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1. Introduction and Background

1.1 Introduction and Research Questions

Imagine a hundred monkeys bashing away unintelligently at typewriters for an infinite amount of time. It is said that in this time the entire works of Shakespeare will be amongst the things they have written¹. Monkeys hitting typewriters randomly like this, is not a very efficient way of re-creating the works of Shakespeare. Or of creating new works similar to the ones of Shakespeare for that matter.

My aims are to find good and important questions concerning aesthetics and chance in connection to generative artworks. On the way, I hope to learn how to teach these monkeys (in my case they are a computer) how to be more efficient when creating new art. I have also wanted to compile, in a compact and easily accessible format, several important disciplines in conjunction to generative art, drama and narrative.

In brief, this is a study into generative artworks which utilize chance. I will look at what chance and generativity are, at whether generative art can be called art or not through some classic art definitions, and finally I will look at generative art's potential for drama. My approach to this study is philosophical, and according to the nature of philosophy, I do not expect to find any final answers to these questions. I feel philosophy best suits this thesis in our cross disciplinary field of new media and that it is as important to raise questions, as it is to answer them. I aim at bringing together different views and points in a way which will make reading this rewarding for others who are interested in the field of generative art.

¹ The parable of the monkeys and the typewriters seems to be widely known. It probably originates from Émile Borel (*Émile Borel, "Mécanique Statistique et Irréversibilité," J. Phys. 5e série, vol. 3, 1913, pp.189-196*) but many seem also to think it originates from something T. H. Huxley has said.

1.2 Background (*Shift* and *Myths for One*)

My interest was aroused by two works of art, *Shift*² and *Myths for One*. *Shift* is a generative artwork made at the Media Lab of the University of Art and Design Helsinki in the autumn of 2001. *Myths for One* again is an installation based on *Shift*, also made at the Media Lab but in the autumn of 2002. I was involved in both of these projects as a programmer.

Shift presents different video material, music and dialogue to the viewer (computer user) in a more or less random order. All three elements are edited in real-time by a computer using both randomisation and a logic of organisation. The programme has certain rules of when it can present its media material, but it employs chance in building the final presentation. *Shift* is generative art because the final presentation is generated by a computer according to rules³ given to it.



Picture 1.1. Aki Suzuki as Buddha⁴ in Shift.

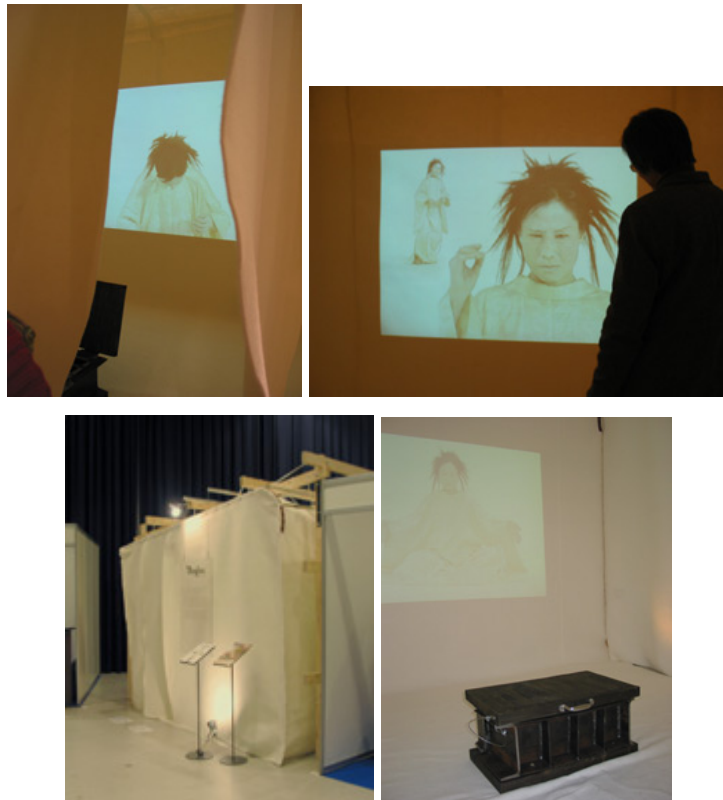
² See: <http://mlab.uiah.fi/myth/> [12.11.2003]

³ *Shift* follows a few rules. It has 316 lines of speech, 10 short pieces of music, and 26 video files in its use. The programme plays in turns music or random dialogue for about 2-5 minutes. *Shift* has a predefined beginning and ending video clip, and in between it plays random videos divided into close-up and wide angle videos. The random videos are picked so that a close-up video will play with a likelihood of 80% when dialogue is on, and when music is playing the close-ups only come with a likelihood of 20%. In addition to these rules it remembers what it has played and will not repeat itself until most of the material has been shown, then it reshuffles the material and uses them again in a different order.

⁴ Image by Egon Randlepp and Juhani Tenhunen.

Myths for one is a slightly modified version of Shift built as an installation in a white felt room. The picture of a sitting Buddha is projected on the wall inside the room, and on the floor there is an iron chest. Users can enter the room and watch the picture. If the lid of the chest is opened, then the Buddha on the wall starts to move, and the room is filled in turns by soothing music or the dialogue of a man and a woman whose voices come from the chest.

The themes in these two pieces are themes and issues that arose during seminar discussions on Joseph Campbell's view on myths at the Media Lab in the autumn of 2001.



Pictures 1.2-1.5 Myths for One at Tampere MindTreck Festival in 2002⁵.

⁵ Pictures by Juhani Tenhunen.

2 Chance, Generativity, and Life

This is an inquiry about chance. Does it exist? If it exists, then what is it? And how are chance and art related?

2.1 Chance, Generativity, and Life - Introduction

2.1.1 Background

I have all my creative life been interested in chance and randomness. I have used chance in many projects that I have been involved in. That is one of the reasons I found Shift so fascinating when we started the project. Now, some time after the work around Shift has calmed down, it has left me with an even bigger interest towards chance in art and in life. The most difficult questions that have been going around in my head are "What is chance? Does it even exist? If it does not exist, does it mean the world is fully deterministic?" I had started doubting the existence of chance already years ago, after reading that Jackson Pollock once said of his controversial painting technique that "I don't use the accident because I deny the accident."⁶

Now is my chance to dig deeper into the subject and write this philosophical cogitation, with the aim of giving something to reflect about to anyone doing chance-related art.

⁶ http://www.spectatoronline.com/2001-03-28/reeldeal_feature.html [12.4.2003]

2.1.2 Overview

I will start this chapter by looking at what chance is. Then I will consider for a while a role of mathematics in chance and our society. From there on I will look at how order is connected to chance. Then how generativity and order are connected, and then I will look at the generative order in art.

2.2 A Look at Chance

'Good players are lucky', the old chess saying has wide application.

(Bass 1989: 147)

An accident is an event which we did not foresee or predicted as improbable and unfortunate. Chance again, has something to do with the likelihood of something happening; it is the area of different probabilities of what might happen. Using chance, in for example creating art as Jackson Pollock did, or as we did with Shift, is letting go of a part of the control, and build the framework within which chance then can act. Like Pollock said, there is no accident involved; I see it as giving the piece a chance to communicate with the artist and audience, and giving it a controlled field of variation to act within.

There have been attempts to define random events. Tikka (1998: 42)⁷ writes that the calculus of probability is often characterised as the mathematical theory of random events. Still there have been difficulties in its domain in defining random events exactly. She continues that we can however generally establish that a phenomenon is deterministic, if it when certain conditions apply necessarily occurs, and random if, when certain conditions apply, it can occur or not. Automatically, when reading a definition like this, the question springs into my mind how one can know that there is considered all the necessary conditions

at the moment in question. This problem arises because the world is not a closed laboratory, but everything is interconnected in a reality of infinite detail. Tikka (1998: 42)⁸ continues that Monod distinguishes between different meanings of the concept of chance. According to him we can discuss operational uncertainty, which is natural for instance with different games of chance, and absolute uncertainty, which he calls mutation and quantum-phenomena (Tikka 1998: 42.) This is a common belief that true randomness can only exist in evolution and mutation. One way or the other, at least for my artistic needs, it is enough that chance brakes linearity and offers the possibility of surprise. To put it another way, I want chance to brake the anticipated presentation from one view to another. I do not need mathematically pure chance. However, both for scientific reasons and for creative questioning it is interesting to look at chance more in general, but in the art I will mostly handle operational uncertainty. At least that is how I read operational uncertainty, that the area of operation is controlled and defined.

Kari Lagerspetz (1998: 42)⁹ strives to complete Monod's division. He emphasizes the relativity of random phenomena. In his specification, he draws a parallel between methodological chance and Monod's operational chance. An event like this is throwing a die. The probability for getting a certain number is 1/6, because every number is considered equally probable. We could however think, that if we knew everything which affects the rolling of the die, the amount of force used, the flow of the wind, the resilience of the table and the die, the weight of the die, and so on, then we could predict the final position of the die. In other words, a lack in the observations, in the observation methods, or in the theory, can lead to defining an event as random. This sounds reasonable to me and is very close to my thoughts. I will explain further on how David Bohm actually connects this to the order of things.

⁷ Tikka refers to Tuominen, Pekka, Norlamo, Pekka: *Todennäköisyyslaskenta*, Limes ry, Helsinki, 1980, p.6-7.

⁸ Tikka refers to Monod, Jacques, *Sattuma ja välttämättömyys*, WSOY, Juva, 1984, p.122-123.

⁹ Tikka refers to Lagerspetz, Kari, *Sattumasta säätelyyn*, WSOY, Juva, 1983, p.76

2.3 About the Purity of Mathematics

We have a big trust in mathematics in the world today. Our western view of the world is based on mathematical logic. These times are such that we believe mathematics to be able to give us an undisputable absolute true picture of the world. This can however be false and even dangerous. Recently an odd phenomenon has been proved in mathematics, it has been shown that even mathematics include random fluctuation. I think this is a sign of the world being more than just mathematics.

What is mathematics? Mathematics is a language, and a language describes the world. The world is not mathematics, but mathematics is a way of describing aspects and relations in the world. If I show you a picture of a pipe, you know that it is not a pipe; it is only a picture of a pipe. The same thing is true if I speak to you about something, a thing is always more than what we can say and is never exhausted by our concepts (Bohm 1987: 8.) We have got this wrong in our picture of mathematics.

Mathematicians have had problems dealing with Gregory Chaitin's mathematical proof, which shows that some mathematical facts are true for no reason, they are true by accident, or at random. Chaitin's theory leads him to draw the conclusion that sometimes mathematical truth is completely random, and has no structure or pattern that we will ever be able to understand. (Chaitin 2002.)

What he found in pure mathematics is a way to model or imitate independent tosses of a fair coin. It's a place where God plays dice with mathematical truth. It consists of mathematical facts which are so delicately balanced between being true or false that we're never going to know, and so you might as well toss a coin. (Chaitin 2002.)

So how did he find this complete lack of structure in an area of pure mathematics? Here's a quick summary how to do it, a complete one would take much more time and space. First we set a programme running on a Turing machine, which is a mathematical idealisation of a digital computer with no time limit. Then we simply ask: "Will the programme go on forever, or at some point

will it say 'I'm finished' and halt?" Instead of asking whether or not a specific programme halts, we look at the ensemble of all possible computer programmes. We assign to each computer programme a probability that it will be chosen. Each bit of information in the random programme is chosen by tossing a coin, an independent toss for each bit. We can now ask what the total probability that those programmes will halt is. This halting probability, call it Omega, wraps up Turing's question of whether a programme halts into one number between 0 and 1. If the programme never halts, Omega is 0; if it always halts, Omega is 1. (Chaitin 1990.)

The Omega Number is defined like this:

$$\text{Omega} = \text{Sum}_{p \text{ halts}} 2^{-|p|}$$

This means that Omega is the probability that a programme, each bit of which is generated by an independent toss of a fair coin, eventually halts. In the formula, $|p|$ is the size in bits of programme p , and Omega is between zero and one. This is counted and then written in binary.

This is how you get randomness; this is how you show that there are facts that are true for no reason in pure maths. When you take this number and then you write it in binary, this halting probability, it turns out that those bits of this number written in binary have absolutely no structure. Even though there's a simple mathematical definition of Omega, those bits, if you could see them, could not be distinguished from independent tosses of a fair coin. (Chaitin 2002).

2.4 Chaos and Order

*Order lies at the root of structure, which is a key issue in life
as a whole.*

(Bohm 1987: 141).

The Oxford English Dictionary¹⁰ writes about 'random', amongst other things, that the natural tendency of all change is to create a greater degree of disorder and randomness. Is randomness disorder? Is it a lack of order?

Bohm writes that there is a connection between randomness, chance, and chaos on the one hand, and order on the other. This can be seen in the case of the generation of random numbers. In order to carry out certain operations, computers sometimes need to call upon strings of random numbers and therefore they contain their own internal programmes for generating them. A particularly simple programme takes a given eight-digit number and multiplies it by itself. The resulting number will be very large but the programme selects only the middle eight digits, which are then multiplied by themselves, the centre digits taken, and so on. In this way a series of numbers are generated which do not appear to have any particular order to each other. This sequence will be, as far as it is possible to test, free from all correlations and without any significant suborder. In this sense, therefore, the order of the numbers is essentially random. Yet in the context of the computer programme, a simple order of low degree determines the succession of numbers. It appears that the notions of a random order and an order of low degree depend upon the wider context in which they are embedded. (Bohm 1987: 125-126.) This is similar to Lagerspetz's view on the relativity of random phenomena explained earlier; it was what he called methodological chance.

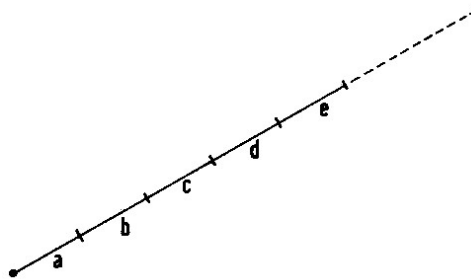
Bohm treats randomness not as something incommensurable with order but as a special case of a more general notion of order (Bohm 1987: 127). This may appear to be a curious step to take, since chance and randomness are

¹⁰ <http://oed.com/> [21.10.2003], search on 'random'

generally thought of as being equal to total disorder (the absence of any order at all).

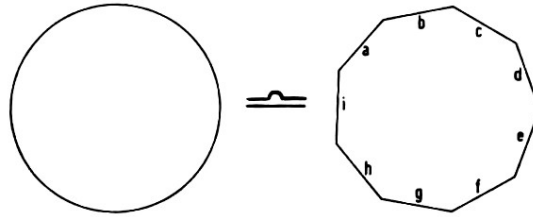
Order itself is generally experienced in a number of different situations and contexts. For example, there is the order of number, of points on a line, of space and time, of the movement of a particle through space, and of the functioning of a machine. But order need not be only mechanical or restricted to inanimate systems. There is also the order of growth of an organism, of a language, of music and art, and of society in general. Indeed it can truly be said that whatever we do presupposes some kind of order. (Bohm 1987: 111.) This view seems to be commonly shared amongst researchers of chaos theory.

