the default GUI widgets.

The music then in some sense remains 'true' to its means of production; it does not force upon the technology ideas inherited from elsewhere—other musical traditions. However, things are not quite so simple as this, there are important exceptions. The 8 step sequencer bears a resemblance to the Roland TB-303, leaving a trace of the techno influence. Also we can see vicarious influences, where a musical tradition has had an impact on related technologies. For example there is no indication of the note name for pitches in the sequencer (or a piano roll etc.), so traditional harmony clearly appears to be unimportant. However it does use MIDI note numbers, which do of course translate to frequencies determined by an equal tempered scale, usually mapped across a standard 88 note piano keyboard.

A graphical keyboard or even just note names give a sense of symmetry and an intuitive indication of how notes will harmonize (indicating the distance between octaves at the very least). But MIDI note numbers lack this immediate symmetry—octaves are 12 numbers apart, but are shown as base 10 numbers. This has no bearing on harmony; two notes ten numbers apart give an unusual interval (a minor 7th—e.g. C to B♭). This is a good example of arbitrariness and strange contingency in the system—the decimal number system, probably developed due to the fact that humans have ten fingers, is used to represent something that has nothing to do with fingers and would be more 'naturally' represented in base 12. Even a basic non-logarithmic representation of pitch, in Hz, would give more of an intuitive understanding of harmony than this—double the number to increase an octave and so on. So the choice to use MIDI note numbers is an interesting one. It indicates an ambivalence towards harmony, pitch is almost seen as an arbitrary parameter. This is not to say that pitch is unimportant, but that pitch values must be arrived at empirically. A composer is unlikely to rationally compose a melody using a representation based on MIDI note values. This prompting of an experimental approach is reinforced by the way in which a sequencer module defaults to random pitch values, giving a starting point for experimentation.

Eidos

The experimental approach described is in opposition to an approach which is perhaps best described by Heidegger, in discussion of 'the eidos' in Greek thought: 'the potter forms a vase out of clay. All forming of shaped products is effected by using an image, in the sense of a model, as a guide or standard. The thing is produced by looking to the anticipated look of what is to be produced by shaping, forming. It is this anticipated look of the thing,

sighted beforehand, that the Greeks mean ontologically by eidos, idea' (Heidegger 1988). The thing then produced is thus seen as a imperfect representation of the originary eidos. The link with Platonic idealist thought is clear. Heidegger claims that this model of artisanal production leads to the idea that *all* things have an eidos, an essence (God as 'super-artisan' (Blattner 2006)). Dewey's concept of ends-in-view provides a different way of thinking of artistic production, in which goal formation is an ongoing process, informed by arbitrary material realities.

In terms of the approach to technology, the eidetic approach requires a theoretical knowledge of the tools being used, whereas an experimental approach requires *embodied* knowledge. This concept of embodied knowledge is perhaps the most striking similarity between Dewey and Heidegger: they both elevate the kind of 'knowing' that is not theoretical, is not of the kind that can be articulated. DJ Pierre and Earl Smith in *Pump Up The Volume: The History of House Music* (Hindmarch 2001) describe their first encounter with the Roland TB-303, that led ultimately to the invention of a new genre. Their innovation was predicated precisely on their *lack* of theoretical knowledge regarding the technology they were using. The acid house they pioneered was not imagined prior to the process of experimentation:

> He said 'I cant figure how how to work this thing, it's still doing this weird sound, I don't know how to program it ... maybe you can figure out how to program it because it ain't come with a book.' And so instead of trying to program it I just started turning knobs ... and he was like 'what are you doing?' I said 'I don't know just turning these knobs,' he said 'keep doing it!' I'm turning the knobs and we're just sat there for 30 or 40 minutes just turning knobs going 'I like that, I like that...' (Hindmarch 2001)

Similarly in the apPatch, the experimental use of the modules is more important than having a technical understanding of them, even for Pieper, who developed the software and therefore can't help but have a technical understanding: 'after a while you don't question the inner workings of a module any more, you just live within the things it can do' [8].

Evol and algorithmic composition

Evol is a music project started by Roc Jiménez de Cisneros and Anna Ramos beginning in 1996 with CD-R releases on their own Alku label which, despite appearing to exist in commercial territory, is described by Jiménez de Cisneros as 'an exercise in masochistic economics'; not non-profitable but 'anti-profitable' (of course, this is somewhat paradoxical). Releases are not only in unusual formats but are also produced in small runs, with many copies given away for free. The first Evol performance was at the 1996 Barcelona Sonar festival. Peter Rehberg was present at this event, a meeting which led eventually to the release of *Principio* on Mego in 1999. Jiménez de Cisneros cites exposure to the work of Rehberg and Farmers Manual as the main influence that led to his involvement in computer music [3].

Evol releases, though often containing collaborative elements, continue to consist mainly of work by Jiménez de Cisneros. He has gone on to release material on a variety of different labels, for instance the *Punani* series ('I was playing lots of Jamaican dancehall music at the time, the word kept coming to me and I thought ... that's a fantastic word for a really long electro-acoustic series' [3]) spans five different labels—Mego, Falsch, Scarcelight Recordings, Alku and Entr'acte. His work has become primarily focussed on algorithmic composition, and as with most artists on these labels, he is operating largely outside of an academic context, therefore exhibiting an approach to the use of algorithms in music which remains fairly undocumented. His background and the origin of his involvement in computer music is not the result of an exposure to academic discourse on electronic music (although he does have a full awareness of this history, from recordings of Ligetti, Stockhausen, Xenakis etc. in a Barcelona public library archive). It's more an auto-didactic approach, and as such differs in some fundamental ways to the majority of academically documented algorithmic composition. The purpose of this chapter is primarily to discuss this approach to algorithmic composition taken by Jiménez de Cisneros. However, for comparison, I will first give an overview of other approaches.

Algorithmic Composition

Surveying the related literature, the impression one gets is that the majority of activity in this area is based on corpus analysis for the automation of composition. In their 'Introduction to Evolutionary Computing for Musicians', Husbands et al discuss whether the evaluation of algorithmic composition systems should be based on musical theory or

concrete examples of musical practice. They opt for the latter, claiming that the aim is for an algorithmic composition system to produce 'something paralleling an end product that significant composers actually produced' (Husbands et al. 2007). They proceed to focus on sonata form, but emphasize its actual use by composers rather than any textbook theory. But they still retain the principal assumption that the goal ultimately is to imitate existing ('human') composition.

Later in the same paper, it is stated, paraphrasing Cope, that 'throughout the history of Western Art Music, composers have used algorithms as part of the creative process'. This is reminiscent of Koenig's remark: 'I have composed algorithmically before I ever saw a computer' (Laske 2011). If musical practice is fundamentally an algorithmic phenomenon (a convincing claim), then what differentiates 'algorithmic composition' of the kind being discussed from any other kind of musical creation? In particular, why should it now be evaluated based on its similarity to archaic composition? Algorithmic processes used in said archaic composition were not themselves devised to imitate previous composition. Consider the way in which algorithmic techniques such as the fugue evolve over time, developed *by* composers, not by people wishing to imitate other composers. This is something that does not escape the attention of Husbands et al: 'The problem arises with Cope's unstated but implied assumption that significant composers at all periods in the development of Western art music did indeed adhere strictly to *established* musical forms in their most original work'. So why then introduce this imitative, fundamentally conservative change in approach?

A likely response to this question, is that the kind of corpus based approaches it applies to should be thought of as more a type of musicology than composition: 'an attempt to verify a musical analysis by resynthesis' (Nierhaus 2008). Encoding a musical form into an algorithm would surely represent the ultimate mastery and understanding of it. This indeed is the aim in approaches such as the evolutionary computing discussed by Husbands et al. Hsü and Hsü adopt a similar approach, and provide an interesting description of it; their aim is to utilize analyses of Bach pieces to build 'an alternative score, according to the theory of music harmony', the end result of which 'will not be Bach's, but it could be comparable in quality if it has been constructed on the basis of a correct understanding of the mathematic structure of Bach's music' (K. J. Hsü & A. Hsü 1991).

The ultimate purpose of this type of practice tends to remain unclear, often with vague notions that it might somehow have pedagogical value ('designing computer programs that will recognize and reason about human musical concepts enables the

creation of applications for performance, education, and production that resonate with and reinforce the basic nature of human musicianship' (Rowe 2004)). Regardless, its purpose is clearly not to devise systems for the creation of 'new' music. However I will argue that the impulse to imitate previous musics can also exist in algorithmic composition that is *not* explicitly corpus based. Manifestations of this include attempts to discover techniques that optimize 'pleasantness' (Manaris et al. 2005), or 'musical intelligibility' (Pecquet 1999); searching for a universal encoding of music in an effort to completely understand it.

Going all the way back to Hiller and Isaacson's original work in computer music, the four experiments of the *Illiac Suite* provide some useful archetypes for approaches to algorithmic composition. They begin with the idea that a computer can compose music as a human does, apparently following basic musical rules. They state that 'computer-produced music which is 'meaningful' is conceivable to the extent to which the laws of musical organization are codifiable' (Hiller & Isaacson 1979). Note the term 'laws of musical organization'; the assumption that such laws exist take the composition inevitably towards imitation. If we do not take such 'laws' to be universal, then they can only refer to the rules and processes that previous musics have used in their composition. In the case of their first experiment this includes first-species strict counterpoint.

Music is perhaps always built upon previous music, based on gradual shifts in aesthetic judgement. But the point here is that a process involving aesthetic judgement is different to the explicit (and rational rather than empirical) evaluation of algorithmically generated new music based on its proximity to existing music. The latter has the effect of closing off the work to any influence that the technology being used might have on the result. The 'technology being used' here could refer for example to the devised algorithms themselves—perhaps deviating from their intended function, not performing their task of imitating previous music efficiently—or even basic characteristics of the platform for the automation of those algorithms. The aspects of the *Illiac Suite* that present interesting original composition are exactly the aspects in which it fails in some respect to imitate 'normal' or 'good' composition: the incessant, overtly stochastic barrage of notes in experiments three and four, or the not-quite-right harmonization in the droning adagio of experiment two. This represents a shift in Hiller and Isaacson's goals as they proceeded through the experiments. By the time they get to experiments three and four, the interest moves towards showing 'that computers might be used in highly unusual ways to produce radically different species of music based upon fundamentally new techniques of musical analysis' (Hiller & Isaacson 1979).

Heinrich Taube sees algorithmic composition as opening up an explicit 'metalevel' in composition; an opportunity to work at the level defining how the composition proceeds, the rules that govern it, 'the composition of the composition' rather than merely doing the composition itself (based on implicit rules that already exist). Crucially, in describing the discovery of this possibility, he explains the importance of its opposition to an analytical approach: 'the realization that this new (to me) level was essentially devoid of any preconceived notions of "musical correctness" and so offered me an attractive alternative to the symbols and glyphs of Common Practice music, which I increasingly felt were too tied to historical tradition' (Taube 2004).

He states that the main reason for being interested in computer composition is 'to think about music and to write music differently than one would without using a computer'. This is linked to the idea that composition is 'an essentially empirical activity, one in which the composer experiments with ideas and rapidly tests them out as they develop from an initial curiosity into their final compositional form ... changes in the metalevel can lead to unintended or unanticipated consequences that trigger new compositional ideas or take the compositional process in a totally new direction'. Computer composition like this may not be categorically different to any other kind of composition, but when a quantitive difference is large enough it becomes qualitative: 'metalevel compositions can explore domains too complex or too large to imagine doing without a computer'.

The aim in many cases though, appears to be to suppress this, and retain the humanity in composition (or more accurately—encode and automate the humanity in composition), attempting to prevent the intrusion of the soulless material world. It is to create a music that is as close as possible to what is taken to be existing aesthetics; importantly, there is an implication here that the reason for doing this is that certain aspects of such aesthetics might in fact be universal. As discussed elsewhere in this thesis, there is a difference between romantic idealism and classical idealism; music is seen as an expression of the self or of humanity, or as an expression of universal formal harmony (but also often *both at the same time*).

Hiller and Isaacson discuss the ways in which aesthetics can be understood and encoded. Regarding the classical, they point out that 'the earliest writers saw in music an *imitation* of a fundamental divine harmony of universal significance', claiming that accordingly, music has often been classified as a form of mathematics (Hiller & Isaacson 1979). They go on to discuss the romantic: 'the still popular concept of music as a direct emotional expression and an explicit and subjective communication from the composer is,

in fact, largely a consequence of the rather extreme views developed during the period of the nineteenth-century Romantic tradition'. When music is seen as emotional communication like this, it must again be merely a portrayal. The point is that both the classical and the romantic involve fundamentally seeing music as representation. Thus we can begin to see how these issues in algorithmic encoding are related to the central issue of the thesis. Formalization is based on the conception of music as imitation; a representation of ideal form (abstract and therefore formalizable).

So by encoding and understanding specific aesthetics, the idea is that we get closer to some underlying rules of aesthetics, based on universal formal beauty, or the universality of the human condition and its expression. There is for instance the ongoing popularity of investigations into 1/f distributions, usually referencing the corpus analysis done by Voss and Clarke (Voss & Clarke 1975). The idea is that both pitch fluctuation and amplitude fluctuation spectra for all kinds of music (and speech) exhibit a relationship where power is inversely proportional to frequency. This is a pattern also found in countless examples in nature (coastlines, heart beat patterns, electronic devices and so on). It is in fact a manifest property of self-similarity—in the case of music this is self-similarity through time.

Keshner's description of 1/f noise is useful in understanding how it is linked to self-similarity: he describes it as the result of what can be reduced to a simple state-based system which 'condenses its past history into the present values of its state variables, one of which represents an average over the most recent 1 unit of time, one for the last 10 time units, 100 units, 1000, 10000, and so on. Each such state variable has an equal influence on present behavior' (Keshner 1982). So we can see how a self-similar system inherently produces 1/f spectra in a logarithmic manner. Given this relationship, the discovery that all different kinds of music show a 1/f spectrum led Voss and Clarke to the conclusion that music is essentially self-similar and therefore can be described by fractal geometry. Many since them have continued this line of inquiry (for more examples see (Dodge & Jerse 1997)).

It is however the case that not only music, but more or less any phenomenon shows aspects of self-similarity. It is hardly surprising that whatever processes determine structure on one level will be similar in character to those determining structure at any other level. Take for instance the erosion and deposition by waves, tides and currents that creates particular types of coastline patterns on a scale of a few metres. Since the process is very similar at a higher-level (again, erosion and deposition by waves, tides and currents) the same kind of patterns will be seen on a scale in the order of hundreds of metres and so on.

In the same way, self-similarity in time, in music for example, seems natural given that at any level it is a phenomenon based on frequency; rhythm is subject to the same harmonic relationships as pitch and so on.

1/f noise through time thus appears simply to describe the way 'things' in general tend to change; a basic property of physical systems—very dependent on their most recent state (causally, or at least related in some way) and exponentially less dependent on their previous states as we look back in time. It produces a balance between repetition and change: 'The observations on music suggest that 1/f noise is a good choice for stochastic composition. Compositions in which the frequency and duration of each note were determined by 1/f noise sources sounded pleasing. Those generated by white noise sources sounded too random, while those generated by $1/f^2$ noise sounded too correlated' (Voss & Clarke 1975). This balance between repetition and change is linked to aesthetics perhaps simply through its familiarity, being present in almost all physical processes.

But for some researchers the relationship is more profound, music is said to have innate links with nature (Fitch et al. 1995). Musical structures seem to exist to give access to a more fundamental or deeper essence. The music in this sense acts as a conduit from the sensible world to an abstract realm of ideal form. This conceptual scheme is manifest in a technical sense by placing emphasis on the connection or 'mapping' between the two, between the mathematics and the material result. This is usually expressed as a desire to find the 'correct' mapping from the output of a process to sound parameters (Doornbusch 2002). Without explicitly stating the fact, this approach belies a transcendent understanding of the nature of music, with the composer as mediating entity between the physical and the ideal. Algorithms used tend to be derived from natural processes—flocking/swarm algorithms, cellular automata, L-Systems etc., the implication again being that there is something 'underlying' the sensible world from which beauty derives, the sublime as emergent complexity in nature. As Dominique Richard puts it: 'fractal music, markovian music, cellular automata, chaos and catastrophe theories fall under that same category of musical formalisation which assumes a universal isomorphy between all natural phenomena' (Richard 1996).

More generally the idea is that music is a manifestation of some form of mathematical perfection. The importance attributed to the use of phenomena such as the golden ratio in Chowning's *Stria* is another example (Meneghini 2007). A search for universality therefore pervades a lot of algorithmic composition, through mathematical abstraction even if corpus analysis is avoided.

For Hsü and Hsü, self-similarity brings about a hierarchical understanding of the nature of music. They perform a mathematical process of 'smoothing out' on Bach's Invention no. 1 (BWV 772), first to halve the number of notes, then to quarter it, and so on down to 1/64, which leaves only 3 notes: 'the foundation upon which the whole composition is built' (K. J. Hsü & A. Hsü 1991) (this is very reminiscent of the Schenkerian concept of a background 'ursatz', fundamental structure). The lower level aspects of the piece are then shown to be self-similar fractal elaborations on this foundation. In this process there is the sense of a reductive search for essence. Hsü and Hsü pose the question: at what point can a piece of music still be considered the work of the composer when the number of notes in it is reduced in this way? I.e. is the 3 note fundamental structure of BWV 772 still Bach? This essentialist reductivism epitomizes a view that Nierhaus, in outlining the historic development of algorithmic techniques, traces back to early enlightenment rationalism: 'Proponents of the theory of rationalism ... base their assumptions on postulates such as metaphysics (the world is logical and constitutionally ordered) or epistemology (the world should be fathomed only by rationality, independent from human experience). These theses favor the presumption of the principal feasibility of all things'. He draws parallels between latter algorithmic composition and fantasies of rationality like Liebniz's 'lingua universalis' ('an all-embracing representation of knowledge'), Lullus' 'Ars Magna', or the concept of a 'book of books' found in various forms in Mallarmé, Lasswitz, Borges and others (Nierhaus 2008); attempts to systematically encode knowledge.