A particular general notion of order can be understood in terms of similar differences and different similarities. Consider the example of a line. It can be thought of as constructed out of a series of equal segments in contact: a, b, c, d, e, f, etc. The characteristic of the line is that the difference between a and b is similar to the difference between b and c, and so on (Bohm 1987: 116.) See picture 2.1.



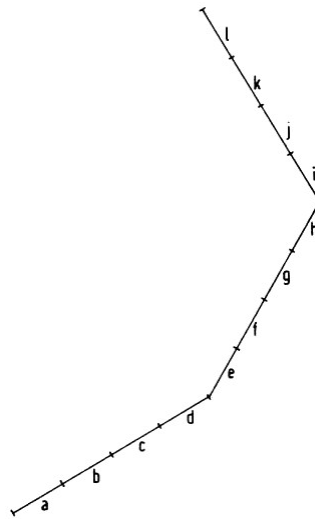
Picture 2.1(Bohm 1987: 116.)

In a similar way it is possible to analyse a curve, such as a circle, by approximating it to a polygon of many sides. See picture 2.2. Here the circle is also defined by a single, similar difference. (Bohm 1987: 116.)



Picture 2.2. (Bohm 1987: 117)

In order to expand this notion of order, let's introduce the idea of an order of orders, which leads to the notion of a degree of order. Curves that can be described in terms of single differences, which can be made as complex as desired. Such curves are determined by two pieces of information: the location of the starting point and the common difference in successive line elements (this remains similar to itself throughout the curve). These curves therefore have an order of second degree. Curves with orders of higher degree can be defined when the differences themselves become different, but similar in a higher order. (Bohm 1987: 121-122.) Look at picture 2.3.



Picture 2.3. (Bohm 1987: 122.)

A curve described by three items of information, the starting point of the first segment, the difference between adjoining segments, and the difference of the differences, it has an order of third degree. In principle such orders can be continued indefinitely to orders of higher and higher degrees, and even to orders of infinite degree. (Bohm 1987: 123.)

The notion of chance as a form of order can be illustrated by considering the random number generator in a computer. The actual sequence of these random numbers is generated by a deterministic sequence of instructions. However, the disadvantage of this procedure is that each time the programme is activated it will generate an identical sequence of 'random' numbers. One way of overcoming this obvious drawback is to begin the programme each time at a different starting point, or to choose some starting configuration more or less by chance. For example, the setting on the electronic clock that monitors the computer's internal time could be used as a parameter in the programme. As the clock setting changes, one random sequence is therefore replaced by another. Each of these sequences of random numbers has a definite order of succession that can be distinguished from that of any other. In the context which includes the computer, its programme, and the clock setting, each sequence is of an order of low degree. However, in the absence of such a context the sequences are of infinite degree and cannot be determined by any finite number of differences. (Bohm 1987: 128.) So the example of predicting the result of a die toss earlier was of infinite order to us because we did not know all the forces affecting it. If we would however have known them, it would have become an order of low degree and thereby predictable to us.

It is clear that randomness cannot be equated with a complete absence of order, which in itself has no meaning. Rather, randomness is a particular kind of order. Language, for example, may be considered as having an infinite order, because its potential for meaning is unlimited and cannot be determined by any finite set of differences. On the other hand, it also contains many different suborders of lower degree – the various rules of syntax and semantics for example. The higher orders also contain and condition these suborders. Within the infinite order of language of a novel, for example, is contained the order of the sentence; the orders of the tense, action, and the subject of the paragraph; and the orders of character and plot that link the chapters together. Although language is of infinite order, it is clearly not random. (Bohm 1987: 128-129.)

The subtle orders of infinite degree discussed above are neither random nor simple regular orders. This implies that randomness can in fact be thought of as one aspect of a general spectrum of order. At one end of this spectrum are the

simple orders of low degree. At the other are the random orders, and in between is a whole world of complex and subtle order, including language and music as well as other examples that could be drawn from art, architecture, games of all kinds, social structures, drama, theatre and rituals. (Bohm 1987: 130.)

2.5 Order and Generativity

If you look at any walls spotted with various stains or with a mixture of different kinds of stones, if you are about to invent some scene you will be able to see in it a resemblance to various different landscapes adorned with mountains, rivers, rocks, trees, plains, wide valleys and groups of hills... With such walls and blends of different stones it comes about as it does with the sound of bells, in whose clanging you may discover every name and word that you can imagine.

- Leonardo da Vinci (Bass 1989: 148-149.)¹¹

Is the Leonardo quotation above an example of the whole universe present in one atom, or is it an example of how our imagination sees what we want it to see, and what we think we should see? Bohm discusses next the generative order. Up to now, order has been considered as arising through a sequence of successions. This is indeed a very common form of order, used in several places and seldom questioned, like linear storytelling for example. I believe that generative order can be as common as linear order. I will explain this more in chapter four later.

It is possible to use the notion of order, based on similarities and differences, to generate shapes, figures, forms, and processes. For example, starting from a single segment it is possible to generate a line by means of a process of repetition, in which each element is similar to the next. A polygon can be produced through a similarity of angle and length. In a related fashion all

second-degree curves can be generated from an initial difference which is repeated in a way that is similar to itself. Higher-degree curves require the repetition of more differences, but they can all be constructed in the same fashion. (Bohm 1987: 152.)

A more developed form of order is the mathematical theory of fractals, which was relatively recently invented by B. B. Mandelbrot, and which is closely related to the theory of chaos. Fractals involve an order of similar differences which include changes of scale as well as other possible changes. (Bohm 1987: 152.) Oxford English Dictionary¹² (OED) defines a fractal as "a mathematically conceived curve such that any small part of it, enlarged, has the same statistical character as the original."

Here is a simple example on how a fractal is built. Start with a base figure, the triangle:



and consider a generator, which is really a small triangle that can be applied to each side of the basic figure:



In this way a six-pointed star is produced:



In the following step, the generator is reduced in scale and applied again to each line segment, giving rise to the figure:



¹¹ Bass refers to: Edward MacCurdy (ed.) *The Notebooks of Leonardo da Vinci* (2 vols.), (ew York: George Brazillier, 1958). p. 873.

This process can continue indefinitely, and result in a figure with extremely interesting properties. The next step would look like this:



Pictures 2.7-2.8 (Bohm 1987: 152-153.)

By choosing different base figures and generators, but each time applying the generator on a smaller and smaller scale, Mandelbrot is able to produce a great variety of shapes and figures that have very interesting mathematical properties. Some of these have the appearance of islands, mountains, clouds, dust, trees, river deltas, and the noise generated in an electronic circuit. All are filled with infinitesimal detail and are evocative of the types of complexity found in natural forms. In addition, they reflect the way in which the details of a form appear to be similar over a wide range of scales of size: Often when we "zoom in" on some object in nature it continues to exhibit similarities of form at greater and greater magnification. Other fractals show ever new detail at smaller and smaller scales. (Bohm 1987: 153-154.) OED also has this quotation "Mandelbrot has argued that a wide range of natural objects and phenomena are fractals; examples of fractal trees include actual trees, plants such as a cauliflower, river systems and the cardiovascular system."¹³ Look at pictures 2.9 and 2.10.

¹² <http://oed.com/> [21.10.2003], search on 'fractal'

¹³ 1985 Nature 21 Feb. 671



Pictures 2.9 and 2.10, a fractal and a real broccoli¹⁴

Mandelbrot points out that the geometry of fractals lies much closer to the forms of nature than do the circles, triangles, and rectangles of Greek geometry. It could be said that traditional geometry, out of which much of mathematics and the tools of physics have evolved, is, in fact, a highly artificial way of describing the world. Something closer to the fractal order should be an appropriate starting point for discussing nature in a more general way. (Bohm 1987: 153-154.)

Figures of even greater complexity can be created using more than one generator and applying the alternative generators according to some fixed rule. One such rule of application, selected by Mandelbrot, is to use random numbers generated in a computer. In this way, through the introduction of random successive differences, he is able to generate the curves for Brownian motion as well as totally irregular coastlines. It should also be possible to generalize Mandelbrot's ideas still further by introducing additional categories of differences other than simple scaling, for example, differences in direction, shape, and so on, to arrive at yet more subtle fractal figures (Bohm 1987: 156.) The connection to generative art is obvious here. Especially if we think of early computer generated art, which, as Edmonds (2003: 23-24) points out, was algorithmic (or generative), i.e. art produced with the aid of a computer by programming it to follow some procedure that generated the work itself.

¹⁴ Pictures are from: <http://www.ics.uci.edu/~eppstein/junkyard/fractal.html> [11.11.2003] and <http://masciulli.free.fr/albumchoux.html> [11.11.2003]

Bohm takes Mandelbrot's theory further and claims that even our consciousness is organized through a generative order (Bohm 1987: 186.) Consider how music is comprehended. At any given moment, a particular note may be sounding in awareness, but at the same time, a kind of "reverberation" of a number of earlier notes can also be sensed. Such reverberation is not the same as recollection or memory. Rather it is more like a part of an unbroken enfoldment and unfoldment of the notes concerned into ever subtler forms, including emotions and impulses to physical movement, as well as a kind of "ethereal" echo of the original notes within the mind. Indeed if successive notes are played several seconds apart, then they no longer combine together in such a way as to convey the dynamic sense of unbroken flow that is essential to the meaning of music. But when they are played at their proper speed, the notes fold together into an overall tune or musical theme. This suggests that, at any given moment, a number of notes are present in awareness in various degrees of enfoldment. (Bohm 1987: 188-189.)

This perception of order is generally common to all works of art. For example, the montage, or editing together of successive images, in the film of a great director has something in common with music, for the internal structure, quality, and feeling of each image infuses all the others. In this way the value and meaning of a particular image, seen alone, is totally transformed and the resulting scene is viewed as an organic whole rather than as a succession of explicit images. Bohm is saying, in my interpretation, that even the act of watching a movie is that of realizing the order of the different enfolded forms and attempting to reach the generative order at the heart of the work. Look at picture 2.11.



Picture 2.11¹⁵ The ending scene in Stanley Kubrick's movie 2001: A Space Odyssey, where a baby in space draws a conclusion to all that was before, an evolutionary circle is full.

To sum it all up, there are no accidents, it is only a question of order. When studying orders, the successive one is the most commonly studied, I call it linear order, but the generative order is perhaps an even more natural order in the world. There is reason to believe that randomness and chaos are just forms of extreme generative order, and that these orders can be (even more) successfully applied in interactive art and construction of drama. I will elaborate more on this in chapter four. These orders are only extreme when understanding as little of the system as we do. With all the right data, there is no chaos, no randomness, only action and reaction interconnected in a reality of infinite detail all linked together in a complex web. There is no chance, it is the nature of our reality.

2.6 Generative order and art

2.6.1 Classic art

If his hand slips when applying a brush stroke, the artist may find a happy and unexpected effect, but he does not look at the canvas and find a whole painting so delivered.

(Bass 1989: 149.)

¹⁵ Picture is from <http://movieimage2.tripod.com/2001/> [3.11.2003]

Generative order can be seen in the work of a painter. In a certain restricted sense the generation of form using Mandelbrot's fractals can be compared with the various stages of painting. At least until last century an artist did not generally begin to work with detail but, in the case of a portrait for example, attempted to capture the overall form and gesture of the sitter with an initial sketch on the canvas. Gradually this initial sketch was built up and made more detailed, solidity being indicated by modelling, as the first layer of paint was added. As the painting progressed, detail was created in a progressive way, each time by building on the whole. Just as the complex forms of nature appear to be generated through successive additions of smaller and smaller detail, so at one level, painting could be thought of as growing in a similar fashion. (Bohm 1987: 157.)

Of course the generative order of a work of art is far more complex than the preceding description might suggest. The painter may begin with a general idea, a feeling that contains, in a tacit or enfolded way, the whole essence of the final work. The next stage may be to observe the general scene and make sketches that rely upon the sense of visual perception. But in addition to the outward perception, there is also an inner perception in operation which is inseparable from the painter's whole life, training, knowledge, and response to the history of painting. The outward and inward perceptions are, in turn, inseparable from an emotional and intellectual relationship to the theme and even to its literary and social values. Yet this vision is by no means rigid and fixed, for as the painter begins to work on the canvas, a new interaction takes place. He or she is constantly faced with both physical limitations and new potentials. (Bohm 1987: 157-158.) I find this an almost perfect description of the creative process. I can sit at a computer to programme or write, and I experience the whole situation of creativity in this way, starting from a generative source of an idea and seeing it unfold through me into an ever more definite form.

While the essence of the generative order of a painting ultimately escapes definition, it is clear that this order is very different from that in which

the whole is built out of parts (i.e., in which the whole emerges through accumulation of detail.) (Bohm 1987: 158-159.)

This can be applied to any created picture. Applying this to a moving picture, look at pictures 2.11 and 2.12 below. You see Shift's white on white aesthetics, which can be read as a sort of spaceless space or some sort of purity of the space. Every element of the character in picture 2.11 speaks about movement, but an unusual way of moving. It is hard to say from the still picture if she is moving forwards, or backwards or just swaying on one place. The character's hair also plays an important role in the pictures. It builds a sort of aura around her head, something resembling a halo. The pictures in Shift have a strict rhythm in time but also in space, the character moves back and forth and can come up close sometimes. Shift creates an illusion of space and perspective by scale of the character. The camera is static and never moves, and that is why it seems like the character is moving and not the camera. In picture 2.11 she is moving in a wide angle shot. After she has walked off the screen in that scene, she might in the next one fade up close to the camera, as in picture 2.12. This gives us the impression that she has moved closer to us. Although this is only our modern western view of reading the pictures. We have to read, for example, Byzantine art differently, because there the social hierarchy is shown through scales in the paintings. The scale and placement of figures show the characters ranking. Someone who is used to read pictures in that fashion would probably read the changes in scale of the character in Shift as changes in her importance. She is more powerful when she comes closer and gets less important when shown as further away (from us.)



Pictures 2.11 and 2.12: Screenshots from Shift.

Classical paintings can often be analysed in terms of simple geometric forms, such as intersecting lines, triangles, rectangles and circles that are balanced and arranged in a harmonious fashion. The invention of perspective by Brunelleschi, gave to painters the possibility of a linear order generated by the receding lines and planes of buildings and even of the human body. In a sense this underlying order, which gives structure to many Renaissance paintings, is similar to what we have called the Cartesian order: that is, the underlying use of a grid to portray space and, in the case of a painting, the tacit backdrop on which buildings, people, boats, rivers, and roads are ordered. It is possible to see something of a Newtonian order being anticipated in these Renaissance paintings. (Bohm 1987: 167-168.)

On the other hand J. W. Turner's passion both in his paintings and poetry was the power of light and the movement of water, so that the underlying order of his art became a form of swirling motion or gyre. In addition, by borrowing from and going far beyond Goethe's theory of advancing and receding colours, Turner was able to give the impression of a constantly rotating vortex within his paintings. Turner was able to overcome the old orders of geometrical structure through the power of his new vortexlike order of light, air, and water in constant motion. Look at picture 2.13.



Picture 2.13: Snow Storm – Steamboat off a Harbor's Mouth Making Signals in Shallow Water and Going by the Lead, Joseph Mallord William Turner¹⁶.

Of course these were just a few examples on how to see generative order in art. Classical art in itself is very rich on different forms and almost an infinite amount of examples could be derived from it.

¹⁶ Picture is from:
<http://www.victorianweb.org/painting/turner/paintings/snowstorm.html>
[16.10.2003]

2.6.2 Digital art

Everything said previously about fine arts applies also to digital art. I will continue by exploring the digital domain of art.

Generative order is strongly present in generative art. The tools for generating generative art on a computer are however not very developed yet. It usually demands the skills of a programmer (also as a "script"-writer) to be able to generate these forms, which in some restricted ways can be seen similar to Mandelbrot's fractals. In many senses the underlying structure built by the programmer, or possibly by a system designer, plays an important role in these works. The algorithms can be seen as a part of the presentation and scriptwriting, for a well made storytelling system makes a good and versatile story possible, whereas a bad one limits the script. At least the story and the system can not be seen as anything totally separated on a computer, because they always affect each other.

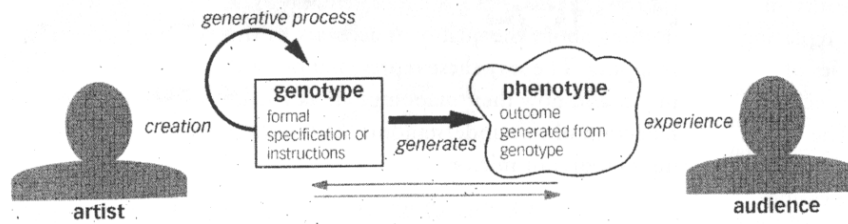
Shift is a generative work and uses chance, but is the structure in it generative in the fractal-sense? In Shift the story unfolds differently each time, and it is basically never-ending (well the user can decide when it should end.) In a way Shift is like a fractal, because it shows more and more details the longer the user watches the story unfold. It is like the piece of music discussed earlier, where the previous note is still ringing and the current moment in it gets its meaning through the flow of the whole presentation. The key to the order of Shift is exactly in the way the story unfolds in our minds from abstract form and associations into a meaningful whole. As an example, the longer Shift is followed, the more the nature of the characters will open up, once the viewer understand their different roles (idealist and materialist), then he will read the story a bit differently after that. I think Myths for One takes this even a step further by building a more immersive experience for the user. To experience it the user has to step into a space designed solely for the purpose of experiencing the story. More about these in chapter four.

The question now remains what is the difference between Shift as a generative artwork and a linear one. Well, a linear one can not function as Shift does. But a linear can unfold in similar ways in our minds. However, Shift is

generated differently every time; it is constructed through the repetition of these media-elements, similarly to how fractals are constructed through numerical values put into an algorithm. The algorithm (programme) defines how the final output will look like.

Ernest Edmonds uses logic programming instead of procedural programming when making generative works. He sees the programme itself as a kind of structure which can be applied to different works (Edmonds 2003: 23.) I agree but want to point out that the programme is like an algorithm, you can create many different forms from it, but one programme can only create one sort of form. It is essential for the work to have the right kind of programme (fractal-code), so that a fitting presentation is generated. One kind of programme can only produce one kind of dramatic whole, so even if I agree with Edmonds, it is with these remarks. But his statement is a clear hint of him also experiencing the programme code somehow similarly to the algorithms of fractals, but he does not use fractal metaphors to describe his works himself. Instead Edmonds uses an evolution-based metaphor to describe his work and its functionality. More precisely, he calls it a variation on genetic algorithms (Edmonds 2003: 23-24), which goes straight into the evolution-category. Evolution-based metaphors are in my opinion the most commonly used contemporary metaphors when describing generative pieces of art.

McCormack presents the functionality of this evolution based metaphor-thinking, and this metaphor really is the core of all his work. He has even developed a programming software based on the biological metaphor of the developing cell (McCormack 2003: 11). McCormack's definition of generative art involves the use of biological terms (2003: 5). The terms genotype and phenotype are used to represent the distinct aspects of this process. Essentially the authoring process is directed towards the creation of the genotype. The genotype is a formal specification of process, generally unambiguous. When this process description is enacted, it generates the phenotype, which is essentially the experience of the artwork. Picture 2.14 illustrates these key elements.



Picture 2.14 (McCormack 2003: 5)

An important factor in this generative process is that through the process specified in the genotype, the phenotype 'unfolds in the world'. In informational terms, this means that the volume of information generated in the phenotype is significantly greater than the genotype itself. It is through the application of a generative process that this amplification occurs. (McCormack 2003: 5.) The similarity to the fractal order of things is quite obvious here, and it gets even more obvious as McCormack presents Lindenmayer's re-writing system, known as L-systems, which he draws his own work from (McCormack 2003: 8).

L-systems were originally developed as a mathematical formalism for the modelling of cellular development in plants. A simple L-system could be:

$$\Sigma = \{F, R, L, [,]\}$$

$$\omega: F$$

$$P: F \rightarrow FFR[RFLFLF]L[LFRFRF]$$

Beginning with the axiom (ω) the productions are iteratively applied in parallel to each symbol in the word (P), thus creating a new word at each iteration. So the L-system above generates this sequence of strings:

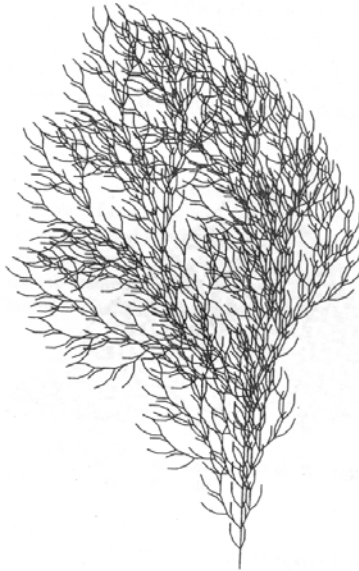
Axiom: F

Iteration 1: FFR[RFLFLF]L[LFRFRF]

Iteration 2: FFR[RFLFLF]L[LFRFRF]FFR[RFLFLF]L[LFRFRF]R[R
 FFR[RFLFLF]L[LFRFRF]LFFR[RFLFLF]L[LFRFRF]LF
 FR[RFLFLF]L[LFRFRF]]L[LFFR[RFLFLF]L[LFRFRF]R
 FFR[RFLFLF]L[LFRFRF]RFFR[RFLFLF]L[LFRFRF]]

(To express this more conversationally, every F in the word are always replaced by the string of symbols the way this is defined in P. Σ defines the symbols

available.) The string size increases rapidly and it is easy to see recursive patterns developing in the produced strings. Picture 2.15 is a simple geometric interpretation of the L-system defined above. (McCormack 2003: 8-9.)¹⁷ The result is quite similar to a plant, tree, or a fractal.



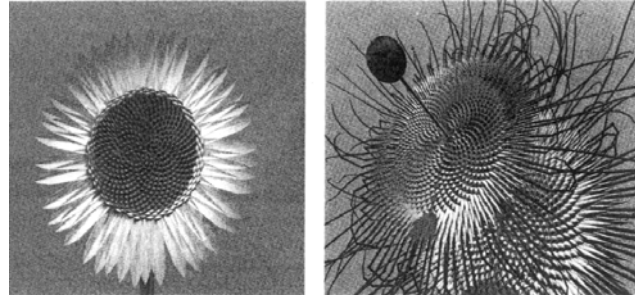
Picture 2.15 (McCormack 2003: 8)

L-systems have been adopted by a number of other communities for purposes that include, in addition to their utility for the modelling and visualization of plants: the modelling of human and animal organs, architectural design, evolutionary neural networks, inference and compression of hierarchical information structures, interactive computer graphics modelling, music composition and other things. (McCormack 2003: 9.)

To get more interesting variation into the piece, the code can be mutated and evolved by processes such as aesthetic selection (McCormack 2003: 15). In McCormack's aesthetic selection, the L-system rules slightly evolve over time, according to other rules, and in this way the possible picture generated will also change. McCormack does not explain if there are rules which determine somehow if one evolved picture is aesthetically more pleasing than another. It

¹⁷ McCormack refers here to Lindenmayer A. (1968) *Mathematical models for cellular interactions in development*, Parts I and II. *Journal of Theoretical Biology* 18, 230-315.

seems that the system of aesthetic selection is content with some change happening, and leaves the aesthetic judgment to others. Picture 2.16 shows the form of a sunflower created with an L-system, and the same form after many generations of aesthetic selection.



Picture 2.16 A sunflower created with a L-system, and the same form after aesthetic selections (McCormack 2003: 15.)

Mccormack compares his programming system and his view on generative art to his view on nature. He thinks a difference is that when we are programming, we usually have conscious goals, but nature is non-teleological (McCormack 2003: 18). I found this interesting, because Bohm again does hint of a teleological possibility behind everything. Bohm writes that the Hamilton-Jacobi theory (well known within quantum physics) is determined by something that approaches teleology; it appears as if all motion is governed by the need to attain an 'end' (Bohm 1987: 43). Even after this, Bohm is against the view of the world being deterministic. By treating randomness as a limiting case of order, he writes, it is possible to bring together the notions of strict determinism and chance (i.e., randomness) as processes that are opposite ends of the general spectrum of order. There is no need to fall into the assumption of complete determinism (although this may in certain fairly broad contexts be a correct abstraction and approximation). Nor is there any need to assume that chance and indeterminism rule absolutely (though these too will provide correct abstractions and approximations in their appropriate context). (Bohm 1987: 131-134.) It seems like he would be saying that our reality is relative, which it of course is.

3. It's clever, but is it Art?

*When the flush of a new-born sun fell first on Eden's green and gold,
Our father Adam sat under the Tree and scratched with a stick in the mould;
And the first rude sketch that the world had seen was joy to his mighty heart,
Till the Devil whispered behind the leaves, "It's pretty, but is it Art?"*
- Rudyard Kipling, "The Conundrum Of The Workshops", 1890¹⁸

This is an inquiry about whether generative art can be called art by considering different borderline cases of art, and trying to put them within the frame of the classic art definitions of Beardsley and Dickie.

3.1 Is it Art - Introduction

3.1.1 Background

When discussing Shift the question has been asked whether Shift is art at all? Watching Shift has been compared to channel surfing on television. Jumping randomly from channel to channel gives us random streams of media, just as in Shift. Of course the differences between the designed Shift and channel surfing are many. One thing is the rules that Shift follows which state what Shift shows and when it shows it. Shift is not entirely random even if it utilizes chance. Another one is that the media material is pre-edited. The video, sound and music it uses is designed and created purposefully for this use. The dialogue flows around a theme, myths more precisely. Still, the question presented is both interesting and current to judge by Minna Tarkka's inquiry (Tarkka 2002), and that is why I will tackle it here. What is art? Where goes the line between

¹⁸ From:
<http://whitewolf.newcastle.edu.au/words/authors/K/KiplingRudyard/verse/volumeXI/conundrumworkshops.html> [9.11.2003]

channel surfing and different kinds of generative installations? These are questions I will address.

3.1.2 Overview

I start this inquiry by presenting different 'classic' borderline cases of art, cases that have caused debate over if they are legitimate art or not. Here I will also present a couple of examples on generative art. Next I will present Davies view on modern art theories, and how he divides them into functional and procedural theories. Then I intend to discuss the problems of machines as art, and then machines that create art. Next I will present Beardsley's art theories as an example of functional theories and then present Dickie's theories which are of the procedural kind. Then I will also present Joyce's view on what is art. After that I intend to tackle the question what it is to create and what is creativity. Can a computer programme create? Lastly I take a quick historical look back to the birth of computerized art. I end this inquiry with some own comments.

3.2 Borderline Cases of Art

3.2.1 Commonly Debated Cases

I mention here swiftly some historically disputed pieces of art. It is worth noticing that most of these works have already now, through the passing of time, been validated as proper pieces of art. This list could be endless, so I will only mention some that I have had in mind writing this paper.

- Jackson Pollock and Mark Tobey: abstract painters whom some think only threw paint randomly at the canvas.
- John Cage: composer, among other things known for his piece 4'33", which only consists of sounds the audience makes while the 'musician' sits quietly at a grand piano for 4 minutes and 33 seconds. He has also written scores for many other experimental pieces,

among other things a piece which is 'played' on a radio by choosing certain AM frequencies for a certain time. It is a sort of random radio, actually comparable to random channel surfing.

- 'Readymades' is an art style invented by Marcel Duchamp. Here you make pieces of art out of objects already existing, created by others or naturally existing. The best known readymade is probably Duchamp's 'Fountain'. Fountain is a urinal, which he signed and sent to an art exhibition in 1917.
- Within music there are many demanding borderline cases. Some compose by throwing coins at scores and interpreting the result. Then there is atonal music, where you regard every note as equal and abandon the usual harmonies we are accustomed to hear, Arnold Schoenberg is remembered as one of the first composers to embrace atonality. Then there is Ligeti's 'Poème symphonique', which consists of a hundred metronomes ticking away for hours. Is it music?
- Jean Tinguely built machines that did different tasks and called both his machines and their blueprints art.
- Another interesting borderline case of art is forgeries and copies, can they be art?

These were examples of art which not everybody want to accept as 'real art', but there are also activities that are not done for the sake of art, even if they could be worth the status of art. Could for example sewing, writing scientific papers, wrestling, cooking or carpentry be art in some sense? How is it then with items such as a bridge, tools, a computer game, etc? Why are they not art?



Picture 3.1¹⁹ Jackson Pollock, Number 8, 1949 (detail)

We will take a look at these classic cases and then apply their judgements to generative pieces. By looking at how these pieces have been treated we can learn about generative pieces too, the analysis of these classic art definitions are applicable to all art, also to digital art.

¹⁹ Picture is from: <http://www.ibiblio.org/wm/paint/auth/pollock/> [26.10.2003]

3.2.2 Generative Artworks



Picture 3.2²⁰ *Myths for One, in the felt-room*

Shift is a generative piece; i.e. a piece where a computer builds the presentation and makes sure it is not the same from time to time. Minna Tarkka (2002) looked chronologically at media art made in Finland from 1982 to 2002. You can read from Tarkka's investigation that there is a tendency within new media art towards generative artworks. Some examples of generative artworks that Tarkka mentions are:

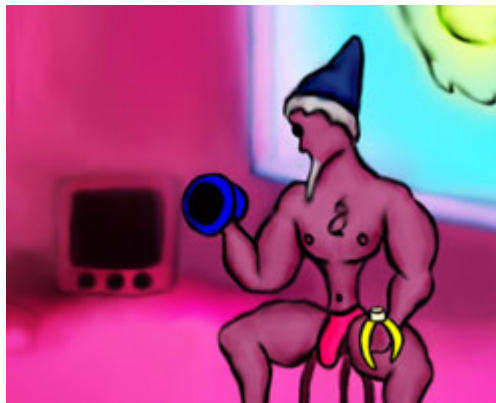
- Hanna Haaslahti's "Falling through the forces of gravity" (2000), where the user is encouraged to dance on a sensor mat and the image playback mode is affected by this. The user's sense of being in control is questionable, as the programme confuses the input-output –sequence by presenting difficult dance moves.
- Laura Beloff's "Hame" (1999), is in the same style, where different jackets correspond to image playback modes.
- Teijo Pellinen's "Akvaario", where two tamagotchi persons are presented on the television by a computer. The computer builds the TV-programme where

²⁰ Photo by Lotta Partanen.

viewers can call and affect the mood and personality of the characters on the screen.