More closely related, we could also identify systematic approaches such as serialism as a precursor. Approaches like this according to Georgina Born are concerned with displacing the aesthetic onto other discursive systems (Born 1995). She identifies in institutions such as IRCAM a denial or avoidance of issues concerning aesthetics. Such issues are replaced by an apparently scientific approach to music—science is the study of nature, these are attempts to understand and rationalize the 'nature' of music. Within this there is always a 'claimed or implied' universality, a 'standardization of music'. Born claims that this overdetermination of aesthetics is ideological, it allows IRCAM to 'formulate the terms of its own legitimation'.

The standardization tendency is particularly present in AI-based approaches to composition. Curtis Roads describes the systematic nature of AI composition:

> The germ idea of organizing musical compositions around a set of
> systematic procedures contains within it the implication that these

procedures could be made automatic. The inverse notion, gaining
ever more significance, is that these procedures and syntactic
structures can be recognized automatically. Indeed, one of the
fundamental notions of any AI application is that it can be
characterized as rule-structured. Certainly one of the major tasks of
composition is creating a rule system. (Roads 1980)

Born takes issue with this position: Roads later gives a brief admission that composition is
not just formalism ('clearly, creative composers do not simply execute a fixed set of
instructions'), but the implications of this admission in fact undermine the entire AI project,
and these implications are not pursued further.

Dreyfus' arguments concerning the fundamental flaws of AI research are relevant
here (Dreyfus 1979). This is somewhat beyond the scope of the thesis, but briefly, the
psychological assumption (that the mind operates according to formal rules) and the
epistemological assumption (that all knowledge can be formalized) are shown to have no
basis. This seems particularly relevant to situations involving the type of knowledge
involved in what we call aesthetics, which appears to be capricious, and specific to any
given situation. A representation of knowledge is just that—a representation. It involves an
abstraction away from context. Dreyfus however emphasizes the importance of context,
following Heidegger; i.e. we are *in* the world, the world is not an external thing
symbolically represented in the mind. More recent AI research has given credibility to
Dreyfus' arguments. Rule-based or goal-based approaches have generally been abandoned.
Roads' statement—'the fundamental notions of any AI application is that it can be
characterized as rule-structured'—is therefore antiquated, yet the impulse to rationalize and
formalize still appears to persist in much algorithmic composition.

Rule-based approaches tend to be based on analysis of extant music, or at least on
notions to do with the proximity of certain systems to 'inherent musicality'. Born states that
in systems that 'derive from the 'nature' of music itself' there is 'the view that domains of
knowledge purportedly analogous to or derived from the analysis of music can become the
basis for *new* music' (italics mine).

Thus, in texts written from this perspective one finds a constant
elision or movement between computer-aided music analysis and
computer-aided composition, based on the assumption that refined
analysis can be used to generate compositional ideas. Or,
continuous with modernism in general, there is simply the

> assumption that the 'aesthetics' of science will also translate into,
> and provide, an aesthetics for music—the notion underlying ...
> arbitrary conceptual foraging from science (genetic biology, fractal
> geometry) as a basis for composition. (Born 1995)

Ultimately, approaches that naturalize or universalize music, for Born, represent 'an attempt to provide an ahistorical, acultural and, paradoxically, nonaesthetic basis for musical aesthetics'. The study carried out in IRCAM presents evidence of tension between this rhetoric and the reality of the situation: composers, technicians and theoreticians express skepticism about the idea that scientific knowledge (e.g. from research into psychoacoustics) can be somehow translated into a systematic aesthetics; there is arbitrary and forced relationship between theory and practice.

Attempts to generalize music in this context become particularly problematic when applied to the design of new music technologies. According to Born's study there is always an 'aesthetic bias' inherent in any given technology. In IRCAM such biases tend to be swept under the carpet, again, evading aesthetics by maintaining a purely scientific approach.

'Displacing the aesthetic' onto formalized systems results in a circular reasoning, as Nierhaus describes: 'an idea is elevated to an axiom on whose basis a model of composition of unchallengeable validity may be asserted. As soon as a 'primary principle' of musical creation is formulated, the quality of musical structure becomes explainable due to this principle; compositions meeting the highest quality criteria will virtually produce themselves through the application of rules that have once been accepted as valid' (Nierhaus 2008). He refers to Shillinger's system (Schillinger 1977) or again, twelve-tone technique (as practiced by Hauer in this case (Lichtenfield 2001)) as examples. The idea is that a piece of music is considered successful if it conforms to the system that was used to produce it (which it does, by definition). There is no reference to anything outside of the system in determining aesthetic value. Di Scipio summarizes this issue succinctly: 'purely formalized procedures are not in themselves composition' (Di Scipio 1990).

Superficially in contrast to formalized methods, for algorithmic composition practitioners such as Husbands et al., music is concerned with human expression and creativity, hence the emphasis on imitating music created by actual composers and not basing it solely on musicological theory. They choose Sonata form as a basis for their study because of 'its potential to encompass so many elements that inform the creative process—exploration, contrast, development, transformation, motivic mutation, etc' (Husbands et al.

2007). It is again an attempt to encode creativity in what would essentially amount to an artificial intelligence; trying to replace the composer with an algorithm. Bruce Jacob claims that the aim of algorithmic composition is to work towards an AI where 'an algorithm faithfully represents an artist's creative process' (Jacob 1996). The spectacular failures that are the results of this type of investigation speak for themselves. It may not be the case that they tried to model 'creativity' and have *so far* failed, but rather that such attempts can *never* succeed, because they appear to be based on what appears to be a misconception of the creative process.

If we take a Markov chain based approach as a typical example, it creates pastiche in a very literal sense of the word: it can *only* output sequences of notes that are found somewhere in the input. Even with a hidden Markov model, the unobservable state transition probabilities must still be known and fixed, based on some kind of input. Likewise, evolutionary techniques search for an optimum, but this optimal result must *already* be given to the machine in some manner, in the form of an evaluation or fitness function. So the corpus based approach attempts to automate creativity, and yet ironically the rational top down aspect of the approach itself closes the possibility of any creative potential in the automation, it can only re-create. There are important exceptions to this, notably Hiller and Isaacson's use of Markov models in their experiment four, and similarly in Xenakis' *Analogique A*. In these examples the input is neither directly from the corpus *nor derived from the corpus*, even informally. The music therefore specifically makes use of the characteristics of the algorithm itself rather than using it as a medium for the automation of an idea external to it.

Attempts to formalize the evaluation of music in general tend to have the effect of closing off creative potential, yet those writing on algorithmic composition often seem to be convinced of the need for such a formalization. Simoni asks 'how do we decide if a composition that uses algorithms has aesthetic merit?' (Simoni 2003). One would have thought the answer to this would simply be to listen to it. But for Simoni, 'to answer this question, one must separate the process of composition from the product of composition, e.g. the music'; i.e. which aspects of a composition should be considered 'when determining aesthetic merit'? Should the beauty of the algorithm itself be considered (perhaps as per Knuth's criteria of simplicity, elegance etc. (Knuth 2011)), or just the musical result regardless of its implementation? This appears to be an attempt to determine how to do something that we already know how to do—we make aesthetic judgements all the time without recourse to a formalized system.

The immediacy of aesthetic judgement in fact implies that it is somehow categorically opposed to formalization. Aesthetic judgement is surely not a rational process; it seems clear that when a rationale is attributed to an aesthetics it is in hindsight —the judgement has already occurred by this point. Knowledge regarding an artifact is bound to change the perception of it, but this is an inextricable part of listening, we cannot consciously choose on which aspects to base our aesthetic appreciation. In other words, no satisfactory answer is found to questions regarding which aspect of a composition to base judgement on, because it is misleading to 'separate the process of composition from the product of composition' in the first place.

Another example of the formalization of aesthetics is found in Pearce and Wiggins' technique for evaluating machine-generated music, a procedure similar to the Turing test. In it, participants are asked to identify which in a group of pieces of music are machine generated and which are human composed. Interestingly this technique very explicitly involves 'a displacement of the aesthetic onto other discursive systems': they claim that one of the benefits of the technique is that 'questions such as: "Is this music good?" are being turned into statements such as "People cannot distinguish the machine composed music from human composed music" which may be refuted through empirical experimentation' (Pearce & Wiggins 2001). This of course, as they note, is only useful if the aim of the system under examination is precisely to imitate 'human' composition. There is however an unstated further assumption: that music fundamentally is either composed by a machine or by a human; see also papers that pose questions such as 'who or what is responsible for the music produced' (Jacob 1996). Such questions only arise if we retain the assumption that there is such a thing as machine-composition: surely a human created the machine in the first place? And is this so different to human composition? Is it not generally understood that all music is composed, at least to some degree, using rules, systems, algorithms, representations, and so on? In short, is music not fundamentally a technological exercise, always involving both human and technical artifact? The human composed/machine composed distinction is perhaps more to do with context—if a computer scientist writes an algorithm for making music it will probably be considered an exercise in machine-composition, whereas when a professional composer uses an algorithm it is more likely to be seen simply as a part of their practice, it remains in the domain of human-composition.

The creative process as described in this thesis so far, could be summed up as a phenomenon of aesthetics in the context of technical investigation. Given this, the aim of creating systems that imitate 'human' composition seems slightly absurd. If human

composition necessarily involves goals determined by technical investigation, then the technology we are creating to replace the composer would need to be open to results that were unforeseen by the designer of the system. This problem is sometimes addressed by those working with this kind of algorithmic composition by dividing a program into two separate parts: one to create material, and one to give aesthetic judgement ('listener', 'critic' etc.). Genetic algorithms already work in this way, or for example Bruce Jacob's 'composer' and 'ear' modules (Jacob 1996). This very clearly abstracts aesthetics from the rest of the system. But it can only base its judgements on mathematical criteria, formalisms, that were determined *before* the investigation began. The aesthetic cannot be abstracted from context like this, since technical investigation appears to guide the aesthetic as much as the aesthetic guides technical investigation. Therefore what is actually modeled in these approaches bears little relation to 'human' composition. But *the modeling process itself is composition by a human*; the composition was merely done at a different level—by the algorithm designer, prior to the machine's excursion into 'the creative process'.

Without somehow subverting the process, this type of approach contributes nothing to original composition, but can it can yield anything of interest in musicology? If an algorithmic composition passes the 'Turing' test then this really just tells us that the algorithm manages to approximate an existing style of music, using perhaps a more automated process than composers who were previously *implicitly* working with that algorithm (or at least a similar algorithm). To an idealist, discovering this successful algorithm might represent a step closer to seeing the underlying essence of the music, the metaphysical properties that make it beautiful, or that reveal the workings of the creative process and so on. Otherwise it is just an arbitrary representation of that specific style of music.

Two possible approaches to algorithmic composition are recognized by Nierhaus: algorithmic composers create systems 'that are either applied for the generation of "style imitations"—the generation of musical material according to a given notion of a musical style—or as a means of implementing compositional strategies for the creation of a new piece of art, which may be called "genuine composition"' (Nierhaus 2008). Similarly we find the distinction 'empirical style modelling' and 'active style synthesis' in Ames' survey (Ames 1992). Style-imitation appears to dominate the field, but this is perhaps due to the fact that the literature represents mainly computer scientists, musicologists and so on, simply because they need to publish for their profession. Nierhaus claims that composers on the other hand publish writing less frequently. He also makes the point that the

separation between the two categories is not as clear as we might like it to be. Much of what appears to be 'genuine composition', as described earlier in fact bases itself on techniques that are inherently geared towards style imitation, and therefore rely on some kind of input that somehow represents or defines what is musical. Nonetheless there *are* certainly examples of algorithmic composition which result in something strikingly original.

One way of understanding this possibility is to see nonhuman intrusions as the *focus* of the work, as aspects that might contribute to changes in a (contingent) aesthetics. It is precisely this intrusion by the technology that marks what Nierhaus calls 'genuine composition'; i.e. something new has been introduced beyond the imitation of previous musics. The new thing is a result of technological inquiry—the development of compositional techniques, processes and so on, and their effect on the outcome, maybe resulting in a shift in aesthetic sensibilities. This is perhaps the case in all 'genuine composition', but in what is currently thought of as algorithmic composition we are concerned specifically with computer automated algorithms having the potential to introduce new sounds, forms and structures.

In 'genuine composition' there is no attempt to automate what the composer was already doing; the composer remains, but algorithms are nonetheless used as part of the compositional process. This is actually more in line with the description given by Cope and others of the historic use of algorithms in music ('throughout the history of Western Art Music, composers have used algorithms as part of the creative process' (Husbands et al. 2007)).

So it is not the case that *all* algorithmic composition represents an attempt to 'displace the aesthetic'. For instance, Bidlack, in discussion of the use of chaos in composition, states that 'rather than viewing the output of chaotic systems as music in its own right ... it is probably best to consider such output as raw material of a certain inherent and potentially useful musicality. Clearly there will be as many ways to apply chaos to musical decision as there are composers interested in doing so' (Bidlack 1992). This position is close to the approach I want to describe below, yet it still retains the idea of an 'inherent musicality'. In contrast, Jiménez de Cisneros quite unambiguously states: 'I do not think there is anything inherently musical in algorithms' [9]. He claims that judgments of aesthetic value cannot be reduced in this way, we cannot bracket out 'cultural background, context, personal interest, perception, etc.'. There cannot be anything *inherently* musical in algorithms, simply because there is no such thing as *inherent*

musicality.

Nierhaus describes an approach that is along these lines: 'here, the algorithms formulated for the compositional concept do not have the validity of axioms—on the contrary, the results of the generative process may need to be critically examined during the creative process. So in this case, the algorithmic procedures become a compilation of useful tools that are used deliberately for the generation of a composition. Here, a large part of the creative work is not determined by algorithms—individual human intervention and original ideas remain essential aspects of this approach' (Nierhaus 2008). But the concept of 'original ideas' seems problematic, as if it is in opposition to mechanical determination. Surely in such an approach that involves aesthetic judgement, the point of working with algorithms is that they *do* determine the creative work; not in the sense that they replace the composer but as part of the composer's practice they are implicated in, and are a source of, creativity.

To conclude from this overview of algorithmic composition, we can identify a few broad streams of activity:

1. Corpus approaches that look to automate a particular style, perhaps with the implication that universal aspects of the nature of music will be revealed.
2. Experiments in AI, attempting to automate the creative process; the computer apparently replaces the composer.
3. Mathematical idealism. The belief that there is a nature of music, inherent musicality, found in algorithmic patterns such as fractals.

The first of these would fall under Nierhaus' 'style imitation', and the third perhaps under 'genuine composition', the second seems like it could be either. But the point is that all three are interrelated. They overlap for instance when the creative process is modeled using corpus analysis, or when particular styles are investigated in relation to the inherent musicality of fractals, or when mathematical formalisms lead to experiments in the automation of creativity (Xenakis: 'the automation of creative action is a natural consequence of the attempt to formalize musical thought' (Varga 2003)) There is an idealist tendency underlying all of these approaches.

However, a further type of algorithmic composition was identified which seems to be categorically different: a pragmatic approach, where algorithms are simply a part of the compositional process—in the way a brush stroke is used by a painter. This in fact comes

closer to describing the way in which algorithms have been used implicitly throughout the history of music prior to the identification of a separate stream of activity called 'algorithmic composition', and does not relate to any of the approaches in the bullet points above. It of course also applies to non-western music (an obvious example being the way in which a raga is defined not as a fully notated score but as ascending and descending sequences within a set number of pitches (Grove & Sadie 1988)).

The work of Jiménez de Cisneros as Evol provides us with the exemplary instance of this alternative approach which we will examine in more detail in the remainder of this chapter. This is a use of algorithms or formal systems that resists attempts to systematically fix music in place; either a particular style of music (as in corpus-based approaches) or music as a whole (cf. Xenakis 1992). The purpose of the algorithm here, in contrast, is not to describe something that is thought to already exist, rather quite the opposite—to suggest new forms that the composer would not otherwise have discovered, new ways of organizing sound.

Principio

The release notes for the first Evol record *Principio*, on the Mego website at the time, suggest a fundamental similarity in approach with other Mego artists: 'Why? No reason, really. No concepts behind it'. The material, recorded in 1997, is the result of sound design experimentation with a Yamaha RY30 drum machine in collaboration with Miguel Ferré, creating high pitched short envelope sounds, arranged and edited into complex patterns using a Yamaha MD4 minidisk four-track editing station. This process led to an experimental approach far from the paradigm of a predetermined score written into a sequencer. The patterns and structure of the album appear to be determined by the possibilities of the equipment and the results of experimentation. The interesting point here is that this prefigures later algorithmic composition in Evol, highlighting the way in which algorithms are perhaps employed as merely another means of introducing a process aspect.