- Tomi Knuutila's "Collagerator" (2000), is a programme to play around with which creates different kinds of audiovisual presentations (art collages)²¹.
- The 'demoscene', is filled with generative artworks, 'intros' and 'demos' that mix video and polygons with audio and visual effects, striving at maximal aesthetic effects with minimal bytesize.

To Tarkka's list above I want to add Ville Eerikäinen's Ladybug, finished in 2003, which is an animation that uses chance to decide upon how the story unfolds. Another interesting work is Eric Zimmerman's Life in the Garden, which is a deck of 52 cards which you pick randomly some cards from. These cards then build you a story or a short parable. This work is interesting as it uses non computerised generativity. There are of course almost infinitely of generative artworks made. According to Goodman (1987: 18-23), computerized generative artworks have been made since around 1960. These were just a few that I mentioned to show that a tendency towards generative art exists.



Picture 3.3²² From Ville Eerikäinen's Ladybug: Sandman is being a man.

3.3 Is it Art?

How should one interpret the question "But is it art?" Tilghman distinguishes three readings of the question. The first is a straightforward question about the

²¹ <http://www.imal.org/collagerator/> [19.10.2003]

²² Picture by Ville Eerikäinen.

work's credentials, about whether the piece was made by an artist, belongs in a gallery, and so on; the second is a question about how good as art the piece is; and the third is a question about whether or not the piece meets the point of art. (Davies 1991: 43). All of these readings should be considered when analyzing whether a piece is art or not. I want to point out that my main interest here is not whether the artwork is good or bad, that is a matter of taste. The question I tackle is whether something can be accepted as being art or not.

So is Duchamp's Fountain now then art? As a urinal it shares its properties (including aesthetic properties) with other porcelainery; but as an artwork it shares its properties with marble statues (Davies 1991: 67). Also note that Fountain is generally credited as being Duchamp's work, even if he did not make the urinal he appropriated in creating that work (Davies 1991: 74). The question arises how he produced the piece of art without making the object? I will return to this matter later on. Another important thing to notice is that I am only discussing within the western art tradition here. Aesthetics is highly culturally bound and in that sense relative. Someone from a totally differing culture would not see a urinal at all in Duchamp's Fountain. That interpretation demands a background within a culture with urinals.



Picture 3.4²³ Duchamp's Fountain

²³ Picture is from:
http://www.sfmoma.org/collections/recent_acquisitions/ma_coll_duchamp.html
[16.11.2003]

Duchamp himself wrote the following defence when his Fountain was neglected from an art exhibition in New York in 1917. He titled his humorous defence "The Richard Mutt Case" (Kuhns 1967: 261-262):

They say any artist paying six dollars may exhibit. Mr. Richard Mutt sent in a fountain. Without discussion this article disappeared and never was exhibited. What were the grounds for refusing Mr. Mutt's fountain:

- Some contended it was immoral, vulgar. [The "fountain" was in fact a urinal.]

- Others, it was plagiarism, a plain piece of plumbing.

Now Mr. Mutt's fountain is not immoral, that is absurd, no more than a bathtub is immoral. It is a fixture that you see every day in plumber's show windows.

Whether Mr. Mutt with his own hands made the fountain or not has no importance. He *chose* it. He took an ordinary article of life, placed it so that its useful significance disappeared under the new title and point of view – created a new thought for that object.

As for plumbing, that is absurd. The only works of art America has given are her plumbing and her bridges.

Here we can read that Duchamp himself is of the opinion that objects can be transformed into art by thought. He chose an existing article and changed the way that people think about it.

Kuhns (1967: 262) thinks that Duchamp's act was daring, but that it was an act of limited creativity. I again am of the opinion that it was an extremely creative act. Kuhns comes with an important point, that no one can do the same thing again. The whole idea and the creativity in it is based upon originality, upon the fact that it was something new which had never been done before. But does this not correspond to most pieces of art? Novelty is one of the properties an artist is expected to create (although just one of several and this is a huge question in itself.) However neither is Mitias (1978: 339) of the opinion that

Duchamp's act would have been creative. If a natural object may become art, in what way does the agency, which confers the status of art, exercise creativity, he asks. Is the act in which the status of art is conferred a creative act? Mitias thinks it is wrong to call that act creative (Mitias 1978: 340), for 'creative', which comes from the Latin *creare*, to make, signifies a conscious, concrete activity in which certain diverse elements are organized into a novel, meaningful whole. I think Mitias argument is otherwise good but he does not seem to understand abstract creativity. It is not an object but a thought, a conception, which Duchamp creates and shakes. An important meaning with these difficult cases of art is that they challenge and perhaps even destroy and ridicule the function and point of art.

3.4 Davies' View on Art Theories

Stephen Davies considers in his book different approaches within the Anglo-American philosophy to define art. He divides the approaches into two groups, the functional and the procedural. He does admit that this division is not always clear, a theory can often have some aspects from both groups in them. The proceduralist believes that an artwork necessarily is created in accordance with certain rules and procedures. These commonly accepted procedures make the object an artwork. The functionalist again believes that, necessarily, an artwork performs a function or functions distinctive to art. (Davies 1991: 1-3).

3.4.1 *The Functionalists*

Davies writes that we can assume that the concept of art has a function, or has at least had a function. It is hard to see how the concept could never have had a function, both because "art" standardly names a manufactured item, rather than a natural kind, and because there would have been no reason for our distinguishing art from nonart (or for our making art as such) if that conceptual distinction had not been useful in indicating some use or function served by

artworks. Davies points out later that it could be true that art in general has a function even if art status is to be defined procedurally; that is, it could be true that the concept of art has a point even if it is equally true that what makes a thing an artwork is not its functionality. (Davies 1991: 50-51.)

The main criticism of functionalism is that the aesthetic properties of pieces are affected by their being given art status. That is to say, aesthetic properties depend on the categorization of the objects in which they are instantiated as art or nonart. A piece may have some aesthetic properties prior to its attaining art status, but on attaining art status and as a result of doing so, a piece takes on many other aesthetic properties. These newly acquired properties may be of a quite different order from those it possessed prior to its acquiring art status. (Davies 1991: 66.) To put it in other words, our expectations towards the piece changes when it acquires art status.

3.4.2 The Procedural Theories

According to Davies, Dickie's institutional theory is the most powerful one of the procedural theories so far presented. According to it, something is a work of art as a result of its being dubbed, baptized, or honoured as a work of art by someone who is authorized thereby to make it an artwork by her position within the institution of the Artworld (Davies 1991: 78). This theory seems intuitively to be a strong one, it explains well how Duchamp's Fountain became art and from it can also be read for instance how John Cage could declare that 4'33" is a piece of music.

Still there are difficulties in the theory. If artworks can be created by artists who never show their creation to the public, then it would appear that the institutional context is not necessary for the creation of art. If not everything hung inside the door of an art gallery (for example, the artist's raincoat) thereby becomes an artwork, then the institutional context is not sufficient for the creation of art. (Davies 1991: 78-79.) One could also ask the question which came first, does art exist because of the Artworld or is it the other way around?

3.5 Machines and Art

"As the eighteenth-century philosopher asked what is the relationship of art to nature, so we ask what is the relationship of art to machine" (Kuhns 1967: 259).

When discussing generative art, one could ask why not just record an exceptionally good presentation the programme delivers, and then repeat it? The way it works now, the programme makes a new thing every time, and exactly this is the point with it. A part of the attraction is that the viewer does not know what it is going to be like, the presentation is different every time and nobody has necessarily seen the same thing you see. Chance is what makes it interesting in my opinion. Still, I believe many are of the opinion that pieces of art made by hand, and with full control over the creative process from the beginning to the end, are somehow more respectable than randomly generated artworks. Many probably hold generative works as just a curiosity. I want to point out that nobody ever has full control over the creative process. No man can draw an entirely straight line. There is always some amount of chance present when creativity is being practiced. Moreover it seems like many artists believe in the potential of the generative work.

Davies asks how it comes that we can return with pleasure to a familiar work? Because artworks are rich and complicated, so that more might always be discovered within them, he answers (Davies 1991: 60). This would indicate that artworks do not need to change from time to time as generative works often do, because the experience of a good work is in itself different every time. I still do not think that this makes the generativity of the piece unnecessary. The generativity is a part of the whole that makes the piece, and it should not be separated from any artwork of this genre. Of course, if a piece is different "literally for each viewer and at each moment in time," as Goodman (1987: 132) puts it, one might hope it is not sheer chance building my personal piece. A piece that is personalized for exactly the person viewing it, at exactly that moment in time, sounds like it could sustain it's interest better in the long run.

This might be done by reacting to some characteristics or personal preferences that the viewer has, or perhaps by reacting in real time to events of the time, like the world news. Still, a piece capable of building different aesthetically pleasing art experiences all the time, is a treasure in itself. This whether the experience the viewer gets is personalized for him or not.

Kuhns insinuates in passing that the significance of introducing machines to art lies in their suggestion of artistic anarchy (Kuhns 1967: 261). I do not know if he means anarchistic art content (a urinal as an piece of art) or creative anarchy (that we for example let chance have a part of the creative process), but both ideas are interesting in my opinion.

Parkinson claims that no machines can create art. It can be programmed to do it, but that is all (Parkinson 1961: 49), it can not do it independently. This means that a computer can be programmed to make a random presentation which someone then can either think is art or not, but it can not come up with one on its own. I want to ask what is it that happens when the programmer lets go of the control and lets chance, i.e. certain things inside the computer, partly determine what the final result will be like? What is the difference between this and when a person is creative? As already discussed, a computer cannot 'choose' any random event. When it is asked to pick a random number, it just generates one through an algorithm. The result then seems to be random to us, but with the same starting number it always produces the same outcome. Is this not close to the situation when a person tries to choose a random number? Neither can we choose any absolutely random number, what we choose is a complicated result of cause and effect, like a very complicated algorithm. This is just how we perceive the world; we call events random because their origin and cause are too complicated for us to comprehend.

In the end, the machine is a tool or a medium for us. It has indeed big potential as a tool. Kuhns (1967: 260) writes that machines can be a source of the demonic in art: the wholly unconscious in control of behaviour. He continues that this lack of consciousness makes machine art and machine analogies a possible source of the comic in art too. I interpret his thoughts so that we can show sides of ourselves, of humanity, through something as inhuman as possible, a machine, and this can be a richness within art. The

machine is in many ways the opposite of the human, but it is at the same time also, especially with the computer, the most human of our tools.

Parkinson describes a machine that composes music randomly (Parkinson 1961: 54-55) and writes that the machine does not "create" anything. It has not invented the system or rules that it composes with. He also asks whether the machine has contributed anything of aesthetic significance to the finished product? I wonder whether it even needs to do this? Is that the definition of creating art? The programmer is the one who has given the machine the rules it follows. Is it then the person that invented these rules who 'creates' something? Even if he has not contributed with anything of aesthetic importance to the final product (which Parkinson criticizes the machine for)?

We have also stumbled upon another related problem here. That of shared authorship, if a programmer programmes, a director directs, and the computer presents an piece of art using random algorithms tuned by the programmer, who is the creator of the final piece? Is it the programmer, director, computer or programme? It is some kind of sum of all these small things together, I can not put it any more precise than that. The next problem is what is the piece of art in this case, where a programme is created which again creates an art experience for an audience. Which is the real artwork, the presentation which is different every time, disappearing in a fleeting moment, or the programme which was created to make these interesting presentations, which can be sold or copied, or are they both? Tikka writes "Jean Tinguely's moving sculptures coherently brought the principle of mechanical unpredictability into visual arts. [...] With these machines Tinguely showed that a work of art creates its own life within its possibilities, the piece is not a final expression, but can have creative forces within itself" (Tikka 1998: 37.) Indeed, this is the nature of generative pieces, that there are further creative forces within a creation. The phenotype is potentially larger than the genotype, as I wrote in chapter 2.6.2.

Even Parkinson (1961: 55) admits that the computer does contribute 'something'. But it is still far from doing what the human composer does, he adds. Once again I wonder if that is what it should do? Is it worthless and uncreative if it does not do the same thing as a human composer would do? The difference between a human composer and a machine composer is according to

Parkinson that a human composer can imagine and hear sounds. For Parkinson this, that something is done intentionally, deliberately and consciously, seems to be an important part of creating something.

Parkinson lastly writes that if there were created, in a way different from the processes of nature, something which could hear or imagine sounds, one would not call this a machine (Parkinson 1961: 55). I might disagree a bit to this, in the light of modern artificial intelligence. Perhaps we one day create something we call a machine which is capable of these things. Perhaps, but probably not.

3.6 Beardsley's Theories

Beardsley's theory is an example of a functional theory. He characterizes an artwork as either an arrangement of conditions intended to be capable of affording an aesthetic experience with marked aesthetic character, or (incidentally) an arrangement belonging to a class or type of arrangement that is typically intended to have this capacity. The intention to which his definition refers is an intention to provide a possible source of aesthetically qualified experience. Once such intentions have been executed often enough that an art kind has been established, artworks might then be created by their relation to the established kind. (Davies 1991: 52.)

To the definition above Beardsley added later that "a piece has aesthetic value if it has the capacity to afford, through the cognition of it, an experience that has value on account of its marked aesthetic character" (Davies 1991: 53). With other words, a work has aesthetic value if it can give an experience of aesthetic nature through this aesthetic character of its.

According to Davies Beardsley needs to show that: (1) there can be an aesthetic character to experience and (2) that character is a valuable feature of such experiences. In response to (1) Beardsley outlines five phenomenal features of aesthetic experience:

- a) it is directed toward an object

- b) what comes has the air of being freely chosen
- c) the object is emotionally distanced
- d) there is active discovery of connections, etc.
- e) there is a sense of integration between oneself as a person and the object of interest

He states that (a) is a necessary condition and that any four including (a) are sufficient for an experience being aesthetic. (Davies 1991: 53.) Therefore an experience is aesthetic if e.g. the conditions a, c, d and e apply.

On the matter of (2) - why the character of aesthetic experiences is valuable - Beardsley answers that the value derives from its giving rise to valuable effects. Beardsley mentions seven effects on consumers of art noted by Shelley, I. A. Richards, and John Dewey, even if a complete list would be very difficult to compile.

Aesthetic experience:

- a) relieves tensions and quiets destructive impulses
- b) resolves lesser conflicts within the self and helps to create an integration, or harmony
- c) refines perception and discrimination
- d) develops the imagination and along with it the ability to put oneself in the place of others
- e) is an aid to mental health, but more as a preventive measure than as a cure
- f) fosters mutual sympathy and understanding
- g) offers an ideal for human life

(Davies 1991: 54)

Beardsley admits that his definition does not cover everything that has been classed as art. It excludes anti-aesthetic art (into which category fall all works lacking aesthetically interesting sensuous properties, such as atonal music or Duchamp's Fountain) and it also excludes all pieces created merely by an act of titling or indexing (such as Duchamp's Readymades). (Davies 1991: 56).

Beardsley seems accordingly to be of the opinion that these are not art. Beardsley's theory also excludes everything made only to shock and which do not have the intention to give aesthetic pleasure. (As a side-note, it is interesting how especially point (a) in this example clearly is in debt to Aristotle's dramaturgic theories. All points above are related to Aristotle's theories on Catharsis and also to Brecht's view on Estrangement, more about these in chapters 4.2.1 and 4.2.2.)

Davies criticizes Beardsley's view on why aesthetic experiences are valuable. He asks if aesthetic experience can not be valued for themselves, and not only as means to further ends. Secondly he wonders if the effects listed by Beardsley could justify the importance attached to art. The experience of artworks would seem to be an extremely indirect and perhaps inefficient means to such effects. It seems that Beardsley holds that the value of *art in general* should be seen as distinct from the way in which we value *particular artworks*. Beardsley writes about art in general though typically we value artworks for themselves and not for the sake of the valuable effects that come from an interest in art in general. (Davies 1991: 57-58.)

3.7 Dickie's Theories

Dickie formulated his theory for the first time in 1974, he then defined a "work of art" as

- (1) an artifact
- (2) a set of the aspects of which has had conferred upon it the status of candidate for appreciation by some person or persons acting on behalf of the Artworld.

Each of (1) and (2) is necessary, and jointly they are sufficient for something being an artwork. (Davies 1991: 83.)

According to Davies interpretation Dickie uses the expression "candidate for appreciation" because "aesthetic" would be a too narrow one (Davies 1991: 107-108). The word "artifact" is explained at Dictionary.com²⁴ as "An object produced or shaped by human craft". Duchamp did not 'create' the urinal which he still made into an artwork, thus I ask again what it means to create something?

In 1984 Dickie modified and refined this definition so that it now reads:

- (1) an artist is a person who participates with understanding in the making of an artwork
- (2) a work of art is an artifact of a kind created to be presented to an Artworld public
- (3) a public is a set of persons who are prepared in some degree to understand an object that is presented to them
- (4) the Artworld is the totality of all Artworld systems
- (5) an Artworld system is a framework for the presentation of a work of art by an artist to an Artworld public.

²⁴ <http://dictionary.com/> [19.4.2003]

Again, each of (1) through (5) is necessary, and jointly they are sufficient for something's being an artwork (Davies 1991: 84). Now I want to state that condition (4) cannot be necessary in this form. It can not be necessary because different Artworlds are very bound to their local cultures. We have different views on art for example in the western world than in the other worlds. This is why it can absolutely not be required that "the totality of all Artworld systems" must accept a piece as art for it to be art. The prerequisite (4) should be limited a bit more, perhaps to "the totality of all Artworld systems within a culturally homogenous domain", which is my suggestion.

About Fountain, the person that created the urinal, the urinal salesman, did not create an artwork (as Duchamp did) because he did not act within the context of the Artworld, writes Davies. There was no institutional bar preventing the salesman's having done what Duchamp did. That the salesman did not do what Duchamp did was only the result of his own limited imagination or courage. Even if the salesman might have created artworks – for example, paintings – it is not obvious that he could have acted in so radical a fashion as did Duchamp. Duchamp had the authority to do what the salesman could not do because Duchamp had acquired an authority as a result of achieving recognition as an avant-garde artist. (Davies 1991: 85, 88.)

Davies suggests that Dickie needs to say more about the structure of the institution in order to explain how it is that at any given time some people in some places in the face of some items have authority to confer art status on those items, whereas other people, or those same people in other places, or those same people faced with different items, could not confer art status on the items in question (Davies 1991: 95). Anything can not at any arbitrary moment be given the status of art even if some people try to claim so.

With his theories Dickie has actually explained how something becomes an artwork, without explaining why it is an artwork (Davies 1991: 113).

3.8 Joyce's View on Beauty

Now I will present another view on art which I also find to be very comprehensive, and different from the ones presented insofar. This is a theory presented by James Joyce, where he borrows and applies views of St. Thomas Aquinas.

Joyce writes that three things are needed for beauty, wholeness, harmony and radiance (*integritas*, *consonantia* and *claritas*.) The first phase of apprehension is a bounding line drawn about the object to be apprehended. You apprehend it as one thing. You see it as one whole. You apprehend its wholeness. That is *integritas*. Then you pass from point to point, led by its formal lines; you apprehend it as balanced part against part within its limits; you feel the rhythm of its structure. Having first felt that it is one thing you feel now that it is a thing. You apprehend it as complex, multiple, divisible, separable, made up of its parts, the result of its parts and their sum, harmonious. That is *consonantia*. When you have apprehended it as one thing and have then analysed it according to its form and apprehended it as a thing you make the only synthesis which is logically and aesthetically permissible. You see that it is that thing which it is and no other thing. The radiance, the whatness, of a thing. This supreme quality is felt by the artist when the aesthetic image is first conceived in his imagination. The instant wherein that supreme quality of beauty, the clear radiance of the aesthetic image, is apprehended luminously by the mind which has been arrested by its wholeness and fascinated by its harmony is the luminous silent stasis of aesthetic pleasure, a spiritual state very like what has been called the enchantment of the heart. (Joyce 1982: 235-236.)

Joyce's theory is based on the notion that the true and the beautiful are akin. Truth is beheld by the intellect which is appeased by the most satisfying relations of the intelligible: beauty is beheld by the imagination which is appeased by the most satisfying relations of the sensible. (Joyce 1982: 230.) The feelings excited by improper art are kinetic, desire or loathing. Desire urges us to possess, to go to something; loathing urges us to abandon, to go from something. These are kinetic emotions. The arts which excite them, pornographical or didactic, are therefore improper arts. The aesthetic emotion is

therefore static. The mind is arrested and raised above desire and loathing.
(Joyce 1982: 227.)

It is important to remember that we are moving in a mental world here. I think that Joyce has really struck on an important aspect of art, his *claritas* is even somewhat related to Beardsley's seven effects on consumers of art which I mentioned in chapter 3.6. Beardsley did just not express it as clearly. One conclusion to draw from Joyce's theory is that we should not be writing about a urinal at all, because the art of it is inferior. It might have *integritas* and *consonantia*, but the *claritas* is lacking. If *claritas* is the supreme quality of beauty, the enchantment of the heart, whereas Fountain is more for the brain than the heart. It falls into Joyce's category of improper art.

Still I wonder, if this is not a too strict view on art. Perhaps it is just that the Fountain of Duchamp should be called something else than art, its creation was a creative act but the product is not pure art. We just do not have a standardized term for what it is.

3.9 Creativity - What is to Create?

*They find it hard to grasp some things that come easy to us,
because they simply don't have our frame of reference. I show
them a can of Campbell's soup.*

*I say, "This is soup." Then I show 'em a picture of Andy
Warhol's painting of a can of Campbell's tomato soup. I say,
"This is art." "This is soup." "This is art." Then I shuffle the
two behind my back. Now, what is this? No, this is soup and
this is art.*

*- Jane Wagner, The Search for Signs of Intelligent Life in the
Universe, 1986*

A central question, which has already turned up a couple of times, is what it means to create. Related questions are, when does one create and does creativity always result in art? Does one need control over the creative process? When

making art, does anything else matter than what appears credible to others in the end?

Mitias (1978: 340) definition on creativity (in chapter 3.3), was that "create, to make, signifies a conscious, concrete activity in which certain diverse elements are organized into a novel, meaningful whole." This is exactly what Shift does, it organizes a collection of certain diverse elements into a novel meaningful whole, a presentation. The difference is of course that it does not do it consciously, as far as we can understand. The conscious power behind the organizing comes from the programmer, or perhaps from the director of the piece.

Mitias (1978: 330) writes about Glickman's²⁵ theories that Glickman defends two main propositions:

1. In attempting to understand the character of 'creativity' we should not attend to the process, the activity, in which the artwork is produced but to the work itself;
2. Creating a work of art is not a kind of *making*. The activity of creating is generically different from the activity of making: one could make something without necessarily creating it, and similarly one could create something without necessarily making it.

The first problem in the view above is in my opinion "the work itself". Is Glickman and Mitias of the opinion that the object itself shows whether its creator has been creative? Mitias is further of the opinion that one can not be 'just' creative, but that creativity is always bound to some other activity. He writes that the creator cannot be just creating; he has to be doing something we could describe as writing, painting, composing, or whatever. He continues that "these are means by which one might create" (Mitias 1978: 331). I am of an entirely different opinion. I think one usually creates in ones mind, it often occurs subconsciously in the mind and when it happens one can be doing anything. You can 'make' an object based on an idea, but you have created when

the idea occurred. Creativity is always a mental thing, I do not believe one can create outside of the mind, even if creativity usually happens hidden and in the subconscious. Glickman also seems to see creativity outside of the physical world. He writes that an artist need not *make* the work he creates, and that the artist need not even design the art object (Mitias 1978: 332).

According to Mitias no artistic activity is creative unless it satisfies the following basic or necessary conditions:

- the artist has a general, and sometimes even vague, feeling or vision of the form which he intends to produce
 - in the process of production the artist exercises critical control – he can, in other words, modify the material medium of his work
 - the object produced is both novel and aesthetically valuable
- (Mitias 1978: 333)

Mitias is too product oriented for me, I do not think a creative activity needs a product as its result. Mitias is of the opinion (1978: 337) that it is almost impossible for an artist to create a work of art without making it. He asks how a poet could create a poem without making it? Perhaps the terminology used should be specified better. If the poem exists only in the poet's mind, perhaps even in a fairly abstract form, has he then created without making it? That is how I see it. In mass production it is a question about making. Designing again is an act of creating, in my opinion, without necessarily making anything. Mitias also demands above that artistic activity needs to lead to something novel. It is hard to argue against the demand for novelty. I think there always has to be some amount of originality in any form of creativity for it to be accepted as genuine creativity, but perhaps it is only original or novel for the one who creates, and not for the whole Artworld. In that case, the person is creative but his activity is not necessarily generally regarded as creative.

This whole discussion is absurd. How can it be valued whether someone has 'created' something or only 'made' it? Creativity is a personal experience as I

²⁵ See: Glickman, Jack (1976) "Creativity in the arts"

hinted above. Mitias does admit that creativity is the artist's spiritual or imaginative activity (Mitias 1978: 334). Still he does not draw the conclusion from this, which is the natural one to draw in my opinion, that creativity is a personal experience and only the artist himself knows whether he has been creative or not. Others can then choose to either appreciate the works he presents or not. A good point, which Mitias makes, is that one can not create something wrong, either one creates or one does not, but it is not done wrong (Mitias 1978: 334). On the other hand, it is easy to make something wrong.

Beardon discusses the dichotomy of the Bauhaus, where fine artists with creative skills were classified as separate from craftspeople with practical skills. He suggests that today we should acknowledge that artists, designers and technologists all employ both creative and practical skills. They produce different kinds of product, but the set of skills they bring to their respective tasks are similar. Where they differ is in the extent to which they call upon their different skills in their approach to work. (Beardon 2002: 175.) Beardon defines the adjective 'creative' as so: "'creativity' is a mode of human interaction with the world that can be contrasted to a technical (or systematic) mode of interaction" (Beardon 2002: 176.) He means that when someone produces something they are faced with the option of adopting a technical strategy or a creative strategy (and possibly others.) The differences between creative and technical practices are according to Beardon that:

- Creative practice employs our senses, intuition and imagination, whereas technical practice uses logical reasoning.
- Creative practice explores a variety of representational forms, whereas technical practice prefers to use symbolic representations.
- Creative practice embraces ambiguity as expressing a richness of meaning, whereas technical practice will try to eliminate ambiguity.
- Creative practice is concerned with communication, whereas technical practice is concerned with language.

(Beardon 2002: 176.)

Basically Beardon seems to see creating as something with a sense of form, and making as a technical aspect.

An artist is considered to be creative, but a relevant question is who is an artist? Davies writes (1991: 87-88) that an artist is someone who has acquired (in some appropriate but informal fashion) the authority to confer art status. This authority is acquired through the artist's participation in the activities of the Artworld. It is not (usually) formally bestowed upon the artist by other members of the Artworld, and neither does it rely directly on their consent. The emphasis is placed on authority rather than skill. I also want to point out here the difference between being an artist and being artistic. An artist can create generally accepted art. An artistic person again can create possibly impressive works, but is not necessarily accepted as a 'real' artist. For example child geniuses are not artists, the society does not accept them as artists, but they can be seen as very artistic.

What we can confer art status upon has also changed with time. Not even Duchamp could have created readymade artworks had he lived two hundred years ago. Now that Duchamp has established a new use of the convention by which art status may be conferred, that use of the conventions has become available to lesser lights in the Artworld. (Davies 1991: 88.)

Davies claims that Dickie has a tendency to write as if anyone who succeeds in conferring art status thereby is an artist. Thus he implies that a gallery director who confers art status on a chimpanzee's painting by displaying it is an artist. People who, in making an artwork, do no more than confer art status on physically unmodified objects, do not act as artists in doing so. (Davies 1991: 89.) For example random drawings made by a computer are not created by an artist, says Davies (1991: 90). Unfortunately he does not explain why. I do not think he has even tried to find out who is creative when random computer-drawings are made, he just states that the computer is not.

3.10 The early days

This inquiry has so far been into the general public's and the "Artworld's" opinions on what may be art and what is not. This has been done by looking at art through traditional philosophical ways of analyzing it. The public opinion and the way big communities think change slowly, so they do base their opinions on these traditional views on art. Of course these classic art definitions are applicable to all art, also to digital art.

Soon however, new media art will hopefully be well enough established, that its pieces of art are no longer questioned about whether they are art or not. Then the question is whether they are good or bad art. Then it is time to focus on the medium's own aesthetics, for a new medium also has new aesthetics.

"Every age seeks out the appropriate medium in which to confront the unanswerable question of human existence. We cannot limit ourselves to Elizabethan or Victorian forms any more than Shakespeare could have written within the conventions of the Aristotelian tragedy or the medieval passion play." (Murray 1997: 280.)

These aesthetics of this new medium have only been developing for a relatively short time now. But no other medium, than the computer, has had such an extraordinary effect on all the visual arts so soon after its inception (Goodman 1987: 10.) The "electronic abstractions," created in 1950 by Ben F. Laposky, are considered to be the first graphic images generated by an electronic machine (Goodman 1987: 18.) Look at picture 3.5 below. Cynthia Goodman (1987: 15) also writes about the early struggle of computer art, she writes that rejection of computer art was initially based as much on the dubious aesthetic quality of early computer graphics accomplishments by scientists, who were mislabelled as artists, as on a fear of the machine itself.