The album consists of 18 untitled tracks, the first of which contains a single 10ms sound with silence on either side. The sound (shown in figure 10) is a 12kHz tone in the left channel, and 10kHz in the right, shaped by what appears to be a 4-stage amplitude envelope. The RY-30 allows this kind of sound design through various voice editing functions with parameters set using what is normally considered an unintuitive text interface. Each voice consists of up to two waveforms layered, with separate parameters for each waveform controlling level, panning, pitch (±3600 cents), decay time, filter

(highpass or lowpass with resonance and cutoff controls) and various envelope generator options. This sound is typical of the sound materials found within more complex structures later in the album.
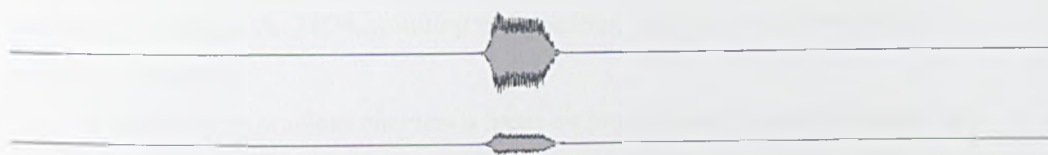
Figure 10:   *Principio* track 1 detail

The second track is the first of 3 silent tracks, demarcating different sections. Each track within these sections has an entirely different 'behavior', resulting for example from the MD4's manual editing capability, its looping, or its shuffle mode. The album in total therefore has a very fragmented structure (see figure 11). This is a recurring strategy throughout the Evol project. Although obviously itself a global compositional structure, it avoids compositional intervention in individual sections, putting automated behavior at the forefront. It also avoids the sense of a global narrative working on the level of metaphor, instead suggesting a clear sequential presentation of materials.
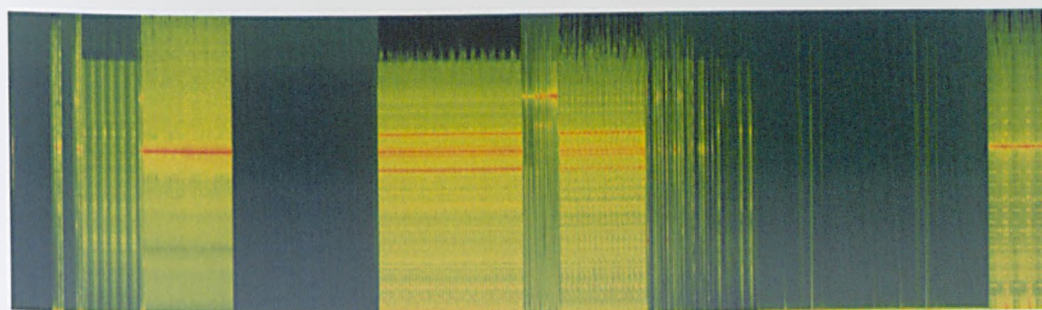
Figure 11:   Spectral analysis of *Principio* tracks 1-18

The section bookended by the silence in track 2 and an even longer silence in track 10 is mostly a series of very short, sparse tracks featuring tonal clicks (as found in the first track), low frequency rumbles, and low amplitude noise bursts, arranged in irregular patterns. Also in this section are two repetitive tracks. Track 7 is a slow pattern of noise bursts, and track 9 is a fast metronomic repetition of clicks and very high frequency tones.

The section after the two and a half minute silence of track 10 begins with the most

traditionally 'musical' material on the album: a three second phrase made out of a number of different percussive sounds, repeating for two and a half minutes. Elements of this phrase are then occasionally used in the following tracks but in randomized, not periodic, patterns. These are built from short minidisc tracks of sound material from the RY30, put into shuffle mode on the MD4, resulting in sometimes rapid and sometimes sparse stochastic patterns.

As we saw in previous chapters a focus on process has the effect of removing traditionally compositional aspects. But this is not a precisely planned surrendering of control to nondeterministic processes, rather an openness to the sounds and patterns arrived at through intuitive interaction with the technology at hand. Such realtime interactions with the drum machine and editing station tend to result in music centered on the characteristics and limitations of the technology itself. This also has an effect on listening; there is little to draw us into an illusory sound world. It is difficult to fathom any communicative meaning in the sound, through gesture, or evocation, or symbolic association, or even source bonding ('it sounds like...'), other than perhaps a source bonding close to reality ('it sounds like an automated drum machine'). We become instead acutely aware of the context of listening, the fact that there is a CD player often outputting near-silence, the arbitrary nature of track marks, the frequency range of the equipment used to both limits on the recording, and so on.

Though superficially not an exercise in algorithmic composition, the approach taken in *Principio* enabled Jiménez de Cisneros to experiment with forms and structures suggesting algorithmic processes—in particular a tension between machinic repetition and chaotic structures, which would later come to characterize his more overtly algorithmic music. *Principio* also shows the beginning of an attraction to creating autonomous systems. '[Working with the MD4] was one of the first cues that made me turn to computers, as I quickly understood they were an ideal tool not only for editing, but to generate and automate certain aspects of the composition's structure' [9].

The use of automation in artistic production is described by Ernest Edmonds as the artist raising their 'level of concern': 'generative art, the use of computer technology and computation as a principle has enabled us ... to lift the levels of concern, as it were, in making work. You work at the level of these structures and the realization of it is dealt with by these automatic systems that we've written ... we work at this higher level' (Fell & Gilmore 2010). As Fell and Gilmore point out, 'it is not so much a case of the artist relinquishing control but instead a refocusing of artistic concern according to the

parameters and characteristics of the system ... in this context creativity is not curtailed by the implementation of formal systems, on the contrary, it is enabled by them'.

For instance painting with a paintbrush puts the artist's concern at the level of a brushstroke, above smaller applications of paint to the canvas. However it is important to note that this is more than merely labour saving—the brush imparts its character on the painting, in a way that would not have otherwise have happened, to the point where brushstrokes themselves can become the focal point (for instance to varying degrees in impressionism, pointillism, some abstract expressionism, etc.).

Automation in composition allows composers to raise their level of concern to that of the algorithm (Taube's 'metalevel'), freeing them from the painstaking arrangement of individual elements, instead leaving higher level decisions for the artist—the basic properties of the composition, the kind of sound materials it will include and so on. But in the process of doing this, the automated arrangement will almost certainly become quite different to the manual arrangement that would have resulted otherwise. The automatic properties of whatever technology is being used becomes implicated in the composition. In *Principio* the patterns created by the shuffle mode of the MD4 could have been conceivably arranged manually, but it is reasonable to assume that the result would have been quite different if the automation was not available.

For Jiménez de Cisneros this work therefore led naturally into the use of a computer as soon as possible, and experimentation with the algorithmic possibilities opened up through programming in Pd, Max and SuperCollider, continuing a compositional process that in the 'creative' response of the machine results in structures, patterns and sounds that would not otherwise have been found.

Punani

Super Punani was released as an mp3 for download on Falsch in 2003, followed by *Punani Shell* on Scarcelight Recordings in 2004. The second Evol album on Mego, *Magia Potagia*, was released in 2005, continuing the Punani series with the half hour long track *Punani Potagia*. This series is fairly uniform in its selection of sound materials, with tracks generally consisting of a rapid series of intricate structures built with the algorithmic modulation of raw oscillator tones, mostly sawtooth.
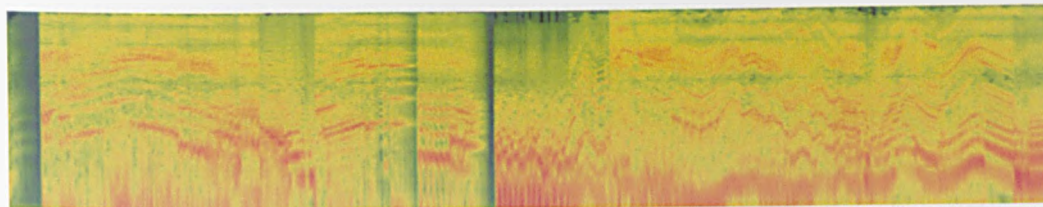
Figure 12: *Punani Potagia* spectral detail (three seconds of audio)

Figure 12 is the spectral analysis of a typical extract. It shows how the harmonic content of the oscillators are arranged into various 'glissandi' patterns. This is normally achieved using well known algorithms—fractal patterns, iterated chaotic equations, strange attractors and so on—to control very basic low-level parameters such as frequency and panning, in either SuperCollider or Pd (Puckette 1996). It is precisely the directness and simplicity of this approach that makes it fairly unique, avoiding high-level concepts such as mapping to note values rather than the raw frequency.

The output of these very 'raw' systems is then edited, to take the most interesting results and order them in very quick succession. In figure 12 we can see the same kind of fragmented structure as in *Principio*; a series of very sharp cuts between different pieces of material. Each fragment is autonomous, but they are brought together in a collage through aesthetic judgements made by the artist.

Jiménez de Cisneros refers to Robert May's investigation of dynamical non-linear systems (May & McLean 2007) as a point of interest which led to his frequent use of equations such as the logistic map in composition, being fascinated on an aesthetic level by the seemingly arbitrary contrast between chaotic and oscillating states, and patterns within islands of stability. In particular the possibilities for the infinite iteration of these equations and the fractal self-similar structures they describe are important. Algorithms that have some physical or spatial analogue such as the Lorenz attractor also hold a lot of interest for Jiménez de Cisneros.

This fascination with mathematical processes may be part of a larger aesthetization (or fetishization) of mathematics in Evol and other Alku projects. Releases include titles such as (341+27+91)-(154)-(100x3)+(1) (Fals.ch 02, fb50, Falsch, 2002) and others that are borrowed from papers on topology such as *Each Absolute And Point Of An Atriodic Irreducible Continuum Is An End Point* (ALKU 67, 2008), being something between homage and parody. Although not merely a joke, the evident humour here undermines the formalism we might otherwise associate with a mathematical approach.

Although Jiménez de Cisneros's approach is partly a result of an interest in mathematics, this is not due to a desire for abstraction or universality. There is no sense of the purity of the mathematics involved being held as axiomatic. The music is not seen in some abstract way as a transparent or direct presentation of the algorithms and equations used. An algorithm that holds some interest is either found or developed, and is sonified, but the most crucial part of the process is in making aesthetic judgments. The censoring or alteration of the mathematics involved, even if this destroys its purity or elegance, is in no way seen as a problem. For Jiménez de Cisneros there is a fascination with these autonomous systems in themselves, but ultimately the musical result holds precedence. 'What I want in the end is something that sounds appealing to me' [3]. For instance, in using the logistic map, alterations are made to suppress the chaotic states so that they remain but can be restrained, simply because they are less interesting than the non-chaotic states. In Xenakis' work, despite a rhetoric of total formalization, he actually makes similar concessions—'I realised that probabilities used wrongly could be boring, but if applied properly they could be interesting ... it is important to break the rules and to change the specifications wherever it seems appropriate in order not to be trapped by machine logic' (Varga 2003). Xenakis was 'criticised for both his indiscriminate use of mathematical functions in music (Griffiths 1975) and for sullying by intuition the purity of his algorithms (Vriend 1981)' (Harley 2005).

So in Evol (and arguably for Xenakis), there is no intention to reveal an absolute or innate beauty in the mathematical object itself. Jiménez de Cisneros has described his contention with an audience member's claim to be able to 'see the fractal' in his music, neatly summarizing and encapsulating the aesthetic implications of these issues. The appreciation of this music is not reducible to the comprehension of abstract beauty in the purity of mathematics: 'You don't have to know about fractals to listen to this' [3]. It's not a conceptual approach, it concerns phenomenal experience; of the forms produced by algorithmic techniques.

The difficulty in describing how algorithms are central yet not privileged in Jiménez de Cisneros's approach comes from the fact that they cannot be considered a separate entity to the music ('behind' the music). Algorithmic composition is often discussed in terms of this algorithm/music distinction, with emphasis placed on the 'mapping layer' between the two. Jiménez de Cisneros has stated: 'I'm not working on these algorithms to make something else, so they are part of the same system' [3]. In other words, the mapping layer does not exist as part of the compositional process. Clearly, the

system could be analyzed in such a way that a mapping is shown to exist—there must be a point at which numbers resulting from an algorithmic process are assigned musical parameters, but this would be an arbitrary distinction, just one of many possible ways to split the system up.

The belief that music functions in this way—as a material realization of something abstract, transcendent rather than immanent—has wider implications. Central to this belief are ideas to do with subjectivity and creativity through expression. Expression in music is often described as a mapping of gestures to musical parameters, and algorithms in algorithmic composition have been assumed to take the role of gesture creation in this scheme (Doornbusch 2002). The Evol approach, in contrast, is to create semi-autonomous systems with some kind of aesthetic appeal or perceptual curiosity, which arbitrarily focus on fractal or chaotic processes as generators of interesting material.

As might be expected, higher level aesthetic choices are influenced by this material. Evol live sets have a sense of arbitrariness in suddenly switching from fast changing small intricate structures to silence or stasis in a sustained monotone, that mirrors the behavior of (for example) the logistic map—which may be used in the set for less macroscopic structuring. 'I'm interested in the way these algorithms behave and the way they handle change and cycles, and so I'm sure after listening to the result of these kind of patches for a long, long time that incorporates in my aesthetic conception of how I structure things on a larger scale' [3]. But this relationship could also be conceived in the opposite direction, i.e. the algorithms are chosen because there already exists an aesthetic sensibility concerned with these kind of properties.

This question in fact addresses crux of the issue: which comes first—the idea of what constitutes something aesthetically 'good', or sense data, input that is then synthesized to form a judgement; i.e. is theory prior to practice? In the context of a pragmatic collapsing of the rational/empirical dichotomy we can see that the correspondence between aesthetic sensibility and algorithmic patterns should not be seen in such simplistic terms.

What we can say is that Jiménez de Cisneros's method is interesting precisely because it does not appear to approach the algorithms being used with any pre-conceived notion of what they should sound like, aside from a kind of feedback in which properties learned in previous similar experiments are pursued or avoided (as per Dewey's ends-in-view). The judgement formed in decisions regarding what material to keep or discard and so on, is often described simply as a matter of what holds interest. This is not the same as the pursuit of a pre-conceived idea.

The nature of the aesthetic judgment involved in Jiménez de Cisneros's approach is based on a desire to create visceral 'aesthetic experiences', music which is 'beyond just sound, and approaching something physical' [3]. As described, the focus is on the presence of the music itself as a material entity rather than the music as an opening to something more abstract.

In the search for 'interesting' sound, in addition to experimenting with processes which satisfy criteria to do with autonomy and physicality, Jiménez de Cisneros has commented on an attraction to 'aggressive sounds and structures'. It's important to note that the aggressiveness here is purely aesthetic according to Jiménez de Cisneros. As with his attraction to other genres normally associated with violence—death metal, black metal—he emphasizes other ways of hearing this aggression, appreciating instead formal properties, regardless of deeply entrenched extra-musical elements. Not outside of context but creating a new context, the possibilities of humour in 'aggressive' noise for example, or its potential to be soothing.

Most Evol releases include the instruction 'Play loud!!!' on the liner notes, and sheer volume is important in creating this 'aggressive' sound, also being connected to the effect of suggesting something physical. But aggression is also related to the interest in chaotic structures—high level structural unpredictability as aggression in the same way that noise, unpredictability at a lower level, is easily associated with aggression. Jiménez de Cisneros sees a necessity to experiment with determinate algorithms ('controlled randomness' [3]) rather than simply using a series of pseudo-random numbers for this purpose, because pure unpredictability, pure noise, is paradoxically predictable. There is a liminal tension in chaotic (not random) processes arising in the play between repetition and unpredictable change, stable states and chaos.

This tension does not manifest itself in structure according to traditional musical theory; i.e. dissonance to be followed by some kind of resolution, but in systemic properties as something that arises from algorithmic processes: 'it's something I try to find and I try to shape the algorithms to make these patterns ... tiny structures like instances of constant iteration of different functions' [3]. In describing his interest in algorithms such as the logistic map, Jiménez de Cisneros links this idea of tension to the aggressive sound he's interested in. Figure 13 shows an example in which percussive sounds trigger at varying intervals balanced at the threshold of chaotic behavior. There is some regularity to the events, but it often lapses into a more sporadic pattern or a much faster stuttering, giving the impression that the system could at any point fall into complete noise (no
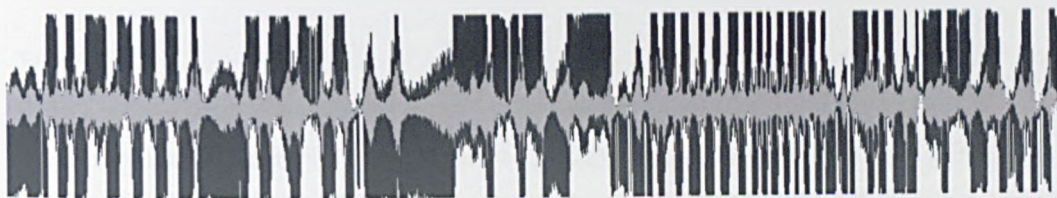
comprehendible pattern or repetition).

Figure 13: Pus Pus Pus extract (from *Magia Potagia*, Mego 2005)

Open/closed systems

Jiménez de Cisneros refers to the software he currently uses (SuperCollider and Pd) as open systems, in contrast to the closed systems he previously used (drum machines, editing station etc.) Closed systems have (or appear to have) a well defined purpose such as the creation of drum sounds or a bassline, as opposed to the impression of much greater freedom in open systems and the ability to define custom constraints rather than work with the constraints given by a manufacturer. The use of a closed system is often characterized by an exploration of its limits and possible subversion of its intended use. In subverting the intended use of some technology there is a sense of going against the grain, forcing it to do something it isn't meant to do, but in reality it is often an intuitive, 'natural' exploratory interaction. Previously mentioned examples of this include Phuture's experimentation with the TB-303 to create acid house, the use of CD skipping/error-correction by Yasunao Tone, or Haswell and Hecker's use of the UPIC.

Effective use of open systems relies in some cases on uncovering a closed aspect, so that there is some distinctive material to respond to creatively, rather than being confronted with a void in which the task is to create something from nothing. In the case of SuperCollider in Evol, the open aspect—its ability to create 'any sound you can imagine' with elaborate GUIs etc.—is eschewed by Jiménez de Cisneros in favour of a more closed programming of (more or less) autonomous simple algorithms as code blocks which can be executed and then stopped, but nothing more, generally using default sawtooth oscillators.

This results in what Jiménez de Cisneros describes as an 'anti-climax structure' [3] —in the execution of each code block there are structures in time as a result of algorithmic envelopes, but as a whole, meta-structurally or external to the algorithm, there is no change. Each section of a set or album is static, a fragment or snapshot of a system, separated by silence (the length of which is also determined in part by the way SuperCollider works, as more or less the time it takes to highlight and execute the next

block of code).

Time

In earlier Evol work, the speed of iteration within each section gave a greater sense of stasis on a macro-structural level, but later work focused in more detail on these micro-structures by 'zooming-in' on them, i.e. slowing them down. The manipulation of time for perception to work at different levels is important in Jiménez de Cisneros. He quotes Dawkins in relation to this aspect of his work:

> Our brains have evolved to help us survive within the orders of magnitude of size and speed which our bodies operate at. Our environment limits what we are capable of imagining. Middle world, the range of sizes and speeds which we have evolved to feel intuitively comfortable with, is a bit like the narrow range of the electromagnetic spectrum that we see as light of various colours. We're blind to all frequencies outside that unless we use instruments to help us. Middle world is the narrow range of reality which we judge to be normal as opposed to the queerness of the very small, the very large and the very fast. (Dawkins 2005)

Jiménez de Cisneros:

> In that sense my work is usually geared toward structures that replicate this queerness ... either very fast, very cramped or very hard to grasp in terms of boundaries (of sound events). In the end it's all about structures that I find aesthetically appealing or interesting, but at the same time somewhat puzzling because there is something in them that makes them *strange*, even if they're also familiar in other aspects. [9]

The relevant point here is that this zooming-in, slowing down the temporal interpretation of the algorithms, has the effect of giving an illusion of structure or narrative within a section. But there is still generally no change outside of the executing and stopping of code blocks, a very explicit kind of 'moment-form' (Kramer 1978).