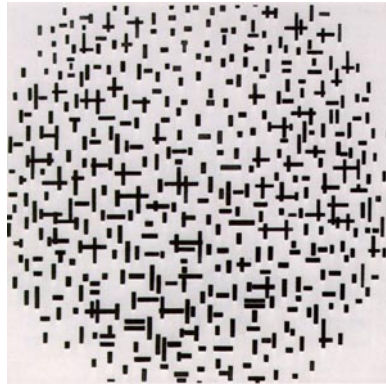
Picture 3.5²⁶ Oscillon Number Four, 1950, by Ben F. Laposky

Early computer graphics were difficult to programme, computer memory was limited, and therefore visual options were restricted. Artworks and scientific studies alike were based primarily on the effects achieved by the transformation of a linear configuration through one or more mathematical functions. The mathematical processes most frequently used were randomness (that is, programming the computer to produce unpredictable results within a framework of established parameters); iteration (the repetition of an operation with slight changes at each repetition); and interpolation (the transformation of one linear image into another through the calculation of a variable number of new values between two existing values)." (Goodman 1987: 21). So the early situation was such that one had first to be a scientist, before one could also be an "electronic artist."

An interesting incident of electronic art becoming more established happened in the mid 1960s, when using a digital computer and microfilm plotter, Michael Noll produced a semirandom picture remarkably similar in composition to the 1917 Mondrian (look at picture 3.6). He then presented Xerox reproductions of the original Mondrian and the computer generated picture to one hundred people at Bell Labs. The subjects, who were informed that they were about to participate in "an exploratory experiment to determine what aesthetic features are involved in abstract art," were instructed to identify the computer picture and the picture of their preference. Only 28 percent correctly identified the computer-generated picture, while an astonishing 59

²⁶ Picture is from: <http://www.dam.org/laposky/> [19.11.2003]

percent preferred the computer's rendition to the actual painting by Mondrian. According to Noll's conclusion, the people "seemed to associate the randomness of the computer-generated picture with human creativity, whereas the orderly bar placement of the Mondrian painting seemed to them machinelike." (Goodman 1987: 25-26.)



Picture 3.6²⁷ *Composition with lines, 1917, Piet Mondrian*

Interactivity is very often seen to be the most prominent aspect of computer art. It is what is very often seen upon as that which can change the whole experience of art. One may no longer so much 'view' as 'experience' art, Goodman writes (1987: 132.) For me the interaction is in the storytelling. I like to look at the generative works I am handling as storytelling systems, and they are interactive with themselves, if not always with humans. Myths for One is interactive with its audience because the audience can Shift its state by opening the coffin. More importantly to me, it is also interactive with itself, it remembers what it has already shown and it has rules as to what it can show and it reacts to these rules using random algorithms. This is also interaction.

²⁷ Picture is from: <http://www.fiu.edu/~andiaa/cg2/chronos.html> [19.11.2003]

3.11 Conclusion on Aesthetics

After writing this inquiry, I can not help thinking that there exists a surprisingly black and white view on the world. This is probably one of the fundamental problems in the question at issue: "is it art?" One should not attempt to simplify the world so much, it does not consist of objects that either are art or not. The world has millions of different shades of grey between the black and white.

Furthermore I think that artists should be able to concentrate on a process which is for them important and artistic, instead of trying to justify what they do to others. I want to change views, arouse feelings and shake ideas in the audience. Without needing to worry whether my ways can be accepted as artistic by the Artworld.

Applying what we have learned to Shift, at least it can be counted as art according to Dickie's theories. Dickie is content because Shift was produced within the Artworld. The University of Art and Design can be regarded as well established within the institution of the Artworld in Finland. Unless someone wants to claim that only fine arts are real art, which I hold unlikely.

Beardsley again accepts Shift as art because it gives and is intended to give aesthetic pleasure. A problem again arises because Shift is not a concrete object but a programme. On the other hand it is a concrete programme, and presents concrete pictures but they are not enduring, but changing. Still I think Beardsley would classify Shift as a concrete thing, and especially Myths for One.

I think that Joyce again would be very content. He would discard the urinal of Duchamp but praise the divine radiation of shift, claritas is the aim of it and it is hopefully also achieved with the piece.

I want to end this inquiry with something worth thinking about that Tristan Tzara wrote in "Lecture on dada" from 1924:

Art is not the most precious manifestation of life. Art has not the celestial and universal value that people like to attribute to it. Life is far more interesting.

(Chipp 1971: 386)

4 Dramaturgy of Generative Works

4.1 Dramaturgy - Introduction

*"Ford!" he said, "there's an infinite number of monkeys outside who want to talk to us about this script for Hamlet they've worked out."*²⁸

Next I will look at some dramaturgic and narrative theories to get a picture of what makes a story. If we are to make any kind of presentation, it will always have some kind of dramaturgic structure. Let it be a scientific text, a theatre piece, a song, a game, a movie or a Dadaist poem, in all of these there is a structure of building expectations, taking things apart, raising questions, answering them, putting things together, rhythm and form and so on. It is my belief that we experience the world through contrasts, and this leads to a narrative structure which we read in all things around us. Janet Murray also writes that we organize the temporal and spatial world into opposing characteristics, which she calls the earliest form of narrative (Murray 1997: 145.)

The questions I am tackling in this part are what the narrative (dramaturgic) characteristics and possibilities of random-generative works are, and how dramaturgy can contribute to chance to elevate the experience.

²⁸ Douglas Adams. *The Hitchhikers' Guide to the Galaxy*, [chapter 9] London: Pan, 1979; New York: Pocket Books, 1981.

4.2 Dramaturgic Theories

"Some people think we're made of flesh and blood and bones. Scientists say we're made of atoms. But I think we're made of stories. When we die, that's what people remember, the stories of our lives and the stories that we told."

*- Ruth Stotter (from *The Power of Personal Storytelling*,
Maguire, 1998)*

4.2.1 Aristotle: Poetics

Anybody handling any sort of dramaturgic analysis always mentions the poetics of Aristotle. The reason for this is simply because Aristotle's poetics has been shown to work in such a magnitude that many think of it as the ultimate opus for analyzing drama. Most true to the Aristotelian drama model today are the Hollywood movies, which continue straight the melodrama of the 19th century (Reetala, Heinonen 2001: 17.) The form has been proven many times as very working, and it is remarkable how even computer games repeat the basic Aristotelian drama structure. As everyone else, so will I too start from the Poetics.

The form of all art according to Aristotle is imitation (mimesis). Tragedy is the imitation of an action and people imitate through action. Actions have two reasons, character and thought, and it is by action, that all success or failure of characters in a play depends. (Aristotle: chapter VI.)

Aristotle divides a tragedy into six parts which determine its quality. These are Song (melody, pattern), Diction (language), Spectacle (enactment), Character, Thought and Plot (action). (I present alternative terms in parenthesis because they might be handy when we return to these later.) Song refers to the vocal compositions incorporated into the performance, and diction refers to the metrical composition of the spoken lines. Spectacle is the aspects that contribute to the visual experience of the play, the costuming of the actors, the scenery, and all other aspects that contribute to the visual experience of the play. Character

includes all the qualities that we associate with individuals represented in the play. Thought is the processes of reasoning that lead characters to behave as they do. The plot is the arrangement of the incidents, it needs to be a coherent whole, and there are simple and complex plots. (Aristotle: chapter VI.)

A whole is that which has a beginning, a middle, and an end. A plot needs a magnitude which may be easily embraced by our memories. Aristotle writes that beauty is a matter of size and order. So a story or plot must be of some length, but of a length to be taken in by the memory (Aristotle: chapter VII.)

Shift is a whole. It has a clearly defined beginning, middle, and an end. The middle is not that clearly defined as to its length, but its form, function and place are clearly defined.

The plot, being an imitation of an action, must imitate one action and that a whole, the structural union of the parts being such that, if any one of them is displaced or removed, the whole will be disjointed and disturbed (Aristotle: chapter VIII.)

How could we build such a whole of a computer generated presentation, that nothing can be added to, or taken away from it, without the whole falling apart? This might be hard especially if no clear length is defined (like in Shift for example.) One solution is that of Shift that every showing is always a different complete whole, where something could have been added into the middle of it, but which then would have made it into something different than the one we got. In a way the version we got might fall apart if something was added to it, but only for something else to emerge instead of it. This is possible through the defined beginning and end and through the dependence on the audiences own activity in building the meaning (more about this in the next chapter).

A tragedy is an imitation not only of a complete action, but of events inspiring fear or pity. Such an effect is best produced when the events come on us by surprise, but at the same time, they follow as cause and effect. For even coincidences are most striking when they have an air of design. (Aristotle: chapter IX.) Things need to happen because of each other, and not only after each other.

The affecting means of the tragedy are recognition and reversal of the situation (Peripeteia, turning point). These are the most powerful elements of emotional interest in Tragedy. (Aristotle: chapter VI.) Reversal of the situation is a change by which the action veers round to its opposite. Recognition, a component of the complex plot, is a change from ignorance to knowledge, a revelation that brings tragedy with it. A third component of the complex plot is pain (the scene of suffering). The scene of suffering is a destructive or painful action, such as death on the stage, bodily agony, wounds, and the like, intended to arouse strong emotions in the audience. (Aristotle: chapter XI.) A simple plot represents a change of fortune which does not come about through a reversal of the situation and does not involve recognition on the part of the hero. In the complex plot, the change of fortune happens because of necessity from the events preceding it. It is brought about through a reversal of the situation or recognition, or both. A complex plot is better. (Aristotle: chapter X.)

After listening to the dialogue in *Shift* for a while, I think the audience might experience recognition if they suddenly realize that there is a theme of Myths going through the dialogue. The meaning of what they had heard before then might change totally, when they get a clearer context to read it in. This recognition might then also bring with it a reversal of situation, although these happen more obviously through the action showed in *Shift*, if one follows it actively.

Every tragedy falls into two parts- Complication and Unravelling (solving) of problems (Aristotle: chapter XVIII.)

Even though Aristotle treats mostly tragedies, he writes that also epic plots ought, as in a tragedy, to be constructed on dramatic principles. (Aristotle: chapter XXIII.)

A tragedy is essentially also imitation of acts causing fear (fobos) and pity (eleos). The aim of the drama according to Aristotle is catharsis. Which is the pleasurable feeling aroused in us when watching events on stage that raise pity and fear in us. We feel pity when someone suffers without reason, and fear if the one suffering is like us. The reversal of luck is an important way to achieve this. (Reetala, Heinonen 2001: 35-37, Aristotle: Commentaries.)

So according to Aristotle a tragedy is first and foremost the representation of human action. Action should show by doing, and all things in a story should be there for a reason, built towards a common end. Upon this is built intrigues and fates of the characters. When we are to generate these with a programme, then everything has to follow a clear blueprint, a plan of how things should flow. Getting everything to follow as probable or necessary is a demanding task.

4.2.2 Open Drama

According to Heinonen and Reetala the dramaturgic concepts of Aristotle fit classic tragedy, but not anymore as such to modern playwriting (Reetala, Heinonen 2001: 14.) They present Brechtian drama theories because his form of open drama has presented the biggest challenge to the closed drama form of Aristotle (Reetala, Heinonen 2001: 42.) Another serious challenge has come from the theatre of the absurd, which also is an open form of drama and which they also take a look at.

An Aristotelian play, where we in the end get answers to the questions presented in the beginning and where the integrity of the plot is often emphasized, represents closed (tectonic) drama. The open (atectonic) form of drama is more epic than the closed one, and can even consist of binding together random seeming events. In the dramaturgy this means partially letting go of the linear structure (as for example in the piece *Woyzeck* by Georg Bücher.) (Reetala, Heinonen 2001: 28-29.)

The epic drama of Bertolt Brecht is in many aspects very similar to the theories of Aristotle. Brecht operates with the same concepts as the Aristotelian dramaturgy; they have a common logic, even if their goals are opposite. (Reetala, Heinonen 2001: 17, 43-44)

Table 4.1 below, is made by Brecht himself and it compares Aspects of the epic theatre of Brecht with Aristotelian theatre.

A Comparison between Dramatic and Epic Forms

| <u>Dramatic Form</u> | <u>Epic Form</u> |
|--|---|
| • the stage embodies an event | • the stage narrates an event |
| • draws spectators into an event | • makes them an observer, but... |
| • consumes their capacity for action | • awakens their capacity for action |
| • allows them to have emotions | • demands decisions from them |
| • provides them with experience | • provides them with knowledge |
| • the spectator is drawn into the plot | • the spectator is placed opposite the plot |
| • suggestion is used | • arguments are used |
| • instinctive feelings are preserved | • brought to the point of recognition |
| • Humans are unalterable | • Humans are alterable and altering |
| • suspense about the outcome | • suspense about the progress |
| • one scene exists for another | • each scene exists for itself |
| • linear development | • in curves |
| • evolutionary determinism | • jumps |
| • the world as it is | • the world as it becomes |
| • what man ought to do | • what man is forced to do |
| • his instincts | • his motivations |
| • thinking determines being | • social being determines thinking |

Table 4.1 (Reetala, Heinonen 2001: 43), translation from Brecht (1964: 37)

The activity of the viewer is the most striking difference between Brechtian and Aristotelian theatre. In the epic theatre there is more for the viewer themselves to fill in and develop, it awakens thoughts and ideas (Reetala, Heinonen 2001: 44). I think a phenotype (see chapter 2.6.2) can be brought out here which is greater than the genotype was. By emphasizing separate single scenes and unlinear jumping resolution of events, the epic theatre actually can have a greater phenotype than the genotype. In Aristotelian drama everything is very clear and emphasized and the phenotype is seldom at least significantly greater than the genotype.

"Alienation effect" (Verfremdungseffekt) which Brecht uses, is a way of presenting action between people so that they provoke attention, demand explanation, are not clear by themselves, and not just natural (Reetala, Heinonen 2001: 44). This was meant to be a constant reminder to the audience to be critical towards what they see and not to immerse too much in the story and fall in a trance.

Aristotle defined catharsis as the end cause of a play (pleasurable release of emotion.) Bertolt Brecht extended the notion of catharsis. He posited that catharsis is not complete until the audience members take what they have assimilated from the representation and put it to work in their lives. In Brecht's hypothesis, the representation lives between imagination and reality, serving as a conductor, amplifier, clarifier, and motivator. (Laurel 1993: 30-31.) Brechtian view on catharsis suggests that emotional closure necessarily takes place beyond the temporal "ending" of a play (Laurel 1993: 121.)

The theatre of the absurd again is not epic nor Aristotelian theatre (Reetala, Heinonen 2001: 45-46). Becket, Camus, Ionesco and Sartre are probably the persons most often associated with the absurd theatre. The fear in absurd tragedies is usually emptiness, the void in our lives. But Aristotelian drama goals can also be achieved in the theatre of the absurd (Reetala, Heinonen 2001: 28), so not even that is totally different. What makes open drama forms especially interesting in our view are the techniques used in conjunction with them. These are such as different montage-techniques and non-linearity. I personally find the immersive mechanism of Aristotelian drama very important,

but a problem with it is that destinies are more determined in traditional drama. The Aristotelian linearity where everything exists for a purpose does not give us that much freedom of representation and interaction. If looking for example at *Shift*, which functions more like the open drama forms where non-linearity and interactivity open up these possibilities. Still even if the Brechtian theatre emphasizes non-linearity by lifting up episodes over the end of the story and the importance of these for themselves, still the episodes were left subordinate to the plot on the level of reception. The separate episodes were experienced as hierarchically organized scenes (Reetala, Heinonen 2001: 64.) I think this is because we like to build a plot and linearity in every story we see, we make the missing connections in our minds.

4.2.3 Poetics of New Media

Brenda Laurel builds up a poetics of interactive form in her book. She does it by comparing theatre to the experience of using computers. She defines "interactivity" as the ability of humans to participate in actions in a representational context (Laurel 1993: 35.) I am striving at an analysis of the dramaturgy in generative multimedia works, which is a sort of poetics of interactive works where my interaction is the ability of the programme to interact with itself and not necessarily with humans. (Although the difference if the interaction is happening with what the programme has already generated or with information acquired from external sources such as humans is not usually big.)

4.2.3.1 How Things are Formed

How does a representation get to be the way it is? Understanding the forces that build a play or computer activity is necessary if we are to know how to make them. The four causes (of Aristotle) are forces that operate concurrently and

interactively during the process of creation²⁹. The first one is the Formal cause. It is the form or shape of what a thing is trying to be. For example, the formal cause of a building is the architect's notion of what its form will be when it is finished. Formal cause operates through an idea or vision of the completed whole, which will undergo change and elaboration as the process of creation unfolds; that is, there is a reciprocal relationship between the formal cause and the work in progress. The second one is the Material cause. This is what a thing is made of. The third one is the Efficient cause. This is the way in which a thing is actually made. This includes both the maker and the tools. The last one is the End cause. It is a thing's purpose - what it is intended to do in the world once it is completed. (Laurel 1993: 41-43).

These can also be applied to theatre where the Formal cause is the completed plot, the whole action that the playwright is trying to represent. It subsumes notions of form and genre and the patterns that define them. The Material cause is the stuff a play is made up of - the sounds and sights of the actors as they move about on stage. Note that the material of a play is not words, because the plays are intended to be acted out, and there is more to enactment than words. The Efficient cause are the skills, tools, and techniques of the playwright, actors and other artists who contribute to the finished play. The End cause is the pleasurable arousal and expression of a particular set of emotions in the audience (catharsis). (Laurel 1993: 41-43).

Finally Laurel also applies these four causes to human-computer activity. There the Formal cause is the form of what it is trying to be. It is a representation of action with agents that may be either human, computer-based, or a combination of both. The Material cause is the enactment, that which unfolds before a person's senses. These are graphics, sound and music, text characters, and even tactile and kinesthetic effects. The Efficient cause again consists of the skills and tools of its maker(s). An application is probably based, at least in parts, on chunks of programme code that have been created by other people for other purposes. The computer equivalent of a playwright is usually a group of people. Lastly the End cause is what it is intended to do in the world. It

²⁹ The four causes can be found in Aristotle's *Physics* Book 2 Chapter 3, although Laurel does not mention it.

involves functionality; word processors should spit out documents. But experience is an equally important aspect of the end cause; that is, what a person thinks and feels about the activity is part of its reason for being the way it is. A person must understand the activity well enough to do something. At best, he or she should be engaged, pleased, or even delighted by the experience. (Laurel 1993: 47-48.)

This is something to think about. Reflecting on how things became what they are probably helps build future projects even better. As these causes are very immaterial, they involve a lot of so called silent knowledge and also what I would call silent perception of the coming form, it is not possible to share, at least not to their full extent, these perceptions with others. I would say that in Shift the Formal cause was generative and interactive multimedia contemplation around Joseph Campbell's notions of Myths. The Material cause is the sound, music and video-clips, which already separately by themselves have a dramaturgic form strongly affecting everything else. The Efficient causes are the director's, scriptwriter's, programmer's and everybody else's who contributed, skills and tools we used. From the programmer's point of view I can add that this also includes at least the skills of the creator's of Macromedia Director, Macintosh OS 9 and many more. The End cause again is the pleasurable experience of the Formal cause if Shift was successful enough. I would say that the experience of the End cause is to some extent a personal one.

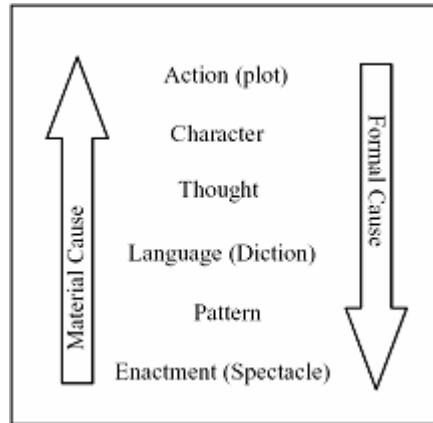
4.2.3.2 The Six Elements of Interactive Form

The most central part of Laurel's poetics is the way she treats Aristotle's six elements that build a tragedy. She sees these as a way to analyze any drama and find its weak and strong points. Laurel takes them and puts them into the realm of interactive computer usage, as shown in table 4.2 below. Each element in the table is the formal cause of all those below it, and each element is the material cause of all those above it (as shown in picture 4.1). This means that as you move up the list of elements from the bottom, you can see how each level is a

successive refinement of the materials offered by the previous level. (Laurel 1993: 49.)

| <u>Element</u> | <u>In Drama</u> | <u>In Human-Computer Activity</u> |
|------------------------------|--|---|
| Action | The whole action being represented. The action is theoretically the same in every performance. | The whole action, as it is collaboratively shaped by system and user. The action may vary in each interactive session. |
| Character | Bundles of predispositions and traits, inferred from agents' pattern of choice. | The same as in drama, but including agents of both human and computer origin. |
| Thought | Inferred internal processes leading to choice: cognition, emotion, and reason. | The same as in drama, but including processes of both human and computer origin. |
| Language | The selection and arrangement of words; the use of language. | The selection and arrangement of signs, including verbal, visual, auditory, and other nonverbal phenomena when used semiotically. |
| Melody (Pattern) | Everything that is heard, but especially the melody of speech. | The pleasurable perception of pattern in sensory phenomena. |
| Spectacle (Enactment) | Everything that is seen. | The sensory dimensions of the action being represented: visual, auditory, kinesthetic and tactile, and potentially all others. |

Table 4.2 (Laurel 1993: 49-51) lists the elements of qualitative structure in a hierarchical order.



*Picture 4.1 Causal relations among elements of quantitative structure
(Laurel 1993: 49-51.)*

Of the six elements, Enactment is composed of all of the sensory phenomena that are part of the representation. It seems appropriate to say that enactment can potentially involve all of the senses. These sensory phenomena are the basic material of both drama and human-computer activity; they are the clay that is progressively shaped by the creator, whether playwright or designer. (Laurel 1993: 54.)

The next one, Pattern, which Aristotle calls "melody", is a kind of pattern in the realm of sound. This arrangement of sounds into a pleasing pattern can be extended to the arrangement of visual images, tactile or kinesthetic sensations, and probably smells and tastes as well. Pattern refers to patterns in the sensory phenomena of the enactment. A key point Aristotle made is that patterns are pleasurable to perceive in and of themselves, whether or not they are further formulated into semiotic devices or language. Hence the use of pattern as a source of pleasure is a characteristic of dramatic representations. (Laurel 1993: 54-55.)

Language in human-computer activities is the graphical signs and symbols, nonverbal sounds, or animation sequences that may be used in the place of words as the means for explicit communication between computers and people. Such nonverbal signs may be said to function as language when they are the principal medium for the expression of thought. These may be evaluated in terms of the same criteria as Aristotle defined for diction - for example, the

effective expression of thought and appropriateness to character. (Laurel 1993: 57.)

Thought may be defined in drama as the processes leading to a character's choices and actions. Although it may be explicitly expressed in the form of dialogue, thought is inferred, by both the audience and the other characters (agents), from a character's choices and actions. Computer-based agents do not have to think; they simply have to provide a representation from which thought may be inferred. The thought of a play can appropriately deal only with what is already manifest at the levels of enactment, pattern, and language. (Laurel 1993: 57-58.)

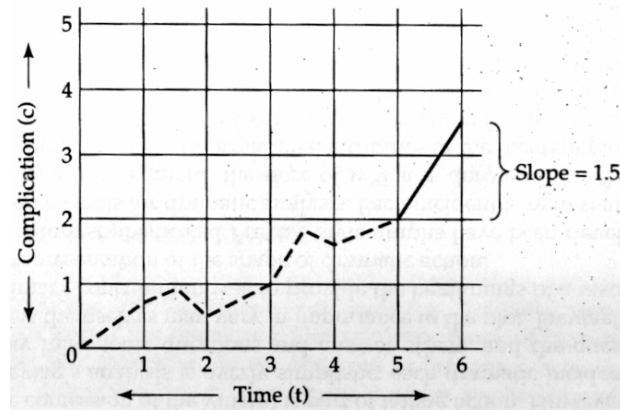
Character may be defined as bundles of traits, predispositions, and choices that, when taken together, form coherent entities. Those entities are the agents of the action represented in the plot. This definition emphasizes the primacy of action, we will use a broader definition of agents to apply to human-computer activity: entities that can initiate and perform actions. (Laurel 1993: 58.)

4.2.3.3 Visualising the Drama Structure

The shape of a play can be visualized in terms of the pattern of emotional tension created in the audience. Typically, tension rises during the course of a play until the climax of the action and falls thereafter. The climax of a play is the moment at which one line of probability becomes necessity, and all competing lines of probability are eliminated. Hence the climax is not only an emotional peak but an informational one as well. (Laurel 1993: 81)

One way to do dramatic analysis, which is used at the moment, is to keep counting variables of the complication of the plot. The information is either positive (it asks a question) or negative (it answers a question). So if C is the complication of a plot then it could start at 0. If the plot starts by the queen gone missing, then the complication would rise, let's say to 4 (one possible scale could be from 0 to 10.) If the problem is later solved or some other problem in the plot is solved, then the complication would diminish. So C could travel up and down

from 0 until the plot ends. The importance of the complicating information needs to be taken into account; the more important a piece of information is the bigger the change in C. Look at picture 4.2 (Laurel 1993: 84.)

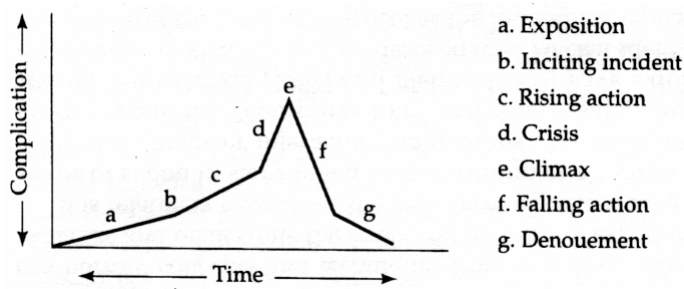


A complication graph where the slope is complication divided by time.

Picture 4.2 (Laurel 1993: 85)

A system like this for representing the complication and tension in a plot would also work as a model when analyzing and planning informational contents for generative pieces. The programme could be made to follow some graph made up for it. This would demand that the programme would have classified different drama-elements as to how complex and time-consuming they are and that it would have the possibility to choose the best suiting one from them.

Picture 4.3 below shows a contemporary version of the shape of dramatic action and its conventionally recognized parts. This is based on the analysis of several pieces built in the spirit of Aristotelian drama.



Picture 4.3 A contemporary version of the shape of dramatic action and its conventionally recognized parts (Laurel 1993: 86.)

Explanations to the parts in the graph in picture 4.3 are in the table 4.3 below.

| | |
|---|---|
| a | Exposition is the part of a play that functions to reveal the context for the unfolding action. |
| b | Inciting incident is the action or event that begins what will become the central action of the play. |
| c | In rising action the characters pursue their central goals, formulating, implementing, and revising plans, and meeting resistances and obstacles along the way. |
| d | Crisis is a period of heightened activity and commitment where many lines of probability are pruned away. |
| e | Climax is the moment at which one of the lines of probability becomes necessity and all others are eliminated. Characters either succeed or fail to achieve their goals. This is the turning point of action. |
| f | Falling action represents the consequences of the climax. |
| g | Dénouement can be described as the return to "normalcy" (the status quo of the dramatic world). In French, the word means "untying" or "unraveling". |

Table 4.3: Explanations to the parts in the graph in picture 4.3.

If we were to enlarge any segment of the graph for a real play, we would see (depending on the resolution of the underlying analysis) still more bumps and curves, representing the structure of smaller component incidents that make up the larger anatomical parts. Laurel writes that here, a fractal metaphor is apt (and perhaps it is more than a metaphor), the smaller components of a given type of action tend to reflect its structure in miniature. (Laurel 1993: 86-87.) This is indeed very fractal-like. The fractal aspect of the generative order should be put to serve in a computer generated drama. Of course, it is hard to see what kind of scriptwriting logic there should be, if the idea is that any part of it can be studied into an infinitely small detail, just as in the real world. I think it demands a change in the form of this dramatic curve, and that change again should come from a change in how generative multimedia works are read by their audiences.

4.3 Reading the Medium

4.3.1 Aesthetics

Janet Murray has established several important concepts which help us read the aesthetics of the interactive medium. The first one is immersion. Immersion is what happens when we concentrate on (sink into) a story so that we forget ourselves and where we are. Murray sees this as one of the most important aspects of a story. But to be able to immerse into the story totally, we first have to learn the rules it expresses itself with, the rules of the media. (Murray 1997: 97-99.) Notice that this is nothing exclusive to the interactive medium but an important feature of most mediums. Still Murray's immersion is the total opposite of Brecht's "Alienation effect." I believe both to be useful; it is a matter of knowing when to pick which. It depends on the Formal cause in creation as the resulting pieces will have very different effects on the audience depending on if immersion or alienation is emphasized.

Another thing needed for the effect of immersion is the "willing suspension of disbelief," a concept introduced by Samuel Taylor Coleridge. This

is similar to the term engagement, which Laurel uses in her book. It is the state of mind that we must attain in order to enjoy a representation of an action. Coleridge believed that any idiot could see that a play on a stage was not real life, so in order to enjoy a play, we must temporarily suspend our knowledge that it is "pretend." Pretending that the action is real affords us the thrill of fear; knowing that the action is pretend saves us from the pain of fear. (Laurel 1993: 113.)

The second characteristic pleasure of digital environments that Murray writes about is agency. Agency is the satisfying power to take meaningful action and see the results of our decisions and choices (Murray 1997: 126.) This is an important factor, if we shoot at a mirror in a computer game, then we want it to brake. If it brakes, and stays broken during the whole game, then the agency is working. The whole concept of agency is designed for environments that interact with the audience. Notice that I am not, like Murray, handling that much the audience's direct participation in the piece. I handle more the mental interaction which happens in the viewers head.

Transformation is the last concept. Transformation is the way in which the digital world offers us possibilities of becoming something else. Murray (1997: 154) writes that computers offer us countless ways of shape-shifting. Her point is basically that there are many believable worlds and roles that we can step into and become someone or something else. I think a proof of people wanting to do this is the effect noticed in different electronic discussion forums (notice-boards, chat-rooms, etc.) Some frequent users of these build different personalities for themselves in these. It is the possibility for them to shape what they are. Saarinen (2001: 31) writes about men pretending to be women in virtual communities and asks why someone would go to cyberspace as themselves when they could be anything they would like to be? I think this is proof enough of the need and power of the shape-shifting effect of the digital world.

4.3.2 Associations

I believe the key to making generative presentations is in using the audience's tendency to build narration and associations in their own heads. We search for narrative structure in everything we experience.