For example in *(341+25+91)-(154)-(100x3)+(1)+(1)+(8)*, released in 2002, the algorithmic behavior iterates at such a speed that there is only an overall sense of texture, remaining constant throughout the track. However, listening tests after slowing it down in an audio editor reveal much the same kind of larger macro-structures found in later work.

Punani Xerrameca, released in 2009 uses algorithmic patterns that begin to imitate empty vocal utterances, and the slowed *(341+25+91)-(154)-(100x3)+(1)+(1)+(8)* has very similar characteristics. This demonstrates how *Punani Xerrameca* and similar pieces, despite elaborate structures at the level of phrasing, in terms of their fundamental behavior remain static throughout tracks or sections—as the sequential discreet execution of code blocks. Each 'moment' has a particular character defined by the algorithm in that code block.

Rather than inferring meaning through narrative structures, an approach to time as duration rather than movement is shown here. Continuity is disrupted by an overt splice, constructing a fragmentation of experience—a disjointed series of musical objects are presented. 'I was sick with the idea of flow and continuity [and] globalness; a long structure that develops' [3]. This is a process in which a technology is suggesting ways to approach composition. Clearly SuperCollider can be used in any number of ways but this is an uncontrived approach, allowing the way in which code blocks are executed to determine structure.

Performance

In line with the anti-climax structure of the music and a focus on technology, Jiménez de Cisneros has stated that in performance he is 'in no way interested in interaction or expression' [3]. The generally condemned idea of a 'spacebar performance' (to be discussed further in chapter 6) is instead embraced. The performance could in fact be nothing more than playback of a sound file—'some people have a moral problem playing sound files live but I really don't understand that because for me it's all about how it sounds, so whether I play a patch or a sound file makes no difference' [3]. When code or patches are executed 'live' in an Evol performance, it's for pragmatic reasons: triggering pieces in this way requires less effort than pre-recording it, and the set can be easily altered from performance to performance to make improvements. Experimentation does not often happen live—'I'm not too concerned with the performance as a really creative act'—and when it does, it's not important that the audience knows this [3].

So there is no interest in the performance as a theatrical act, or using it for communicating skill or virtuosity to the audience. Nonetheless there *is* skill involved in an Evol performance, in creating the right experience, subtle adjustment of EQ and other parameters. According to Jiménez de Cisneros, the mood, space, and PA all affect decisions regarding the sound. But a choice is made not to put this virtuosity or any personality in the

foreground. 'The most important thing is how the piece sounds, I don't really care if someone is performing in real-time or not' [3]. Unpredictable algorithms and processes are avoided, so that intervention can be generally avoided during performance. But where necessary, a 'boring' algorithm is stopped short, or other alterations are made if needed. This kind of pragmatism is evident in all aspects of Jiménez de Cisneros's work, including the length of performances: roughly 20 minutes, because much longer and the audience begin to lose attention. The 3" CD is the best format in his opinion, for the same reason.

Algorithm/system/process

Sol LeWitt's comment, 'the idea becomes a machine that makes the art', is pertinent to process and system music, and algorithmic composition (Collins 2008). But in the work of Jiménez de Cisneros, an idea (the conception of a system) does not appear to precede the making of a machine (implementing the system), since this 'idea' is clearly a response to the results of experimentation with algorithms and the means of implementing them; not a pre-existing abstract entity but the result of a process. This leads us to a very different understanding of the role of algorithms in composition, where 'the art' is not a reflection of 'the idea' enabled by 'the machine', and in which it becomes difficult even to draw such distinctions. Jiménez de Cisneros's very direct approach to 'mapping' and 'sonification', and the clear sequential presentation of different algorithmic systems encourage such a holistic non-reductive understanding.

This is clearly an algorithmic music, and it does not contrive any of the material into forms or structures according to existing musical ideas. However the approach also suggests that there is no intended clear representation of the abstract form of any particular algorithm, only the audio result of the entire system. This leads me to the conclusion that algorithmic composition here functions as a technique for the problematization of representation in the music. We are left with the physicality of algorithmic sound without intrinsic meaning. Furthermore the algorithms are precisely the means by which a distancing from notions of intrinsic meaning is achieved. Yasunao Tone once described his work in this way, summing up the central point here, claiming that the reason for his engagement with systems and processes was 'to get to new places, places beyond his imagination or intention' (Fell & Gilmore 2010).

Farmers Manual and literal noise

Farmers Manual began making music together in 1995, comprising at the time of Mathias Gmachl, Stefan Possert, Oswald Berthold, Gert Brantner and Nik Gaffney. As discussed in relation to other artists operating at that time, some kind of affinity was felt with the techno scene, they initially sent demos to techno labels. But according to Gmachl it quickly became clear that this was not a good context for the work they were doing (Sjogren 1998). They approached Mego in 1996 with a demo, feeling there was some common ground: 'They just worked in a similar way to ours. Nearly the same equipment and a related approach. So we just met them and saw them and started talking and they said: why don't you make a release on our label. We just did it' (Sjogren 1998). Rehberg describes this encounter in the same way [1]. So the question is: what is this 'similar way' of working, or 'related approach'? The rest of the chapter will explore what this approach might be, and look for similarities to the approaches described in previous chapters.

No Backup

The release of Farmers Manual's first album *No Backup* (Mego 008) happened later in 1996. Fairly typical techno equipment was used in its production, as evidenced in tracks like *Biomagic I* with its central kick drum and bass line, the recognizable 808 kit in *Perimeter 87*. Laptop computers and DSP software, the technology that would later come to define the Mego aesthetic, was not readily available at this time. However we will see that a similar approach to their later work in software can be observed in their use of hardware in *No Backup*, an approach that focuses on experimentation with the technology being used, experimenting in particular with autonomous processes. As seen previously in relation to Evol, this tends to prefigure an interest in the possibility of setting up autonomous processes in software. In the case of Farmers Manual this led to algorithmic composition based on random triggering and processing of sound files. But prior to this, when the technology consists of hardware drum machines, synthesizers, sequencers, and effects units, these autonomous process have a very different character, and tend to be focussed in particular on looping and repetition.

Despite the technological and contextual associations with techno, it should be emphasized that the repetition in *No Backup* is of a very different kind. The eponymous track *Farmers Manual* for instance, features a slow, meandering repetition. A complex, short sequence on a synth with large amounts of portamento repeats through almost the

entire track. But the sequence drifts, gradually changes. Notes are occasionally added or removed, or their pitch altered, which due to the portamento also changes the perception of the surrounding notes. Drum parts, mainly hi-hats, and a pad synth sound, also perform this same-but-different, drifting repetition; particularly with occasional pitch shifts in the pad sound. In addition to gradual changes in the looped sequences, there seem to be a number of effects involved, with changes to parameters happening in a similar meandering fashion, i.e. without teleology—the changes do not give the impression of leading anywhere. For instance at around 2 minutes a filter resonance increases and its cutoff frequency is changed. The change is not fast enough to be considered gestural, and not slow enough to build tension as if building to a climax.

The impression given is that, in contrast to a top down composed sequencing of the entire piece, an autonomous system has been set up: a series of loops going through various effects processors. Berthold confirms this impression: 'we were experimenting with "degradation" of sound, up to the point where it provided an entirely different quality. This was done through feedback loops with processing elements in between (filters and such) ... this also raised issues of stability in generating processes / loops' [10]. The track seems to be an arbitrary duration of the output of this system, with a walk through the parameters available.

Likewise, *Biomagic I* is a series of loops, with an occasional, disorienting pitch shift in the bassline. These tracks have what we could refer to as an 'undirected' sound[8]. Parameter changes are not used in an expressive way, they appear almost 'accidental'. As discussed in chapter 4, perhaps the best way to explain these 'accidental' aspects is that they militate against 'correct' musicality—the events that we intuitively expect to hear given preceding events. In listening, this undirected and accidental structure has the effect of confounding attempts to fathom narrative content. It seems to stand in polar opposition to what we could call a 'composed' sound, events that sound as though they were arranged with deliberate intention. In this sense of the word composed, the 'composed' and the 'accidental' are in fact opposed by definition—an accident is something that is not intended.

Two possible interpretations of this undirectedness and accidentalness seem

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8   My use of the term 'undirected' here is related to, but more general than, Christophe Charles' use of it in his work. For him it refers to music that 'doesn't intend to 'tell' anything to the listener, or to impose him/her to listen to a particular ordered development'; 'the music is not based on any kind of story board ... The sounds appear independently from any global structure which should intentionally impose on them an arbitrary hierarchy' (Charles 2000). Incidentally, to achieve this, Charles sometimes uses a technique of numbering sound files and having this determine their composition, a technique also used in *Explorers_We*.

possible. First, that these pieces are intentionally composed to sound undirected (a careful structuring to sound unstructured), with intentional accidents (accidents that are not really accidental). Or second that it actually is the result of a process that manages to avoid certain aspects of traditional composition (by which I mean the manual organization of sound materials in time). Evidence for the latter is given by Berthold: 'I was strongly interested in fully automatic composition … unwanted, unanticipated results, *things you just wouldn't do as a human.*' [10], and Possert: 'there is no basic concept at all we can follow. It's just going there and start and see what's happening' (Sjogren 1998).

This is of course not to say that there is no concept to the project at all, there is in fact a deep conceptual rigour which we will see throughout the examples in this chapter. I claim that the concept is manifest perhaps in the approach to technology. But the implication is that the work is not concept*ual* – its purpose is not to *convey* a concept or idea. It is merely sound resulting from a process of technological production, the result of experimentation with materials; technology as material not as a medium. The affordances of the looping system set up in hardware define not only the low level elements of the music (the drum samples, the synth sounds and so on) but also the higher level structural aspects—in built sequencers lead to the repetition and variation of short sequences, and additional variation is provided by effects parameters. Berthold states that he was interested in letting the technology

> 'do its own thing', within the confines of the various environments / formalisms / systems. That is, you set up a system that can do something (in terms of sound), but the entirety of the 'something' is implicit. The actual realisation of these processes is left to the machine … But there was a lot of probing, experimentation, reflection, new experimentation which left longer and shorter bits and stretches of sounds which could then be assembled. The experimentation was intimately tied to technology, a quest to get to the guts of technology. [10]

As discussed previously, being open to the contingency of the technology introduces some element of nondeterminism, i.e. elements determined by the machine not by the artist. It is not so much that the machine is making decisions, but that there is an openness to results arrived at through processes that are intentionally beyond direct control of the artist. As such it preempts later Farmers Manual work in software, representing a raising of the level of concern above manual composition.

So as with the use of hardware in early Evol releases, this is akin to algorithmic composition, but the algorithm, and mappings to parameters etc., are not designed in a rational way. The rational approach will tend to impose notions of received musicality—the designer of the algorithm and parameter mapping must encode what is and is not musical. So mappings will be chosen to result in the kind of phrasing and rhythmic, melodic or harmonic structures that already exist (if we hold that ideas arise in the process of technical inquiry, not as inspiration out of the blue). In other words the result is not much different to manual composition in this sense. The potential of autonomous technology to create new sonic forms and expand ideas of what can be musical is held back. The undirected approach exemplified by Farmers Manual however is another example of a less rational and more intuitive process, relying on experimentation with machines that have some autonomy.

Certain aesthetic choices are more or less constant throughout the work of Farmers Manual—for instance a tendency towards a 'raw', 'underproduced' sound, without cleaning up traditionally undesirable artifacts, such as harsh resonances. Despite consistencies like this, *No Backup* does sound different in many ways to later albums. But this is precisely *because* the approach to technology in general remains the same—the sound is defined by the technology, an exploration of the materials used in production. *No Backup* therefore has structures and sound materials defined by hardware: drum machines, sequencers, synthesizers, samplers and effects processors, whereas later pieces created with computers tend instead to be characterized by more esoteric DSP techniques and algorithmically triggered soundfile playback.

So my claim is that since something like *No Backup* is so dependent on the technology used in its production, its sound is the result of experimentation, not the directed building of a system or composition based on reaching musical goals conceived prior to production. The latter is found in work in which the artist approaches materials and technology with pre-conceived ideas of what will be produced—reproducing existing genre forms and so on. The approach here in contrast appears to be used specifically to create distance from existing musical conventions. Therefore we can start to see that what links many of the artists associated with Mego is not so much a particular sound; it is an attitude and an approach—an attitude oppositional to musical tradition and norms, and an approach that appears to be there to avoid lapsing into such norms.

The focus on the biases and limitations of the technology means that when the technology changes, so does the sound. The changing nature of technology (as well as the

endless number of existing technologies to explore) therefore also enables the avoidance of becoming entrenched in any particular sound. We see this in the move from hardware to software with Mego artists in the late 90s (and also more recently in the shift of attention back to older technologies—see chapter 7).

Fsck

The first Farmers Manual album to make use of computers is named after the unix command for performing a file system check: *Fsck*, released on their own Tray label (TRAY 2, 1997). At this point it appears that the approach discussed above was not translated into software effectively, this came in their third album *Explorers_We*, released on Russell Haswell's Touch sub-label OR (SQUISH 4, 1998). Berthold describes the difference: '*Fsck* was really arranged. We just took soundfiles and put them where they are now, and *Explorers* is not. *Explorers* is just defining a pool of soundfiles and letting a program run across it' (Sjogren 1998).

The word 'arranged' is key; what is meant by this? Clearly sound materials are arranged in both albums; the very least we can say about *any* piece of music is that it is (to paraphrase Varèse) arranged sound. It seems obvious from the rest of Berthold's statement that the difference lies in who (or what) does the arranging. *Fsck* was arranged manually, 'by hand'—this is the 'composed' approach discussed above. The alternative is to make use of automation. Note that although this does seem to have the effect of removing superficially 'human' aspects (the kind of arrangements one would expect a human to make based on musical tradition; compositional clichés—gestures, climaxes and so on), the intention does not appear to be a Cagean removal of the self from the work. Possert makes this point succinctly: 'If you push random, you push it because you want to' (Sjogren 1998). Instead we should return once again to the idea that automation raises the artist's level of concern. At this metalevel, there is the sense of stepping outside of existing musical theory or learned musicality, enabling instead the construction and exploration of new musical theories or musicality.

Berthold's description of *Fsck* however, implies that it remains within the realm of normal 'intuitive' musical thinking. In contrast to *Explorers_We*, it is structured as a series of discrete tracks. Each track proceeds with the successive introduction of different parts, rhythmically related and layered on top of each other. Consider a typical dictionary definition of composition—the arrangement of different elements to form a whole. This layering approach epitomizes the composed sound.

Figure 14 shows the end of *371 Adv3*, in which there are only a few distinct sounds: a high hat repeats regularly, while two high amplitude clicks and and two synthetic stab sounds in the left channel and right channel separately, move in and out of phase with each other. The way in which these sounds are taken out of the composition sequentially, leaving only one of the clicks at the end, demonstrates the layering of different parts befitting a sequencer/score compositional paradigm. *Fsck* as a whole does not get beyond this paradigm, having an arranged or composed feel throughout. It has large dynamics, it is often gestural and expressive at the level of phrasing, and narrative or evocative of mood at a structural level, e.g. the tension of *Klopp01.Proc (Mono)* leading to the cathartic and aggressive release of *Loop Der.II.Proc*. There is also occasional adherence to genre conventions—in particular the drum and bass drum breaks in *368 Mix, 369 Fin* and *1 Out*.

Figure 14:   *371 Adv3* waveform detail

So despite superficial similarities with *Explorers_We*, sharing similar sound materials, *Fsck* embodies a very different aesthetic. The computer has been used as a medium for the communication of meaning; sometimes quite expressively gestural content, and existing generic ways of organizing sound etc. It does not use the computer as a source of meaning itself, even though the digital nature of the sounds and sound processing suggest otherwise. In other words, it is, as the album and track titles betray, closer to the high tech aesthetic discussed in chapter 2, albeit a particularly 'DIY' lofi high tech; a 'Unix aesthetic'.

Explorers_We

The first three tracks of *Explorers_We* consist of something close to silence—room ambience (with small events in the background) and the noise floor of a recording device.

At some point in the fourth track, a synth or guitar sample begins to repeat at a very low volume, before the 'program' appears to begin proper. The room ambience section, like the rest of the album, is a continuous recording, split into separate tracks at the turn of each minute exactly, regardless of what is happening in the audio at that point. The disparity between track marks and their contents suggests it is an arbitrary convention. The sixty tracks on the album are all untitled (although amusingly, on ripping the CD to MP3, the Gracenote database gives the tracks titles from a generic sample CD; the three almost identical tracks at the start, for instance, become *Trail Blazer*, *Eurohouse* and *Trance Atlantic*).

The erroneous naming of the tracks is surprisingly fitting; *Explorers_We* is based largely on appropriation, but is far removed from the (literally) generic nature of most music production that makes use of sample CDs. It makes use of generic samples— samples designed for the reproduction and imitation of existing genres, but the use of such samples throughout the album subverts their intended use.

In track 27, for instance, we can hear something that sounds like it was originally a drum loop sample. Instead of being used as a loop, it is triggered just once, and is processed almost beyond recognition with various delays and distortions. At other points, in particular in tracks 46 and 47, very short fragments of samples are triggered rhythmically. The fragments are short enough such that again, their source is unclear, most of them having barely discernible vocal qualities.

It should be noted that, as we have encountered repeatedly throughout the thesis, there is a use of stereo that eschews basic panning techniques. Stereo recorded sounds, particularly towards the start of the album, are played back as is. But from roughly track 8 onwards, we begin to get sounds placed either in one channel, or the other, or both together. The two channels are often related in various ways but generally treated as separate entities. For example in the triggering of events in tracks 10 to 13 the two channels, though separate, have a rhythmic relationship.

In general there is an overwhelming barrage of sample sources and types of processing throughout the album, put together in an apparently random fashion. It has a fairly 'flat' structure; despite massive short term variation, a meta-process or a second order process remains constant. The only movement at this second order level appears to be a change from arhythmically layered fairly long sounds at the start, to the rhythmically triggered shorter sounds towards the end. Regardless of whether it is controlled by a human or not, we could refer to this change as a third order process, in turn governed by fourth

order processes and so on to infinity. Gmachl describes this as a multi-layered instrument: 'you can have more levels in an instrument. There's always a basic level which is the way the sounds are generated and structured, and then using and building this instrument you start to think of a method to let the computer do what you do and you can make a second level which uses the instrument you used yourself before' (Sjogren 1998). So we have an instrument that chooses and controls instruments and so on recursively. This is the first time we've encountered such an explicit description by an artist of this raising of the level of concern. Furthermore it demonstrates how we should consider not just composition-level and meta-composition-level, but a complex multitude of processes at potentially infinite different levels, which the artist can engage with at any chosen point. Each step moves more decisions from the composer to the machine.

However with the indeterminacy involved (pseudo-random numbers and so on) as already noted, there is still an initial decision to invoke any such process. 'The question is what is random. Random always has this part of uncontrolled taste with it' (Sjogren 1998). It is seen by Berthold more as something like controlled randomness, of the kind required in almost all stochastic algorithmic composition: 'to define a set of ten states and you can randomly choose between ten predefined ways of things to work or so. That's the thing of not being totally random' (Sjogren 1998). This is followed by a constant monitoring of output, and alteration to create changes. So what we are listening to in a work like *Explorers_We* is not simply a series of indiscriminate random processes, but an engagement with technology that includes elements of pseudo-randomness as a characteristic of the materials of production.

The process in *Explorers_We* is one approximating collage or montage in its use of sampled material. The final track in particular switches to an 'instrument' that appears to select fragments of different soundfiles, one by one—a monophonic use of samples in contrast to the layering that occurs in the rest of the album. Each selection lasts a fraction of a second, and we're left with a only a vague impression of the types of sound sources used: film dialogue, game shows, sports commentary and appropriated music. Figure 15 shows a spectrogram of this track, highlighting its fragmented structure.

Chris Cutler writing on the use of samples in music ('plunderphonics') observes that 'a recording may be considered as no more than the anonymous carrier of a 'pure'—which is to say non-referential—sound'[9] (Cutler 1994). But Cutler also posits the other extreme, the idea that sound might 'consist of *nothing but* referentiality'. In a work of

9   Again, the acousmatic, reduced listening (Schaeffer 1966).

plunderphonics, with each sound divorced from its original context, he suggests that something special happens in the reflexive nature of the experience—the fragmented quality of the references brings to the fore signification itself; the apprehension of reference *as* reference: 'the recording—for instance a sample—may be no more than a fragment, a knowing self reference, a version, *and may be used to point at this very quality in itself* (italics mine). Referential sound in this context loses its original signification, being apprehended instead as a sample, as recorded sound. The suspension of disbelief, the illusory 'I am listening to a voice' is jolted more forcefully into 'I am listening to a recording of a voice'. The two extremes of nothing-but-reference and non-reference therefore slide into one another: 'plundered sound carries, above all, the unique ability not just to *refer* but to *be*; it offers not just a new means but a new meaning'.

Figure 15: *Explorers_We* track 60 spectral detail

Unlike most work described as plunderphonics however, the focus in *Explorers_We* does not seem to be on the samples, but rather on their processing. The effect of the extreme montage technique is perhaps better explained by drawing parallels with materialist film, which often used the technique of extreme montage, rapid cutting between an arbitrary selection of materials. In discussion of this kind of montage, Peter Gidal describes the viewer's response to barrages of appropriated material: 'A montage of shots in any film is a construction of duration and continuance in the face of the viewer's attempts to grasp and arrest the seen, attempts at making definition and meaning. When the film at hand refuses to fill those meanings with "truth" or "nature" or "the real," meanings are unmade as quickly as made' (Gidal 1989). This is precisely the way in which track 60, or *Explorers_We* as collage/montage as a whole operates. There is a refusal to engage with the meaning that might be taken to be inherent in certain sounds.

Much writing on the use of samples in music focusses on the idea of cultural recycling, playing with well established signifiers; Paul Miller for instance describes it as

'remixing' in 'the age of the infinite archive' (Miller 2008). But here the argument is that samples become empty raw material. 'The instrument is stronger than the samples. The instrument is the way that things are arranged or structured and it's more important to the music that comes out of the PA than the samples themselves' (Sjogren 1998). Any meaning that might come out of the process, from the very eclectic set of sound sources, is left to chance. The arbitrariness of sample selection is evidenced by Gmachl's technique of numbering soundfiles, to allow an instrument to select them at random. Methods like this result in the incidental sound of *Explorers_We*, contrasted to the more deliberate *Fsck*.

Arbitrariness

The importance of arbitrariness cannot be underestimated here, as the obverse to entrenched meaning. In Gidal's words, 'since everything is constructed, no "nature" pre-existent, the production process of a film, and the production of its meanings, can be recognized as arbitrary ... the concept of "arbitrariness" is based on the political demand that nothing be seen as accepted or natural. This is not a denial of meanings but rather a recognition of the imposition of ideologies' (Gidal 1989). He links this with the idea of the 'empty signifier', an attempt to make identification in the work impossible. If there is nothing in the work that is recognizable in terms of meaning content (the repetition of signifiers naturalized in the dominant ideology), the viewers/listeners cannot position themselves in relation to it—the goal is non-identity. However, 'the problem for structural/materialist film is that the concepts of arbitrariness and non-identity can not be simply applied; each work has its specificities. There is no overall aesthetic strategy which assures certain results or effects' (Gidal 1989). In *Explorers_We* some level of arbitrariness is achieved simply through the running of random processes over a bank of soundfiles.

It is important to note that arbitrariness, although the ideals it points towards might be the empty signifier and non-identity, cannot move a work outside of ideology, or create some ideal space free of meaning. All ideological constructions are in fact arbitrary, but the recognition of this fact and the explicit use of arbitrariness in a work, prevents anything from being presented as if it were something other than arbitrary. To clarify this by way of illustration, overtly gestural music (with examples too numerous to mention—romanticism, rock music) tends to present the gesture as an expression of feeling or emotion, on the assumption that it will be understood as such by the listener. The human condition and its expression is presented as universal and natural. Indeterminate music however manages to sidestep this kind of imposition on the listener, leaving its reception more open; meaning

can be constructed external to the work, rather than pre-determined and contained 'within' it.

Again we happen upon concepts associated with Cage. This time his ideas do seem appropriate to the situation and applicable to the work of Farmers Manual:

> When I hear what we call music it seems to me that someone is
> talking, and talking about his feelings or about his ideas of
> relationships. But when I hear traffic, the sound of traffic ... for
> instance, I don't have the feeling that anyone is talking, I have the
> feeling that sound is acting, and I love the activity of sound ... I'm
> completely satisfied with that. I don't need sound to talk to me ...
> People expect listening to be more than listening, so sometimes
> they speak of inner listening, or the meaning of sound. When I talk
> about music it finally comes to peoples minds that I'm talking about
> sound, that doesn't mean anything, that is not inner, that is just
> outer. (Cage 1991)

So the move away from cultural meaning in samples, or meaning in sound in general, is the way in which this music begins to establish itself as literal. It is concerned primarily with material processes and phenomenological result, having the effect of not fixing any meaning in place. Possert states clearly: 'I feel that there's a big misunderstanding between the audience and us because they think that we're trying to communicate anything. It's just the music and the visuals ... there's no general message' (Sjogren 1998). Gmachl describes the situation similarly: "it often happened that people who listened to our music would have difficulty recognising certain elements that they usually expect in music" (Gmachl 2002). It is a process and system based music, in which the process or system is not generally revealed to the listener. Its goal is not to represent something beyond itself (either narrative or systemic or documentary).

Failure

Farmers Manual, for Cascone (Cascone 2000), are one of many groups of artists exemplifying the 'glitch' aesthetic, an aesthetic of failure. However it seems that the approach outlined above does not incorporate any aspect of failure, only deliberately indeterminate systems. Once aware of this, the sound of *Explorers_We* does not signify the idea of errors. The cut-up vocal samples in tracks 42 to 59 for instance, might be described as 'glitchy', but do not in fact sound like any error that might occur in digital sound

reproduction (CD skipping for instance). Furthermore it could be argued that even works making use of techniques like CD skipping, such as Yasunao Tone's *Wounded CD*, still constitute an exploration of technological processes, not an aestheticization of failure *per se*. This is perhaps implied by Cascone in his recurrent use of scare quotes for the word 'failure'. As Hegarty puts it: 'failure is only "failure"—it is not a judgement about badness, but one of a refusal of heroic success in the form of musical mastery or mastery of musical forms' (Hegarty 2007).

Cascone also describes the tendency to incorporate digital 'failure' into music as an interest in what was previously considered background sound, beginning (predictably) with Russolo's obsession with industrial noise, and continuing through Cage's *4'33'*, then jumping to what he calls the 'post-digital' music around the turn of the millennium. But taking *Wounded CD* as an exemplar of this approach manifest in digital technology, we can see that the impulse to experiment with all facets of a new technology is there as soon as it becomes available to artists (it was first performed in 1985, only 3 years after the first CD player was commercially available). The same is also surely true for new technologies and materials in all art forms. This approach is nothing new, as Cascone in fact concedes. So we could say that experimental digital music was always 'post-digital' in this sense, or put more simply, it is music that is the result of experimentation with digital technology.

The 'glitch', the unwanted sound, or more generally, noise, that comes out of such experimentation, could be considered broadly any sound that is not in a very traditional sense considered musical. For example an overt splicing together of two sounds will often cause a click, as the waveforms spliced together are not crossfaded seamlessly. The sharp vertical lines in the spectrogram in figure 15 are an example. In fact, any kind of temporal incongruity can be considered noise in this sense—two sounds put together that in previous vocabularies (musical, linguistic, acoustic) would not ordinarily follow. This will result from the kind of indeterminate processes behind works like *Explorers_We*, that do not follow the logic of human rationality or language.

Noise

Noise is always negatively defined according to Hegarty—it is specifically whatever music is not. It is 'a resistance, but also defined by what society resists', 'it can never be positively, definitively and timelessly located' (Hegarty 2007). The modernist attempt to broaden musicality and incorporate all sounds in music (to varying degrees—Satie, Russolo, Varèse, Schaeffer, Cage) tends to the ideal that all sound is potentially musical, which

Hegarty calls neo-Pythagoreanism, 'i.e. the music of the spheres being out there, even if presently inaudible to humans' (Hegarty 2007). However the reception of these works (e.g. the famous 'riots' at the premier of *Déserts* or at the futurist concerts) suggests this often acts as not so much a broadening of musicality, but an incorporation of what is considered by the audience non-music, noise; a willful and provocative opposition to musical tradition.

Haswell's compilation for his OR label *OR MD Comp* (OR Just 13, 2003) contains a live recording of Farmers Manual playing in the Sheffield Showroom Cinema bar in 1998. The recording is notable for the contribution of two audience members who, throughout the set, heckle the band for not playing the kind of music they expect to hear. There are quiet, high pitched tones, with very sparse, sporadic, percussive sounds. The percussive sounds are loud enough that the potential of the sound system is demonstrated.

> A: Hit the beat, boy, hit the beat, boy. We need a beat, boy, we need
> a beat, boy, we need a beat, boy ... Have you plugged in? Have you
> plugged in? ... Have you got a bass? You must have a bass.
> B: Get a fucking bassline.
> A: C'mon, bassline now, bassline now.
> B: Who are you anyway?
> A: You know you can do it, kick it off ... You've got 4 computers
> there, c'mon where's the 'bam-ba-bam-ba-bam'

These taunts are met with no reply and a blank refusal to change anything, the sound remains more or less the same throughout the recording.

This oppositional attitude is seen in numerous examples in the history of Mego. Rehberg, at the same gig, put on what is sometimes referred to as a 'spacebar performance', i.e. the often maligned practice of pressing a single button and letting the computer play (see for example Puckette 1991, for discussion of the perceived problem of performance in electronic music from the decoupling of control and output; or for the antithesis see d' Escriván 2006, who discusses the idea that this does not pose a problem for younger generations who have been exposed to electronic control their entire life). In Rehberg's approach there is no traditional performance element at all. In this case he was simply starting a generative Supercollider patch. Once it was running he walked off stage leaving the computer, expressing a dislike for 'faking it' [1]—pretending to control some element of the sound when it was unnecessary. This was simply the type of software available to him at the time, he has pointed out that patches with interactive sliders and controls only

came later [1]. This type of performance superficially has a precedent in the acousmatic tradition, but the context is entirely different. It becomes very confrontational in concerts in which the audience is expecting techno, or a rock band, or even jazz. The degree to which it alienates audiences should not be underestimated. He describes similar gigs at which no one clapped, they did not even realize the performance had finished [1].

Reactions range from dismissal to the more extreme. Haswell describes the kind of audience reactions he has previously encountered: 'people have been on stage and pulled my leads out, I've had people prod me with things, I've had people that push the laptop lid down while I was playing and things like that just to stop me' [6]. Shocks based on performance paradigms aside, this is the oppositional effect of what can broadly be referred to as noise.

Torben Sangild gives three different ways of defining noise, reflecting the most common uses of the word: acoustic, communicative and subjective. 'Acoustic noise' is descriptive of the basic objective characteristics of sound—'sounds that are impure and irregular'—i.e. sounds which at a very low-level do not follow a repeating pattern, resulting in wide-band spectra. Atonality approaches this, begins to be considered noisy in this sense, and as we add more atonal elements we get closer and closer to pure white noise. Techniques for introducing noise therefore include the kind of processes that result in resynthesis artifacts, or aliasing and so on, for introducing atonality. Wider-band noise results from various distortion techniques, or from simply using noisy material as a sound source. It is interesting to note that a sharp click of the kind described above also has this wide-band characteristic (taken to the extreme a theoretical perfect impulse contains every frequency, if only for theoretically no length of time).

'Communicative noise', as per the standard Shannon and Weaver definition of noise (Shannon et al. 1969), is 'that which distorts the signal on its way from transmitter to recipient' (Sangild 1992). It is generally thought of as the elements in a sound that arise from the imperfection of the medium. This is perhaps the model which forms the basis of descriptions of 'glitch music' in writing such as Cascone's—there is a focus on the medium itself, made possible by its failure. Simon Reynolds describes something like this understanding of noise, but in a slightly more general sense and with an anti-idealist corollary:

> If music is like a language, if it communicates some kind of
> emotional or spiritual message, then noise is best defined as
> interference, something which blocks transmission, jams the code,

prevents sense being made. The subliminal message of most music is that the universe is essentially benign, that if there is sadness or tragedy, this is resolved at the level of some higher harmony. Noise troubles this worldview. (Reynolds 1990)

Like Gidal, Reynolds sees non-identity as the goal here (although, unlike Gidal, his reasons are individual rather than political):

[Noise] causes a blockage and destabilization of the codes by which we make sense of the world ... [it] occurs when language breaks down. Noise is a wordless state in which the very constitution of our selves is in jeopardy. The pleasure of noise lies in the fact that the obliteration of meaning and identity is ecstasy (literally, being out-of-oneself). (Reynolds 1990)

A disruption of effective communication is one way of thinking about this, but it does not account for a scenario where this kind of linear communication has no relevance—where it is not attempted in the first place or even alluded to. In such a scenario, technology is not mediating, and merely enabling/impeding communication to varying degrees, it is itself fundamentally and directly implicated in whatever interaction is taking place. Figure 16 shows how a slight reformulation of Shannon and Weaver's model provides us with a basic model of artistic production in relation to noise music. What this shows is not just an *emphasis* of the noise (as might be inferred from an aesthetic of failure), it is a fundamental change in the way in which musical production is understood. It also neatly demonstrates the importance this gives to technology; previously it was merely a necessary inconvenience (or a desired inconvenience in an aesthetic of failure), but in the reformulated model it is primary in determining the result (and is not in any sense of the word 'failing'). Technology is central in creating meaning, not just communicating it. The technology or algorithm can be considered a tool, but not a tool with any kind of transparency, which merely enables the realization of an artist's vision. It is fully implicated in the result.

Sangild's final definition is 'subjective noise', perhaps the most familiar conception of noise—defined simply as unpleasant or unwanted sound. He makes an interesting point regarding the contextual nature of judgements regarding this type of noisiness: 'the noise of the roaring sea, for example, is not far from white radio noise, but nonetheless is not considered unpleasant and irritating. We still seek meaning in nature and therefore the roaring sea is a blissful sound, whereas radio noise (even if we were to hear it as

indistinguishable from the sea) is normally considered a disturbance' (Sangild 1992). In a music that allows any sound, nothing is considered noise; it is tempting therefore to say that this subjective definition becomes irrelevant. But Sangild warns against ignoring it: 'that would be a hasty dismissal of the important tension you get from infusing the formerly negative' (Sangild 1992).
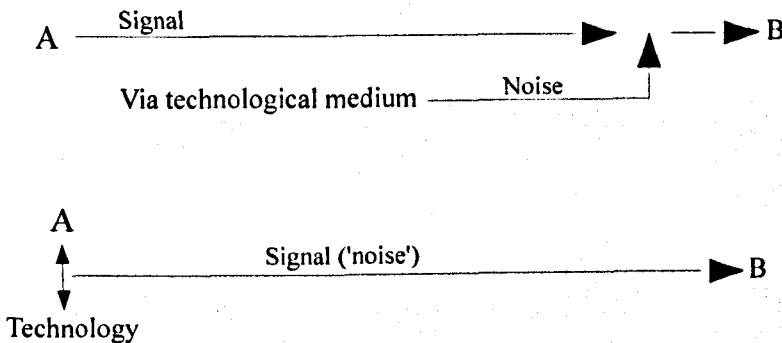
Figure 16: Communication model and reformulation

It is easy to see how all three of these definitions are related—the patternless nature of acoustically defined noise makes it the usual and most effective way in which communication is impeded, and its role as impediment to meaning in a given context is likely to make it unwanted subjectively. The important point is that when noise is antagonistic to meaning, it ceases to operate on a symbolic level and presents the listener instead with its materiality. This is the sense in which I will define noise for the purposes of this thesis, as an alternative to the three definitions given above. It is close to the communicative definition, but the point is that it has nothing to do with this simplistic type of communication at all; it is not the element within a signal that distorts or impedes communication, it is itself a signal (that happens to have no determinate meaning). To distinguish, I will refer to this as literal noise. So, for example, when noise (acoustically defined) is used *for* communication, when it has strong symbolic associations, this is not literal noise.

     In contrast to the acoustic definition of noise, Reynolds points out the importance of high-level inconsistency in the noise, claiming for instance that hip-hop (due to its collage/montage structure, as with *Explorers_We*) is more effectively noisy than a barrage of acoustically noisy material that becomes predictable.

     A tangent on literal noise and materialist ontology: if noise is meaningless

vibration, then we could define 'material'—the point at which thought fails (Brassier, via Žižek (Brassier 2010))—as noise. Everything is ultimately noise; there is no inherent meaning in sound or any other kind of vibration. Meanings are culturally or ideologically or evolutionarily, but ultimately contingently, assigned to certain patterns in the noise. Throughout writing on aesthetics in the materialist tradition, as well as in Heidegger's phenomenology, there is the recurring idea that works of art unmake these meanings, either to make new meanings or to glimpse the 'noise'. But given this, Reynolds highlights a fundamental paradox in theorizing noise:

> To speak of noise, to give it attributes, to claim things for it, is
> immediately to shackle it with meaning again, to make it part of
> culture. If noise is where language ceases, then to describe it is to
> imprison it again with adjectives. To confer the status of value upon
> excess and extremism is to bring these things back within the pale
> of decency. So the rhetoriticians of noise actually destroy the power
> they strive to celebrate; they are the very start of the process by
> which subversion is turned into contribution, which is absorbed as
> a renewal for the system. (Reynolds 1990)

This is particularly reminiscent of Heidegger's revealing/concealing nature of being; the very process of revealing causes concealment. There is here the implication that meaning is somehow 'false'; what I'm calling noise is the 'true' reality underlying normal phenomenological experience. This seems to contradict the notion that phenomenology overcomes the subject/object dichotomy. Materialism recently, in the form of speculative realism, attacks phenomenology on the grounds that despite claims to the contrary it remains what Harman calls 'a philosophy of access', i.e. it is concerned with how a subject accesses objects, a philosophy of the relationship between humans ('dasien' etc.) and the world (Harman 2007). The details of disagreements between these approaches to philosophy do not directly concern us here, but what they seem to share is a conviction that there is something undefinable at the base (or even non-base, non-ground) of reality, which is concealed. As Brassier says for instance, his nihilist realism is 'the unavoidable corollary of the realist conviction that there is a mind-independent reality, which despite the presumptions of human narcissism, is indifferent to our existence and oblivious to the 'values' and 'meanings' which we would drape over it in order to make it more hospitable' (Brassier 2010).

Returning to the discussion of noise, in a separate paper Sangild gives another

taxonomy, this time regarding the *use* of noise in music (Sangild 2004b). He describes expressionist, introvert and minimal noise. It is clear that Sangild here is interested in the meaning of noise. What we are concerned with however is specifically noise as void of meaning. Expressionist, introvert and minimal noise are each in opposition to literal noise. Accordingly, the examples he gives do not function in the way I have described *Explorers_We*. He describes noise in The Who, Hendrix, Sonic Youth and so on as a 'gesture of rush, rage, excitement, aggression, pain, fear, anger, emotional chaos and ecstasy'; in My Bloody Valentine as 'drowsy', 'dreamlike', 'melancholic', 'sensual' and 'intimate'; in Merzbow as 'violently aggressive' at the same time as 'meditative', 'hypnotic' and 'trance-like'; and finally in Oval as 'fragile'. None of these descriptions seem suitable for *Explorers_We*.

Some commentators have, following Cascone's implications, focussed on the aforementioned possibility of revealing the mediating technology, which was previously (or ideally) hidden in its transparency (Bates 2004, Hainge 2007, Stuart 2011). But, to use materialist film as an analogy again, this would embody Gidal's concept of 'pseudo-documentary'—to reiterate: 'the point here is not that every procedure should be "there" on film, exposed or explained, as that is merely another level of documentation, "seeing what is 'really' taking place"' (Gidal 1989). An exposure of the technology and production in this way appears not to be the intention in 'glitch' music, particularly since for the most part the finished product is presented as a CD presumably for playback on high fidelity equipment. At the very least from the stage of mastering to playback, the process is one of illusionistic reproduction (Christian Marclay's *Record Without a Cover* is a notable exception).

Clearly, a 'glitch' album such as *Explorers_We*, although concerned almost solely with technological processes, is not an exposition of, or comment on its own format. This would lead to a blatant reintroduction of semiotic content—a certain kind of semiotic content that in its documentary style pertains to a 'truth', the representation of a something as if it were not a representation. This would again most likely result in something like the high-tech aesthetic, primarily a work *about* technology not *of* technology.

The *Explorers_We* press release states that the '60 PQ start points [make] full use of your dusty shuffle button'. This is an effective use of the CD, subverting and playing with the possibilities of the format rather than attempting to 'reveal' it by, for instance, recording the playback of a damaged CD and reproducing it on undamaged CDs. Both of these approaches result in something real, of course, but the latter is about a different, previous real, recorded and reproduced. It therefore is a work of illusionism and idealism, far from

its superficially materialist aim of a revelation of process. The futility of such an endeavor is highlighted in this irony. But again, this is not the aim of Farmers Manual. As Possert says: 'There is no concept. There's nothing' (Sjogren 1998). What remains is literal noise: 'we are arrested, fascinated, by a convulsion of sound to which we are unable to assign a meaning. We are mesmerized by the materiality of music' (Reynolds 1990).

Returnal and *A New Way To Pay Old Debts*:
Disinterment of technology and technique

This chapter will look at more recent developments in Editions Mego, in particular two albums: *Returnal* by Dan Lopatin as Oneohtrix Point Never (eMEGO 104, 2010) and *A New Way To Pay Old Debts* by Bill Orcutt (eMEGO 119, 2011)—a CD reissue of the LP release on Orcutt's own Palilalia label (PAL-002, 2009). On the surface it seems that these two albums have very little in common, but the point of convergence and the focus of this chapter is the way in which they both give the impression of looking to the past in some way. The evidence and possible reasons for this will be explored, followed by a discussion of a number of possible interpretations. Jameson's concept of the 'nostalgia mode' will be contrasted with the recent interest in what has become known as 'hauntology'. Both will ultimately be rejected in favour of a third option that is more in line with the general thrust of the descriptions of artistic practice in the rest of the thesis.

The VHS Aesthetic

Returnal (eternal returning—also suggested in the title of track 7, *Ouroboros*) looks primarily to vintage analog synthesis. Lopatin mainly uses a Roland Juno-60, a polyphonic analog synthesizer produced in the early 1980s with a single (digitally controlled) oscillator per voice, low and high pass analog filters, a triangle LFO and a distinctive chorus effect. Importantly it also has a built-in arpeggiator. The characteristic sound of the Juno-60 is inevitably reminiscent of 80s synthpop—it was heavily used by bands like The Human League, Duran Duran, A-Ha etc. Its arpeggiators and resonant textures are also synonymous with library music of the time, recalling science documentaries or obscure and forgotten television programmes. The pervasiveness and anonymity of library music makes it difficult to pinpoint specific examples of the source of this, but the critical reception to the album repeatedly highlights this aspect of the sound, particularly the utopianism associated with the period.

It has been described variously as: 'a nostalgic sound, drenched in retro-futurist melancholy, conjuring a nightclub of the near future as it might have been imagined by some straight-to-VHS movie from the early 1980s' (Sherburne 2010); 'a shape-shifting new-age hymnal whose gamelan-inspired sequences and new-age, pitch-shifted vocals converge to form a retro-futurist manifesto' (Tiny Mix Tapes 2010); a 'repurposed VHS

aesthetic' that nonetheless rather than '[focussing] exclusively on the past ... focuses on our various unfulfilled visions of the future' (Blackwell 2010). Lopatin does not in fact use any VHS technology (Powell 2010), this 'VHS aesthetic' therefore refers more to the associations we have with the sound of synthesizers like the Juno-60 (and the forms that result from their compositional affordances).

Sad News From Korea and the ontology of songs

A New Way To Pay Old Debts (title taken from the 15th century Philip Massinger play), in contrast, is described on its press release as an 'acoustic hardcore blues stormer', and consists solely of unprocessed recordings of Orcutt playing the guitar with occasional vocals. The title alludes to an interesting relationship between new and old, which we see for example in the second track on the album: a version of Lightin' Hopkins' *Sad News From Korea* (1951), which is completely unrecognizable as the same song. Hopkins' standard 12-bar blues is replaced with a very loose riff that hangs on a single high D# hit arrhythmically for up to 15 seconds at a time before dropping into rapid chaotic strumming, repeated for the roughly 3 minute duration of the track.

This creates an interesting problematization of the ideality implied by separating the concept of a song from any specific instance or version of it. Most musical ontologists (in the analytic tradition, for example see (Levinson 1980), (Davies 2005), (Dodd 2007), (Kania 2008)) would almost certainly claim that Orcutt's *Sad News From Korea* is not the same song as Hopkins' *Sad News From Korea*. According to Dodd's ontology for example, there is a type-token relationship between a musical work and any given instance of it. That is, the work is an abstract type and an instance of it is is a concrete token (as with the relationship between 'tree' and 'a tree'). He therefore allows for slight variation between tokens while they still count as the same type—pieces can be 'thicker' or 'thinner', i.e. some information can be left out or added while still retaining the essence of the piece, and since musical works are 'norm-types' (they describe how the world *should* be) he therefore also allows for occasional wrong notes and so on. However the two versions of *Sad News From Korea* stretch this beyond reason. There is not just slight variation, there is almost no correlation. If we want to say that they are the same song, then we have to discard the type-token view of musical works.

But Dodd claims that the type-token understanding is a necessary prerequisite for any musical ontology, since without it there can in fact be no repeatability of a musical work at all, i.e. no two performances of a piece are actually the same piece because they

are not identical. He states that incoherence results if we discard it. But what becomes incoherent is not the concept of a musical work as used in any specific situation, only the concept of a generalized, all-encompassing universal theory of 'musical works'. When the boundaries of a musical work become blurred, the question becomes moot; we *could* describe the two versions of *Sad News From Korea* as the same song, or as different songs, but what does this actually tell us? Is it a useful or interesting distinction? Note that both options ultimately assume the existence of an abstract 'musical work', of which we are debating the nature. Musical works for Dodd are 'eternal, unstructured, unchanging, modally inflexible, abstract entities' (Kania 2008), which are discovered, rather than created. Flexibility is allowed only in the token, the actual physical sound, which is explicitly described as being not 'the work itself'. Kania highlights some of the absurdities that entail:

> Since musical works are simple sound-event types, there is no
> intentional condition on producing an instance of a work. Thus,
> since all possible sound-event types are eternal existents, whenever
> there is a sound it is an instance of a musical work. If you think
> that's bad enough, let me turn the screw twice more. First, since
> Dodd allows for thicker and thinner works, whenever a kitten
> walks along the keys of a piano, it does not merely instance one
> work, but an infinite number of works: the work that mandates
> exactly those notes in that order; the work that mandates roughly
> those notes, but allows for some variation; the work that mandates
> any notes that fit this harmonic profile; and so on. There is an
> infinite number of such works, since thickness and thinness are
> merely two ends on a continuum. Second, the kitten produces an
> instance of more works than this. Since works are norm-types on
> Dodd's view, the kitten can 'get some notes wrong.' It instances not
> only the work that mandates just these notes in this order, but also
> all works that differ from this work by one note, two notes, three
> notes, and so on. Thus, for each of the infinite number of works the
> kitten instances, mentioned above, there is a further infinity of
> works the kitten produces a passable, but imperfect, instance of.
> Note also that I picked a kitten on a piano only for convenience.
> Every sound event, and every part of every sound event, is an

instance of an infinite number of works for just the same reasons.

(Kania 2008)

Whatever the nature of Orcutt's conviction that he was performing Hopkins' *Sad News From Korea*, it seems clear that it displays a disregard for any such ontological idealism. The naming of the track in this way is almost arbitrary, other than acting perhaps as a reference point. Lightnin' Hopkins influence *is* clear, not only in this track but throughout the album. There is the looseness in the playing, the disregard for tight timing and rigid measures, and a recurrent use of riffs that hang on a single note. These aspects, although taken to an extreme, are very much reminiscent of Hopkins' style. Other influences explicitly mentioned by Orcutt include Fred McDowell and Muddy Waters (Masters & Currin 2010).

The style more generally recalls earlier Delta blues, and the very first recordings of blues music; one of the most salient aspects of the album is the 'lo-fi' character of the recordings. Like the recordings of Robert Johnson—single-session takes recorded in a hotel room (or a room next to a busy street in San Francisco in Orcutt's case, see liner notes)—aspects such as the room ambience are arguably as important to the aesthetic as the guitar playing or singing. This aspect is again taken to something of an extreme in *A New Way To Pay Old Debts* with, for example, no effort being made to hide a phone ringing in the background of the opening track *Lip Rich*, or a police siren that can be heard in *Street Peaches*.

Nostalgia and hauntology

The disinterment of older techniques and aesthetics is relevant to Jameson's concept of the nostalgia mode. He uses the term to refer to the cannibalization of styles of the past; note that this is not to do with any psychological feeling of nostalgia—as Jameson says, 'nostalgia does not strike one as an altogether satisfactory word'. He sees in postmodern cultural production (film and architecture in particular) a tendency towards historical pastiche that ironically militates against any real historicity: 'the nostalgia film was never a matter of some old-fashioned 'representation' of historical content, but instead approached the 'past' through stylistic connotation, conveying 'pastness' by the glossy qualities of the image, and '1930s-ness' or '1950s-ness' by the attributes of fashion' (Jameson 1990).

Postmodern history then is simulacral. Jameson's theory carries a conviction that postmodernism amounts almost to a denial of the past, seeing history only as an archive of forms to be reappropriated; reappropriating perhaps in order to distantiate from the past, to

make it seem less real and to reassert an eternal political present. Given this, the nostalgia mode for Jameson is an integral component of the logic of late capitalism. The constant reiteration of signifiers of the past essentially reasserts the end of history (Fukuyama 1993). It also provides a wealth of interchangeable fashions and aesthetics for consumption that can be endlessly recycled and presented as if they are new. Mark Fisher's conception of hauntology is formulated in opposition to this: 'hauntology is the counterpart to this nostalgia mode. The preoccupation with the past in hauntological music could easily be construed as 'nostalgic'. But it is the very foregrounding of temporality that makes hauntology differ from the typical products of the nostalgia mode, which bracket out history altogether in order to present themselves as new' (Fisher 2008).

Hauntology is originally a Derrida neologism, a play on the word 'ontology', referring to the being of a spectre—paradoxically present in its absence. More specifically he is referring to the 'spectre of Marx' (Derrida 2006); the ghost that continues to haunt Europe even after the fall of the Berlin wall—post-end-of-history. The result of this haunting according to Derrida is a looking to the past in aesthetics and ideology which appears to be quite different to the nostalgia mode, perhaps because it represents a genuine nostalgia, a yearning for modernist utopianism. Reynolds describes this, quoting David Toop, as a 'nostalgia for the future' (Reynolds 2006a). Fisher explains how this has become manifest in music recently, using the first Burial album (Hyperdub HDBCD001, 2006) as an example:

> If there is one act which makes a case for the supreme pertinence of
> the concept of hauntology in relation to music today, it is Burial.
> Precisely because Burial deals with nostalgic longings, his music
> does not belong to the nostalgia mode. What you hear in Burial's
> two LPs is a craving for a past which nevertheless appears
> irretrievably lost, veiled behind a relentless drizzle of crackle.
> Beyond the longing for a particular moment or a particular musical
> genre is a longing for the ceaseless forward motion of a culture
> which once appeared capable of infinite renewal, but which is now
> used up, involuted. The nostalgia for modernism resists the
> postmodern nostalgia mode. (Fisher 2008)

The overall feeling is that of dyschronia; 'time is out of joint' (also from Derrida's *Spectres of Marx*, originally a *Hamlet* quote). This is described in particular through aspects such as 'surface noise'—the sound and distortions of the recording medium.

Dyschronia is not repressed in hauntology; it rises to the surface. Or rather, it unsettles the very distinction between surface and depth, between background and foreground. In sonic hauntology, we hear that time is out of joint. The joins are audible - in the crackles, the hiss ... What Little Axe, Burial, Ghost Box, The Caretaker share with Tricky is that they foreground the surface noise. There is no attempt to smooth away the textural discrepancy between the crackly sample and the rest of the recording. This is one reason why hauntology is not just some lazy, hazy term for the ethereal. Hauntology isn't about hoky atmospherics or 'spookiness' but a technological uncanny ... The surface noise of the sample unsettles the illusion of presence in at least two ways: first, temporally, by alerting us to the fact that what we are listening to is a phonographic revenant, and second, ontologically, by introducing the technical frame, the unheard material pre-condition of the recording, on the level of content. We're now so accustomed to this violation of ontological hierarchy that it goes unnoticed. (Fisher 2006)

So is this theory of hauntology an appropriate way to understand the albums considered here? Superficially both have remarkably similar characteristics to the kind of music discussed in writing on 'sonic hauntology'. In *A New Way To Pay Old Debts*, there is the surface noise that has already been mentioned; there is its uncanny resemblance to blues of the 1950s and earlier; there is even what could be heard as a yearning melancholy at some points—particularly *Poor Black Math*, in which the distortion and surface noise could easily be read on a metaphorical level as signifiers of the degredation of memory, as tends to be the case with audio processing effects in hauntology based analyses.

Similarly in *Returnal*, there is what is often interpreted as a melancholic nostalgia for a lost future (see previous quotes from critics); the sound of '80s analog synthesis and its various associations (mainly in *Stress Waves*, *Returnal* and *Where Does Time Go*); the appearance on *Ouroboros* of a clear layer of 'surface noise'; and throughout the album a large amount of audio processing—taking recordings of the synthesizers and time stretching, pitch shifting, and repeatedly 'sampling and resampling' on a computer (Powell 2010)—again apparently befitting the (slightly trite) memory metaphor. Various samples from youtube are also used in this process (certainly 'lo-fi' but not necessarily 'retro').

Reynolds, in a later article, claims that actually 'the [hauntological] is surely an undercurrent within all recorded music... the recording process being inherently eerie and out of joint' (Reynolds 2006b). All music refers to the past in some way, if not through traces of the recording process, simply through the adoption of techniques and aesthetics which are a development or a negation of previous techniques and aesthetics. It is perhaps something of a red herring to understand these albums as being specifically concerned with the past any more than other music, given that music will always be historically situated.

At the other extreme, references to the past could be seen as only byproducts; byproducts in a search for materials to explore, which just happen to be in the form of older technologies and techniques. The aspects that are being foregrounded in these works are technological artifacts, some of which signify particular periods in history through association, but this of course is arbitrary, it does not have to be the case. The prevalence of these kinds of sounds (vintage synthesis, intentional surface noise) in recent music actually might reduce their symbolic efficacy in this regard—because the associations are specifically to do with history, their repeated use in a contemporary context erodes such associations. Their symbolic associations become less important, and to some extent they are re-assimilated into musical production simply as extra material to work with, for their sonic qualities alone. If there is a trend of looking backwards for material to work with in electronic music, this is perhaps simply due to the feeling that older technology offers more fertile ground for experimentation. Lopatin describes his experimental approach to the technology: 'My relative lack of know-how when it comes to analog synthesis helps me because I don't approach gear with metaphors in mind. Like, if I run this patch into that patch and modulate the shit out of the LFO, blah blah blah—I just don't get it. I just play with stuff' (Powell 2010).

Surface noise

To return to the surface noise example, its figurative use signifies that this is merely a trace of something that previously took place. The music (the thing that is *not* the surface noise —it is *behind* the surface noise) is hidden or degraded, to approximate half forgotten memories and so on. 'In sonic hauntology, disinterment goes alongside internment, the deliberate burial of signal behind noise' (Fisher 2006). Once again we see the communication theory model—an ideal music mediated and impeded by technological noise. In a more general sense, Reynolds refers to a 'half-erased or never-quite-attained songform'. The ideal form is intentionally degraded, acting as a signifier of its materiality.

It deals with temporality, contingency and so on, on a metaphorical level. This is predicated either on the idea of a record as documentation or trace of a previous event, a way of accessing some kind of 'presence' (in the Derridean sense); or as an imperfect medium for 'remembering' the ideal songform.

But what if we see the record not as a way of accessing something else, but as a thing in itself? The ontology of the music shifts—the recorded sound is no longer a degraded form of the ideal music, we instead take the music to be whatever sound the record produces. The surface noise should be seen as a fundamental part of the music, not something that the music hides behind. The term surface noise is sometimes used as a synecdoche; not just to refer to noise on the surface of vinyl, but to any aspect of a recording that is introduced by the recording process or medium itself. If we take this definition to an extreme, it essentially points towards any influence of technology on the sound—the ways in which the contingencies and characteristics of an instrument are implicated in a composition for that instrument, technologies such as notation, and more recently sequencers, DSP techniques and so on. The argument in this thesis, then, is that music can be thought of as *nothing but* surface noise.

In *A New Way To Pay Old Debts*, the songs seem so shot through with contingency that the concept of an ideal songform is not even suggested. For instance it might be tempting for a critic to describe the *Sad News From Korea* cover as a 'twisted' or 'mangled' version of the original, but the differences are so great that this would require quite a stretch of the imagination. Throughout the album there is never the impression of an originary song behind the 'twisted' or 'mangled' riffs. The approach is very much straight improvisation: 'it's based around a scale, and I'll have a general structure in mind, and certain things I know I want to hit along the way, certain phrases or dynamics. So I'll go into it with those few landmarks in mind, and navigate my way through it.' (Masters & Currin 2010).

The noise aspects (and artifacts in the audio such as distortion) are not added post-production, in a deliberate way after the fact, for a specific semantic effect. Any surface noise is fundamental part of the process of recording. Compare this to something like *Selected Memories From The Haunted Ballroom* by the Caretaker (1999, V/Vm Test Records, OFFAL02), taken by writers like Fisher to be an archetype of sonic hauntology. It consists of recordings of swing and ballroom music from the 1930s, processed in extreme ways such that the 'hidden' nature of the music is hugely emphasized. There is an exaggerated amount of surface noise—vinyl crackle, hiss etc.—as well as other kinds of

processing to degrade the audio that further indicate the idea that these are faded memories. 'It's a stranger's past relocated within your own memories, a re-imagined history from an alien past' (Fletcher 2008).

The approach taken in *A New Way To Pay Old Debts*, in contrast, is not based around the simulacral—creating the 'image' of a recording, something that sounds *like* a recording; it simply *is* a recording. The presence of surface noise in *A New Way To Pay Old Debts* could be explained as the result of an approach that treats the recordings as something closer to field recordings. To clarify, this is in contrast to studio recordings; the way in which one would normally think of studio recordings is in the isolation of one or more particular elements, instruments for instance. There is an ideality and reductionism implied in the studio approach. The idea is to record the *music*, in what is thought perhaps to be a contextless way, to get the perfect recording by reducing any effect from the external world. The studio is the equivalent of the white space of an art gallery—a context that is supposed to be neutral but in fact has a very peculiar character of its own.

A field recording, however, makes use of the contingency in capturing all aspects of a location's context (if the point were to capture a single element in the environment out of its context then one would ideally take this element into some kind of studio, i.e. it would be a studio recording rather than a field recording). As discussed in chapter 2, Demers argues that the field recording approach can be related to literalism; sounds as 'autonomous objects free of residual associations' (Demers 2009). The idea in a field recording is not just to record 'music', i.e. an abstract linguistic construct, but to record contingent sound that does not necessarily have a communicative aspect. Orcutt's recordings *are* intentional recordings of an instrument, but the contextual and contingent aspects of field recording are introduced. Orcutt's guitar is just one of many elements in the recordings, that are presented as flat durations, slabs of recording, unedited except for the sudden splicing into different recordings between tracks. An interesting exception to this is found in *High Waisted*; at 2:46 into the track, the recording, at this point only room ambience, is cut to silence, then a wailing distorted microphone feedback sound quickly cuts in and plays for the remaining 37 seconds of the track. This editing is very much like the approaches we have encountered in previous chapters—a brutal foregrounding of the editing itself, of 'the splice'.

Instruments

We could also compare the approach in *Returnal* and *A New Way To Pay Old Debts* to

Haswell and Hecker's approach to the UPIC discussed in chapter 3. Found technologies or existing techniques are used as the material that constitutes the work. Furthermore the found technologies are used in a 'raw' (deliberately naïve?) way. This foregrounds the contingency of the material means in all three cases. For instance, Orcutt describes how he came to use his four-string guitar, and why it sounds the way it does:

> I strung the guitar back with four strings and just started to play
> again ... this was the one that I got when I was in college. It had
> always been around and I had played it on and off, and it was
> broken a couple times. When I moved to San Francisco, the neck
> was broken off. So I took it to some shop here and the guy said
> what he would charge me to put it together was more than the value
> of the guitar. And I said, 'That's fine, I just want something to play.'
> So after he put the neck back on he said, 'Don't tune it back up to
> concert pitch because the neck's not going to be strong enough to
> hold it.' He had tuned the low E string down to a C, and that's
> where I left it. (Masters & Currin 2010)

Lopatin describes a similar history in his relationship with the Juno-60, having inherited it from a young age and becoming accustomed to its peculiarities; 'that closeness and history yields a lot of interesting results' (Powell 2010). So Lopatin's music can be said to be largely a result of this relationship. However there remains the feeling that Lopatin, more so than Orcutt, *is* to some extent playing with listeners associations with the past (if we look at the previous Oneohtrix Point Never album, *Rifts* (2009, No Fun Productions, NFP-56), we can see a much more explicit nostalgic reference—the accompanying videos of super-8 video footage and so on. See e.g. *Laser To Laser*).

Despite this, Lopatins practice has been described by one commentator with the phrase 'synth as synth' (Keenan 2009). This is an interesting concept to examine more closely. It implies a literalness—the synth-as-something-else would be depictive, representational. The most obvious case of depiction would be to synthesize acoustic instruments. However this does not entirely capture the use of synthesis in Oneohtrix Point Never. In an interview, Lopatin compares his father's use of the Juno-60 to his own:

> Lopatin: All his sounds emulated accordions and whatnot.
> Interviewer: He didn't let the machine do what the machine does
> best—he didn't let it *not* be a real-world acoustic instrument.
> Lopatin: I guess not, but it's pretty far out to use an analog synth to

strive towards emulation of 'the natural'. Enter the uncanny valley.

(Powell 2010)

Rifts in particular features synth sounds that have this uncanny resemblance to acoustic instruments. See for example the flute-esque loop in *Physical Memories*, or the more reedy sounding oboe lead on *Betrayed In The Octagon*. But it is the way in which these sounds 'fail' to properly imitate acoustic instruments that remains the focus—their uncanny-ness, similar but not the same. In this aspect of the sound we are still therefore primarily foregrounding the influence and character of the Juno-60.

The 'synth as synth' could refer not just to an opposition to synthesis of acoustic instruments, but also in a more generalized sense to all kinds of depiction; synth-as-synth opposed to any use of the synth-as-medium—for expressivity, narrativity, etc. *Returnal* could certainly afford listening on this level, however Lopatin's own description of his work again undermines this: '[the Juno-60] is used for lead voices. She's the narrator, and when she's not narrating, she's generating lots of environmental data, like the shape of the landscape. But it's just data, and I need to sculpt it to actually turn it into the landscape' (Powell 2010). So the synthesizer sounds are in fact not 'merely' the sounds of a synthesizer, but are descriptions of landscapes and narratives (for Lopatin at least).

Label curation

To return to the question of what unites the music associated with Mego, so far we have seen that this might be to do with what I have defined as noise music; an approach that avoids the imposition of meaning or the use of representation. The result is therefore something like literalism. If this is the case, we can perhaps conclude that Orcutt's work is in line with the existing 'Mego aesthetic' to a greater degree than Oneohtrix Point Never. This is perhaps counter-intuitive because of the superficial aspect of genre—Oneohtrix Point Never as drone based electronic music fits into the Mego catalogue quite innocuously, whereas Orcutt playing acoustic blues seems to stick out as an anomaly.

So there are two kinds of inconsistency here: a superficial change in genre with Orcutt, and a more fundamental change, towards a romantic, narrative sound in Oneohtrix Point Never (which, it should be noted, does perhaps have at least one precedent in the Mego back catalogue in the form of Fennesz). But on both counts this is actually in line with Rehberg's approach as a curator. His idea is to keep the label's vitality by avoiding predictability in the releases. There *are* shared sensibilities between the majority of artists associated with Mego as we have seen, but exceptions to the rule are necessary for

Rehberg. There is a desire to avoid a totalized overarching aesthetic:

> I always wanted to do a label that was loud, not loud in terms of
> sound, but like 'here we are', rocking the boat a bit. I still have that
> approach. Lots of labels and groups get into a generic flow of
> things and always do the same thing. I never was interested in that,
> so that's why the catalogue is quite jagged, you can't pigeon hole
> the label. [1]

Conclusion

This thesis has been centered around splitting approaches to music into two general categories, defined by their ontology. A representational or idealist approach (and corresponding rationalism) was described in numerous contexts—in classical philosophy, in romanticism, in the electro-acoustic tradition, in algorithmic composition literature, and also in the design of software such as digital audio workstations. Of particular relevance is the idealism found in the notion of a 'digital aesthetic'. Digital technology is seen as a means of exploring 'the deepest aesthetics between math and art' (Ikeda in Eubank 2008); this sums up precisely what Coyne means by 'technoromanticism' (Coyne 2001).

I claimed that sound is seen as the means of representing a musical eidos in all of these approaches. A listener is supposed to recover this eidos, and the model therefore is a kind of communication, which can then be very roughly grouped into either the classical or romantic; mimetic or expressive. As Hiller and Issacson put it: 'an imitation of a fundamental divine harmony of universal significance' on the one hand, or 'a direct emotional expression and an explicit and subjective communication' on the other. The music is communicating something about the world, or more commonly, humanity; infusing it with signifiers of humanity—love, aggression, loneliness, joy, etc. If we take a materialist view, this can only be seen as the construction of various fictions, largely based on naturalizations—concepts that are particular to an ideological orientation but are taken to be universal. The fictions constructed by these notions feel real and inescapable, making them somewhat oppressive.

Linguistic representation, cultural signifiers and so on, represent in their totality something like Lacan's 'symbolic order'. The symbolic order highlights the difference between what he refers to as reality and the Real; the world as we are (inescapably) indoctrinated to interpret it, and the chaotic, meaningless, 'traumatic' thing at its base. The Real is beyond the symbolic order, beyond reality as we experience it, as 'that which resists symbolization absolutely' (Lacan 1991). According to Lacan the Real is only occasionally glimpsed, as a gap or rupture in the symbolic order, where something is unrecognizable and meaning cannot be grasped.

For Marxists, the symbolic order might be understood as the dominant ideological superstructure. Marx split society into its 'base' and 'superstructure'. He defined the base as the forces and relations of production, and the superstructure as institutions, culture, religion and so on, elements that are largely superficial but sometimes influence the base.

Althusser reversed this priority, claiming that the superstructure is prior to the base, it is the ideological underpinning that shapes and supports it (Althusser 2008). Ideologies are not statements of political reality, they orient subjects' relations and therefore *construct* a political reality (Žižek 1989). Furthermore Althusser claimed that ideology is material; i.e. it is precisely things like music, cultural products, that constitute it.

The concept of naturalization is crucial to ideology; a necessary condition for the proper functioning of an ideology is that it is viewed as non-ideological. It should appear to be based on facts rather than values. The purpose of a truly progressive art has often been seen as disrupting such ideology. Fisher summarizes this: 'as theorists from Brecht through to Foucault and Badiou have maintained, emancipatory politics must always destroy the appearance of a "natural order", must reveal what is presented as necessary and inevitable to be a mere contingency' (Fisher 2009).

Another similar (but less politically motivated) theory is found in Heidegger's distinction between 'world' and 'earth'. 'World' is the web of significance and relations in which we exist, and 'earth' is the unintelligible outside of this. Worlds nonetheless are built upon or emerge from earth. He claims that art, although it is an object of 'world', appeals to 'earth' in its materiality (Heidegger 1993). It provides a temporary rupture in the world. Again we return to the idea of 'revealing'; truth for Heidegger is a product of this temporary glimpsing.

Romanticism, as I have defined it, appears to be predicated precisely on conserving the current symbolic order (or maintaining the dominant ideology). The romantic goal of expressing human truths is achieved through emotion and instinct; the elevation of the artist's subjectivity. But in order to communicate emotional content, it must rely on the repetition of existing signifiers of this or that emotion. It proceeds by association. Throughout the 19th and 20th centuries any art form that embraced the romantic notion of expression was seen as the epitome of bourgeois individualism. For example, expressionism (unsurprisingly—the clue is in the name) was at the centre of much debate in Marxist aesthetics in the early 20th century (see Adorno et al. 2007).

This argument is based around a specific politics, but we can also say that romanticism is conservative in a more general, structural sense: an approach focussed on expression epitomizes the myth of creativity, of the self as source of ideas. As Butler puts it, this is the idea that 'works of art *are* made, semi-miraculously, in the imagination, and the creative process restores a wholeness lost in common experience' (Butler 1981). Under this misconception, one is blind to the existence of external influence, and is likely to

simply express the prevalent ideas of the period, under the guise of radicality. It has been argued that this is the case with the original romantic movement itself, that it was ultimately a conservative or even reactionary movement, despite its revolutionary outward appearance (Brown 2001, Honour 1979, Butler 1981). The unifying element in 18th/19th century romanticism, in as much as one can be identified at all, was not one of technique, it was not stylistic or formal. It was rather to do with these notions—an elevation of the artist expressing subjective but fundamental truths; the patriarchal structure of a genius communicating his humanity to a grateful audience.

This is relevant beyond the romantic period. Rock music seems like the natural descendent of romantic ideas of authenticity and expression. But I have also discussed the romanticism in approaches such as spectromorphology. In approaches like this the concept of gesture is normally taken to be fundamental in communicating meaning. Middleton prioritizes meaning, specifically meaning via gesture, in his analysis of popular music, but also claims that this contributes to a general musicology (Middleton 1993). In the course of this thesis I repeatedly found that gesture was an inappropriate way to talk about the music, at least not in the most common sense of the word—as changes in sound properties that are analogous to movements of the body. We therefore cannot consider the sound as merely a medium for communicating abstract gestural content.

This is a subtle distinction in the way we think of the abstract in music. Miranda, for example, states that 'musical compositions carry abstract structures' (Miranda 2001). But abstractions, precisely *because* they are abstractions, are supervened on by the thing they are abstracted from—the sound. The sound is primary, the abstraction cannot exist without it, in the same way that form cannot exist without matter; form *is* matter (and matter *is* form). Musical compositions carry form only in the sense that any other physical entity carries form. There is no reason therefore to *necessarily* consider the abstract as the essence of music. Taube argues that 'the score is not the same thing as the music, it is a representation of the music ... [it] can be thought of as constituting a level of abstraction above the sonic waveform' (Taube 2004). The crux of this approach is in seeing representations as representations.

In order to develop this position, I drew from materialist philosophy (in which, as above, the abstract is seen as exactly that—an abstraction, *from* material reality) and from pragmatic philosophy (in which the existence or non-existence of abstracta is simply not considered an issue at all). I claimed some level of compatibility between these philosophies for as far as the purposes of this thesis go. In the musics I considered, the

intention is not representation or the communication of ideas. In particular, notions of expression tend to be avoided as far as possible. Without the anthropocentric focus on subjectivity, it is less likely to reinforce the current dominant ideology via representation and identification as described above.

In thinking of a music not based on communication, one thinks of the notion of 'absolute music': 'an ideal of "pure" music independent of words, drama or representational meaning ... understood as objective structure without expressive content' (Grove & Sadie 1988). But absolute music is of course a romantic concept, and the conclusion I reach in this thesis does ironically begin to resemble the romanticism we began in opposition to; the idea of re-unification with, or illumination of, an ineffable reality. It is not inconsistent with notions of the sublime—glimpsing something beyond comprehension. There is a paradox in either a materialist or anti-metaphysical philosophy that has something unexplainable at its base that almost seems ideal: 'matter', or Heidegger's 'Being' (often capitalized in the way that 'God' is capitalized, giving it a mystical overtone).

The difference appears superficial but is actually fundamental. As discussed in the introduction, Romanticism (according to Schlegel) is concerned with somehow expressing 'the infinite'—a term that implies escapism via abstraction. The quest ultimately is for an absolute meta-physical unity, by means of universals such as beauty. Schlegel said that 'beauty is a symbolic representation of the infinite' (Bonds 1997). Therein lies the difference in approach—a literal aesthetic is not concerned with symbolically representing anything. It strives for apprehension of the 'thing itself'—the *ding an sich* that for Kant is fundamentally unknowable, but for Heidegger is inseparable from phenomenal experience (phenomenology is ontology).

So absolute music represents perhaps that aspect of nineteenth century romanticism that is concerned with expressing 'the infinite'. It is opposed to anything 'extra-musical' and yet it remains an entity that points beyond itself:

> To borrow an imagery central to Schlegel's philosophy, a work is
> like an ancient fragment that has been torn from an original form,
> but is still able to recapture in its brokenness the perfection of an
> unknown totality that the Romantic imagination can reconstruct ...
> A work as a fragment therefore always gestures beyond itself; it is
> never complete. (Chua 1999)

The music of Mego in contrast cannot be said to point towards 'the perfection of an unknown totality'. It is quite the opposite of absolute; I have shown it to be specific and

contingent. There is nothing underpinning it that is universal. The music of Mego attempts to reveal only its physical existence. Of course, meaning can be found in the music, but it was not 'put there' intentionally, hence the model is not one of linear communication or representation.

Absolute music, as with other examples encountered in previous chapters—Greenberg/Fried, acousmatic listening, spectromorphology, and so on—is concerned primarily with *transcending the material*, to appreciate either the form that it embodies, free of contingency and context, or some symbolic association with what is depicted. In their foregrounding of materiality, musics such as that represented by Mego should not therefore be considered 'absolute' in any way. The words that best describe it are words that are defined precisely in opposition to concepts of absoluteness: specificity, arbitrariness, contingency, impurity—it is very specific to its technological context, with arbitrary compositional decisions based on the contingency of that situation, and the unity of a work is often undermined by various aesthetic inconsistencies. Furthermore even issues of individual taste and aesthetics are certainly not bracketed out, this is all part of the context in which the process of production is taking place.

Returning to Goodman's terminology mentioned in the introduction, this music is simply a non-notional artform. It is literal. The object of contemplation is the-thing-itself, not a depiction or representation of abstract content/meaning. There is not considered to be a need for the music to point to something else beyond its own physical existence. But just because the music does not predicate itself on communicating something else, this does not mean it exists in an absolute realm, separated from meaning, ideology, and so on. Rather, that its position and function in the world (in some sense its 'meaning') must be found external to the work, in the aesthetic or political implications of the concept of a non-notional artform. For Chua, this is also the case, despite its claims to the contrary, with absolute music: 'absolute music cannot be confined to the history of music as if it were purely musical, circling in its own autonomous sphere. What it claims to be is embedded in structures outside music(ology)' (Chua 1999). In Mego there is no implied claim to be autonomous in this manner. In line with Chua's description, meaning is not embedded in the music and yet a statement is certainly made in the act of creating/distributing it. A statement that is primarily oppositional—the music defines itself in opposition to individualist expression, or narrative escapism (this is how it becomes literal noise music; using the realm of material process and technological experimentation to avoid forms that could be taken in this way).

The centrality of ontology to aesthetics has been demonstrated at length in numerous examples. If sound is not seen as a communicative medium, carrying abstract musical content, then structures and forms that imply it *is* (e.g. expressively gestural or overtly narrative musics) will inevitably be viewed with distaste. And conversely, if a listener understands music as being fundamentally concerned with communicating something beyond itself, then they will tend to react with (sometimes extreme) distaste to noise music. The understanding of what music in general 'is' affects the value judgements in listening to and creating it.

Linguistic models of music (see for example Levinson 1991) require fundamentally that music is intelligible. Noise music however is unintelligible, the mode of listening is different. Herein lies the importance of noise; does it present the only escape from the 'fictions' I described in romantic artistic production? Noise could be considered either an attempt to step outside of the symbolic order, making us aware of its existence, or perhaps an attempt to reconfigure it. So we return to the two possible theses mentioned in the introduction:

1. Any meaning produced, although not the point of the work, is not detrimental to the appreciation of the music. The point is that the meaning is not determined by the composer, it is left open, and arises from a specific listening context.

2. Meaning produced is actually detrimental to appreciation of the music, since the music is attempting to be an 'empty-signifier'. This is something like the absolute music described above, but attempting apprehension of a specific and contingent reality rather than an abstract absolute one.

To put it in Lacanian terms: does noise offer new ways of seeing reality, or of glimpsing the Real? Dewey provides some support for the first of these options. He sees technological inquiry specifically as the way in which meaning is *produced*, i.e. meaning is continually constructed in the process of properly experimental inquiry. It is for him in fact the only way in which meaning is produced. Compare this to the conception of technology as a medium for the *communication* of meaning. Likewise in Marxist aesthetics, theorists like Gidal tend to see materialist artistic production as a means of undermining ideological structures in order to open the possibility of new ideologies: '*the denial of semioticity* ... is each time an ideological position rather than the representation of a prior essence, truth, or nature' (Gidal 1989).

However something closer in to the second option is suggested by Heidegger, or, I should say, by my deliberately selective reading of Heidegger. Gumbrecht makes a similar

reading, in which art is fundamentally about 'presence', presenting something that is not to be interpreted but experienced in a physical way, revealing being. Meaning is certainly detrimental to this. Like Dewey though, for Heidegger, it is technics that is central:

> *techne* ... reveals whatever does not bring itself forth and does not
> yet lie here before us, whatever can look and turn out now one way
> and now another ... Thus what is decisive in *techne* does not lie at
> all in making and manipulating nor in the using of means, but
> rather in the aforementioned revealing. It is as revealing, and not as
> manufacturing, that *techne* is a bringing-forth. (Heidegger 1993)

It initially seems difficult to reconcile the two possibilities, they appear to be mutually exclusive. But perhaps we should emphasize the way in which being is revealed *in the process of* a disruption and reconfiguring of meanings, and vice-versa. For Heidegger revealing/concealing is a constant process, in that being is always interpreted, but when it is glimpsed, 'bringing-forth', it immediately withdraws, as the understanding of it becomes a new interpretation itself. Reciprocally, an approach like Gidal's, in undermining existing ideology, if nothing else makes the viewer very aware of the existence of ideology, and therefore aware of at least the potential of an outside-of ideology.

Perhaps we could say that there does not exist the possibility of gaining access to something outside of symbolically mediated reality, the symbolic order; the Real remains inaccessible. *But* through a lack of identification, replaced by an awareness and material presence, the symbolic order is temporarily disrupted and one is made more acutely aware of its existence. The alternative is to become further entrenched in it, which requires its continued concealment by being re-presented as natural and universal. The experience of presence is thus shifted external to the way traditional aesthetics explains the experience of art. But there still remains a sense of the sublime, in the existence of something beyond meaning that is unknowable or ungraspable. Perhaps this does not imply some truth merely beyond comprehension waiting to be revealed, but rather the lack of anything to reveal (Borges: 'this imminence of a revelation which does not occur is, perhaps, the aesthetic phenomenon' (Borges 2000)).

This thing that is either revealed, cannot be revealed, or in fact does not even exist, is referred to in various philosophies ('philosophies of access' (Harman 2007)) as 'material', the 'thing-in-itself', 'noumena', 'the Real', 'presence'... (It is tempting to say that Macbeth has the last word on this; reality, like noise music, is 'full of sound and fury, *signifying nothing*'). For Brassier and Žižek it is simply the point at which thought fails (Brassier

2010). For Derrida, it should not even be considered a 'non-ground' (i.e. it is not even 'nothing', as 'nothing' is itself a kind of thing). He posits an *infinite deferral with no fundamental* to which we can appeal. Deconstruction in fact offers a good model for the artistic production described in this thesis: rather than appealing to final or absolute determined meaning in communicating ideas, it engages in the constant flux of experimentation, 'play' (Caputo 1988). Or, as Gumbrecht puts it, rather than a new worldview, 'resistance to a smooth integration into *any* metaphysical worldview' (Gumbrecht 2004).

Note that one thing this kind of work is not concerned with revealing (in most instances) is the material processes used in production. This to reiterate, is best described by Gidal, as 'pseudo-documentary', pertaining to a 'truth' and is thus a representation. This is sometimes the basic idea described by those writing on 'glitch', where the sounds are taken to be failures of the technology (Cascone 2000). In contrast, the conclusion here is that these sounds are not to do with notions of fidelity, but are a quite normal process of what is sometimes referred to as extended technique. Glitches, surface noise and so on can all be considered in this way, not as impediments to an original sound, but as original sounds themselves. It is 'extended' because it moves beyond the traditional use of an instrument, beyond its 'institutional' use. Such experimentation with materials once again emphasizes embodied knowledge of material processes, *making*. It also highlights the lack of distinction between composition and performance, the exploration and use of improvised extended technique is *part of* the compositional process. Extended technique and material processes do not provide a truth regarding production, but, can certainly be used to subvert a conventionally representational medium, thereby creating something of heightened materiality.

For fear of becoming lost in abstractions, one final example will ground these concepts and hopefully demonstrate their relevance to musical practice. Thus far I have only discussed the algorithmic work of Evol, but more recent work, culminating in *Ten Canisters Of Pressurized Tetrafluoroethane Over Three Weeks* (Alku 89, 2009), is based around experimentation with gas horns.

> The first EVOL performance to involve the use of pressurized gas
> horns dates from late 1999 in Barcelona's legendary Moog Club.
> Back then, the combination of horns and computer generated
> sounds was more a humorous prop (an extension of the *computer
> music for hooligans* motto) than a deliberate aesthetic statement.

> But just a couple of years later, these mighty ($\approx$ 120 dB!) sound
> generators quickly became a regular ingredient in EVOL
> performances, featuring entire acoustic sections where the horns
> mimic textures, timbres and dynamics of the electronic parts of the
> show. Sometimes, these acoustic interludes have involved up to
> four horn operators, hiding among the audience in each corner of
> the room. (Jiménez de Cisneros 2009)

Jiménez de Cisneros says that other than the 'computer music for hooligans' link, the initial attraction to gas horns arose from the observation that their sound shares qualities with the synthetic sounds he was already working with [3]. This tentative and indeterminate goal was followed, and experimentation (in the form of actual performance practice in this case) suggested greater and greater subtleties and techniques in the use of the airhorns. For example, he found that firing two horns into each other produces amplitude modulation ('purely physical renditions of classical synthesis techniques' (Jiménez de Cisneros 2009)), and the chaotic bubbling of the final pressurization as the canister is near to empty gives very similar results to some of the algorithms he was using. By the time *Ten Canisters Of Pressurized Tetrafluoroethane Over Three Weeks* was recorded, the focus had shifted entirely to the airhorns; the record contains no electronic sounds (by which I mean synthesized sounds). It is recordings of airhorns only, with no processing or even overdubbing. Jiménez de Cisneros refers to this as a continuation of the same practice, part of the Evol computer music project, reconfiguring notions of computer music. A precedent was perhaps set in this respect by Goodiepal, whose computer music project has superficially very little to do with computers (or music for that matter, in some cases) (see for instance Goodiepal 2009).

So Jiménez de Cisneros followed an 'end-in-view', which incrementally suggested further goals, to the point where it became clear that the horns provide enough potentially interesting material to form an entire record by themselves. Although aesthetic preferences (based partly on previous experience in algorithmic music) were clearly taken into account, there remains the sense that the horns were approached 'from scratch'—their possibilities being explored without much preconception of the result. The result therefore is quite radically unique in its materials and structure.

The recordings are incredibly varied given the limited palette used, yet almost the entire record consists of sounds at a pitch of around 440Hz, since this is generally the pitch chosen by gas horn manufacturers. What varies are aspects such as the amplitudes and

panning, but most importantly, the harmonic makeup of the sound, and its timbral qualities at various stages of canister depletion, or at different orientations and room positions. The tones are not held for long enough for it to be suited to the term drone music, but it certainly also has no melodic content in any traditional sense. It is presented as a series of experiments, rather than using the horns as an expressive medium.

Derivation of meaning is therefore frustrated, and in listening one becomes concerned with the sheer 'physicality' of the sound. Volume is, as always, important for Jiménez de Cisneros (the sleeve notes stating in the usual way, 'play loud, at 45 RPM!!!'). When particular meanings *are* ascribed to the sound in the act of listening, it tends to be a surprising reconfiguration of associations. For instance, in a similar vein to previous Evol releases in the *Punani* series, the idea that loud sounds signify aggression is often undermined, with one of the most common reactions being laughter.

To return to the issue of 'where is the art "located"?', when someone hums a tune it is generally considered to be the same 'music' as an official recording or performance of it despite being very different, i.e. the music is not the same thing as the sound. Noise music, or more generally, music that is in some sense fundamentally timbral, is categorically different. You cannot hum the tunes. Being timbral, it cannot be easily reduced to an abstract higher level entity.

With regard to a hummable tune, the abstract work entity does exist *nominally*, since it is clearly useful to have such a concept in language. Kania describes this ontology in classical music as 'the most defendable, albeit defeasible, view' (Kania 2005). He goes on to define recorded tracks as being 'the work' in rock music, where tracks 'manifest songs'. In jazz, the situation is more complicated, he claims this is a tradition without the concept of 'a work'—performances are compared directly without reference to an 'enduring object'. If we require a nominal work concept in contemporary computer music, it might have elements of both Kania's rock and jazz ontology. A work in this field can generally be considered as either a performance, a recorded track, or an installation. Importantly, *all* of these exist without reference to an enduring object; tracks do not 'manifest songs' for example (even in the case of someone like Bill Orcutt as discussed in chapter 7).

The concept of a score in classical music means that a composer is working less directly with the materials that ultimately constitute their work, in contrast to, for example, the way that a painter works quite directly with paint. This may be one of the fundamental reasons for the often discussed 'reification of the score' situation, where the score is seen as 'the music' itself. However in practices such as those discussed in this thesis (and timbral

musics in general) the situation is moved back closer to the plastic arts. There is no 'score' as such, so the process is usually more direct. The sound producing technologies, or material processes in general, are not separated from the act of composition and are therefore integral to the result. The situation is closer to a craft practice rather than an eidetic rational exercise.

Christian Marclay has been quoted as saying: 'music is material. Recording technology has turned music into an object' (Curiger 1997). This is true not just of recording technologies, but also sound production technologies. The composer can work with the material of sound rather than a more abstract score. As this quote highlights, it is via the exploration of approaches to technology that we can realize the importance of ontology. The influence of technology, or in a more general sense, process, is an effective means by which existing vocabularies, and expressivity are avoided. The work is less able to function by association, taking the focus away from ideas behind the sound, placing it more on the sound itself. The unintelligibility of the result establishes it as literal. In Heidegger's words, it exists only to 'show something that has the character of a thing' (Heidegger 1993).

I attempted to define the above approach/aesthetic/ontology by comparing a number of pieces from the Mego catalogue to various alternative antitheses. I first drew a comparison against music that engages with technology on a symbolic level, i.e. that promotes a 'digital aesthetic'. I then compared it to a music that attempts total generality, and in particular the approach to technology that this engenders (the desire for a value-neutral, transparent technology). Then a further examination of some of the tools used led to the idea that non-value-neutrality and limitations are important in a pragmatic approach centered on experimentation, providing a basis for the formation of goals and ends-in-view. Algorithmic composition was then identified as one particular way of introducing technological influence, to move beyond the limitations of the imagination. This is in contrast with much writing on algorithmic composition that focusses on reproducing existing musical forms or algorithms as a means of accessing the beauty of pure mathematical form. I then developed a definition of noise music, with 'literal noise' as that which is unintelligible, and militates against intrinsic meaning.

Finally, the approach was shown to also exist, to some extent, in recent Mego releases that superficially have more semantic content. Mirroring the music, there seems to be a 'noise' approach in the curation of the label—a refusal to allow comprehension of any pattern. A curatorial approach of complete eclecticism could be seen as analogous to white

noise—predictably unpredictable. So some consistency is required in order for the inconsistencies to function as noise. This, problematically for a thesis, makes generalizations difficult. The approach described is a vague connection between the artists on Mego, but there are inevitably exceptions, *necessarily*, to achieve what Rehberg refers to as a 'jagged' kind of curation [1].

Notes

[1] Peter Rehberg in discussion with the New Aesthetics in Computer Music research group between 12/07/09 and 25/07/09

[2] Peter Rehberg in email communication 2010

[3] Roc Jiménez de Cisneros in discussion with the New Aesthetics in Computer Music research group between 17/11/08 and 01/12/08

[4] New Aesthetics in Computer Music Interview with Peter Rehberg, available at http://www.music.york.ac.uk/mrc/na-cm/index.php?n=Main.PeterRehberg

[5] Russell Haswell in email communication 2011

[6] Russell Haswell in discussion with the New Aesthetics in Computer Music research group between 11/01/07 and 02/02/07

[7] Yasunao Tone in discussion with the New Aesthetics in Computer Music research group between 01/03/09 and 14/03/09

[8] Andreas Pieper in email communication 2011

[9] Roc Jiménez de Cisneros in email communication 2010

[10] Oswald Berthold in email communication 2011

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