One example of this is the Kuleshov effect. The Russian film pioneer Lev Kuleshov demonstrated that audiences will take the same footage of an actor's face as signifying appetite, grief, or affection, depending on whether it is juxtaposed with images of a bowl of soup, a dead woman, or a little girl playing with a teddy bear. Using the computer, we can make use of this Kuleshov effect to create juxtapositions that are intentionally open to multiple meaningful interpretations. (Murray 1997: 160.) This is a montage technique, pictures are juxtapositioned in time and /or space, meaning after each other or partially on top of each other. The viewer then builds linear dependencies between pictures shown in parallel, and not only with pictures but this effect applies across all media and all experiences we have.

Stanley Kubrick uses the Kuleshov effect powerfully in his movies. With its help, he gets life and feelings into the red light bulb presenting the eye of the supercomputer HAL in *2001: A Space Odyssey* (see picture 4.4). In the movie there are scenes where HAL does not speak at all. Still the viewer can read shock, anger, and betrayal from the picture of the red light. This all just because of the events presented earlier in the story.



Picture 4.4. The eye of the supercomputer HAL in Stanley Kubrick's movie 2001: A Space Odyssey, MGM 1968³⁰.

The Kuleshov effect is because of how we experience our world in general. In order to see anything at all, it is necessary for the eye to engage in rapid movements which help to extract elements of information from the scene. The ways in which these elements are then built into a whole, consciously perceived picture have been shown to depend strongly on a person's general knowledge and assumptions about the nature of reality. Some striking experiments demonstrate that the flow of information from the higher levels of the brain into its picture-building areas actually exceeds the amount of information that is arriving from the eyes. In other words, what we "see" is as much the product of previous knowledge as it is of incoming visual data, writes Bohm (1987: 64). A narrative theorist again expresses it so that we are actively building the story all the time as we watch it (Bordwell 1986: 53.)

This is a known fact within psychology, that organized clusters of knowledge guide our hypothesis making. These clusters are called schemata (Bordwell 1986: 31) and narrative is a fundamental way of organizing data (Branigan 1996: 1.) In watching a representational film, we draw on schemata derived from our transactions with the everyday world, with other artworks, and with other films. Everything from recognizing objects and understanding dialogue to comprehending the film's overall story utilizes previous knowledge and experience (Bordwell 1986: 32-33.)

³⁰ Picture is taken from: <http://movieimage2.tripod.com/2001/> [12.11.2003]

John Fiske also expresses a similar thing through the theory of intertextuality. Intertextuality means that any one text is necessarily read in relationship to others and that a range of textual knowledge is brought to bear upon it (Fiske 1987: 108.) Taken to its full extent this means that reality itself exists only in the interrelations between all that a culture has written, spoken or visualized about it. From the point of view of interactive authoring this means that no form of authoring ever actually produces anything static, but that everything changes, and has always changed, according to the times and context of the person reading it. This does of course not change the fact that an interactive text works in ways very different from that of a classic linear text.

So the specific psychological method which searches for a narrative pattern, and which we all have, is called a schema. We have many kinds of mental schemas and the narrative one is just one of them. Narrative studies have shown that the narrative schema has the following format:

- 1 Introduction of setting and characters
- 2 Explanation of a state of affairs
- 3 Initiating event
- 4 Emotional response or statement of a goal by the protagonist
- 5 Complicating actions
- 6 Outcome
- 7 Reactions to outcome

(Branigan 1996: 13-14.)

These are things which we search for when building our narrative associations in the world. Now compare these to the shape and structure of dramatic action presented in chapter 4.2.3.3. Notice that the graph in picture 4.3 also has seven different segments, and then compare their explanations in table 4.3 to the descriptions above. The beginning and end are the same but the structure of events is a bit different in between, but they are quite similar. The difference rises partly because this schema does not have time in it as an aspect at all.

Is it not interesting that our existence in the world is all about organizing data, and that this is also exactly what Shift does. Shift has data which we created for it and then we built algorithms for it to organize the data in meaningful ways with.

4.4 Building on Tradition

4.4.1 Algorithms as Fairy Tales

I am searching for things that never vary in good stories (things that are always there.) These are things that should be there in order to make a presentation interesting. Of course every medium has its own set of demands, but there is the essence of stories which can, and should, be adapted to all medias. When you have these, the smallest common denominators of the stories, then you know you can vary everything else around these. This is needed especially for building algorithmic presentations. The computer never understands dramaturgy, so it needs rules and harmonies analyzed for it and expressed in numbers.

One way of avoiding the arduous task of teaching the computer to understand the world well enough to make aesthetic judgments is to code very specific story elements in terms of their dramatic function. (Murray 1997: 201.) This is not a new idea, many have insisted that there are a limited number of plots in the world, corresponding to the basic patterns of desire, fulfilment, and loss in human life (Murray 1997: 186.) Ultimate story structures have been sought for and also found in different forms. Vladimir Propp defined the logic of the Russian wondertale in terms of seven basic "spheres of action" (character roles), thirty-one "functions" (types of action), certain "moves" (fixed strings of functions), and "auxiliaries" (transitions) (Branigan 1996: 9.) He did this based on 450 fairy tales.

Georges Polti³¹ again wrote about 36 different dramatic situations, which he thinks is all there is. These are such as Crime Pursued by Vengeance, Daring Enterprise, Falling Prey To Cruelty Or Misfortune, Rivalry Of Kinsmen, etc. HE also defined the central roles needed for these situation (for example "an Avenger and a Criminal") and different variations of these dramatic situations

(Vengeance for a Mistress Slain, Vengeance for a Slain or Injured Friend, Vengeance for a Sister Seduced, and so on.)

Polti wrote about these in 1868, so attempting to reduce stories into their ultimate essence is no new thing. But computers are a relatively new invention, and so also the need to express these stories as algorithms. The dramatic situations of Polti and Propp are not that easily reducible to algorithms. There needs at least to be a system for describing the different aspects of these situations as numbers, but also a more coherent picture of how these situations can correlate to each other and to the world. I do think it would be useful to have, for example, the different dramatic situations of Polti programmed in a story system, but the system needs more information. It needs to recognize different dramaturgic possibilities of an evolving story and try to develop itself in real-time towards delivering a maximum strength 'catharsis'.

4.4.2 Algorithms as Improvisation

Commedia dell'Arte (CdA) has a fractal likeness in that it is being improvised into any detail demanded by the audience. This improvisation is done in a very generative, but also human, way. I intend to look here at some aspects of CdA that could be adapted for machines and algorithms.

The popular essentials of CdA included the set of predefined rules for improvisation and the use of the same masked characters whatever the plot. A CdA scenario only included the list of roles and properties, as well as a summary of entrances, actions and exits. A CdA actor then improvised according to the general rules, his mask and the summary. (Tuomola 1999: 3.) These could also be the framework for computer based characters in a digital storyworld. Murray (1997: 235) also writes that the insides of a digital character should perhaps resemble the improvisational materials of an actor - including set speeches, stage business, and plot patterns.

³¹ Polti information and examples are from:
<http://www.wordplayer.com/archives/poltisitu.01-12.html> [6.11.2003]

A small number of actors were able to perform a large repertoire of plays, ranging from farces to heavy melodramas, even though none of the plays had a written script. They did so by developing predictable formulas of interaction that gave shape to their improvisations (Tuomola 1999: 3.) Developing predictable formulas in a play takes a long time of educating the audience. It would mean first teaching them the language of the media, which is still in a stage of development.

CdA stage scenery was simple and put emphasis on characters and their relationships (Tuomola 1999: 3.) This is definitely a way of approaching a storyworld. An important aspect is that everything has to be kept simple so that it is controllable.

Eerikäinen (2003) has discovered a similar thing when making his non-linear movie *Ladybug*. He writes that simplicity is the key to a piece's movability. If we want prepared media elements to be easily applicable to different situations, and so also open to as many different readings of it as possible (see chapter 4.3.2), then the separate elements should be as simple as possible.

Here's a description of a sort of CdA drama structure, a performance often started with music, had love serenades and comic dances in the middle, and ended up with an easy-to-catch tune that would remain in audience's mind even after their departure. The music lured people to see the performance on a market square, kept their attention by focusing into the themes of the performance and sent them home happily recollecting what had happened (Tuomola 1999: 3-4.) Basically it is the same Aristotelian beginning, middle and end of a story.

CdA was much like a chess game. It created interesting, dramatic situations not because the game was written beforehand, but because the rules of representation were predefined and clear. Each character, like each chess piece, could only do certain things. They could only use certain masks, mimics, passages and properties. (Tuomola 1999: 3-4.)

Improvisation was made more fluent by few practices. In addition to ready rehearsed lazzi (sight gags), there were also memorised passages like *battute* (stock repartees) and *concetti* (stock speeches). Monologues were also

stock, taken from repertorio or zibaldone (gag-book) kept by the actor. (Tuomola 1999: 8.) These are definitely things for digital characters to have plenty of in stock.

In CdA, each scenario included always a 1) proposition, 2) development and 3) solution. The smallest actions (like lazzi and concetti) were designed in the same manner in order to provide constant possibilities for other characters to enter without spoiling drama: each solution provided a place for entrance, new proposition. (Tuomola 1999: 6-7.) Here is the generative order again, a play is divided into smaller scenes which offers the possibility to continue generating it into a magnitude of different directions, depending on entrances of different characters.

The basic plot lines and scenarios of CdA were really turning around three or four goals: love, money, vengeance and food (Tuomola 1999: 7.) these sound like a good set of basic interesting plots. Religion and politics could be added.

CdA usually presented the same universal battle again and again. The conflict was always between the old and the new, very often between young lovers and the old forces of society. This same battle and the change from old to new is something we witness constantly in all forms of drama and ritual, as well as in our own lives. (Tuomola 1999: 7) I would say that we experience the world through contrasts, like I already pointed out earlier, it is the oldest form of narrative.

Questions to think about include how autonomous do we want a fictional character to get? It is important to restrict it but still be able to keep it believable, the character should not walk away with the story altogether and not be too dull either. It needs some sort of spiritual life, Murray (1997: 243) writes that what we look for in a created character is not mere surprise but revelation.

4.4.3 Algorithms as Cinema

The biggest challenge for the digitally extended cinema is the conception and design of new narrative techniques that allow the interactive and emergent features of that medium to be fulfillingly embodied. Going beyond the triteness of branching plot options and video game mazes, one approach is to develop modular structures of narrative content which permit an indeterminate yet meaningful numbers of permutations. Another approach involves the algorithmic design of content characterizations that would permit the automatic generation of narrative sequences that could be modulated by the user. (Rastas 2003: introduction)

When considering a piece like *Shift*, then cinema is the intuitively closest counterpart in the old media. But it is important to remember that working with a generative piece is very different from working with traditional cinema. Everything starting from scriptwriting, editing, designing soundscapes, etc., is different from traditional cinema. Each of these separate aspects have new (or at least different) things to consider in order to be able to build a meaningful whole out of the piece. Still, it is interesting to compare these with each other.

Weinbren (1997 :1) states that cinema communicates on the basis of one frame following another. He writes about the possibilities of presenting video material in a random order, and is sure that if we give up control of the image sequence, then we give up the cinema we know. And this, of course, can be a positive thing. I have a bit different view as I do not think control over the image sequence should be given up, it should just be made unlinear and unpredictable, to a certain extent.

Weinbren continues that the most crucial thing in making a movie, in his opinion, is the final cut. When in control of the edit, you control the language, the meaning, the music, the emotion, the expressivity of the medium, he writes. "And in the shrieks of Herrman's violins against Anthony Perkins upraised

knife/cut to the swinging lightbulb/cut to Vera Miles face ... we get cinema." (Weinbren 1997 :1.) I agree a lot with this, the edit is at the heart of the cinematic language, and so also in the language of the new media, which will inherit to a big part the cinematic language.

As the changing power of the digitalization of the movies he sees the possibility of images to appear in sequences other than that in which they are recorded. The sequence of images can be determined at presentation time, rather than during the process of production. Suddenly the viewer can have some control over the montage. (Weinbren 1997 :1.)

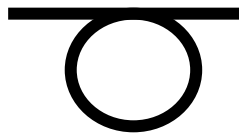

He is talking about interactive filmmaking, and he sees the interactive filmmaker's task as producing a set of film materials and plotting some pathways through it. The filmmaker becomes more the designer of a pattern of trails through a landscape of images, he writes (Weinbren 1997 :2.) I think this view is a bit too narrow. One aspect could be that of plotting a pathway through mediamaterial but there is so much more to take into account considering possible interaction and how meaning is accumulated differently depending on what material is shown in conjunction with what. It is also important to see that this plotting of a trail is not the same thing as a branching-tree structure, or should not be, because that structure is not a very working structure (as will be explained later.)

Weinbren believes that for cinema the more fundamental breakthrough is in random access to data (as opposed to just digitalization – which gives better quality but not anything fundamentally different) Random access brings about a different cinema, a cinema different in what it can say and how it says it, in the manner it represents reality and the aspects of reality it can represent. So the first structural issue according to him is to find a cinematic or narrative form that deemphasizes sequence. With non-linearity comes a dynamic between the viewer's time with the piece (which in any single session is, by definition, linear and continuous), and the space of the work, which is probably in some sense continuous (Weinbren 1997 :2-4). In Shift for example, there is a fixed database of material to be traversed in various ways. This results in a temporally nonlinear representation playing against the linear time of the viewer's experience.

Every performance explains the composition, but does not exhaust it. Every performance makes the work an actuality, but is itself only complementary to all the other performances of the work. In short, we can say that every performance offers us a complete and satisfying version of the work, but at the same time makes it incomplete for us, because it cannot simultaneously give all the other artistic solutions which the work may admit. (Weinbren 1997 :6.) This is an aspect which viewers might experience as problematic, because they are used to experience 'the whole thing.'

4.4.4 Algorithms as Hypertext

Hypertext in the form of the World Wide Web is the most used form of new media. From observation of a variety of actual hypertexts, Bernstein has identified a variety of common structural patterns that may prove useful for description, analysis, and perhaps for design of generative stories. These patterns include:

| | | |
|----------------------|--|---|
| Cycle | In the Cycle, the reader returns to a previously-visited node and eventually departs along a new path. Cycles create recurrence and so express the presence of structure. |  |
| Joyce's Cycle | In Joyce's Cycle, the reader rejoins a previously-visited part of the hypertext and continues along a previously-traversed trajectory through one or more spaces before the cycle is broken. Revisiting a previously-visited scene, moreover, may itself provide a fresh experience because the new context can change the meaning of a passage even though the words remain the same. |  |





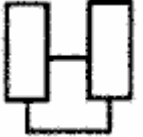

| | | |
|---------------------|---|---|
| Contour | A contour is formed where cycles impinge on each other, allowing free movement within and between the paths defined by each cycle. |  |
| Counterpoint | In Counterpoint, two voices alternate, interleaving themes or welding together theme and response. |  |
| Mirrorworld | Mirrorworlds provide a parallel or intertextual narrative that adopts a different voice or contrasting perspective. |  |
| Sieve | Sieves sort readers through one or more layers of choice in order to direct them to sections or episodes. Sieves are often trees, but may be multitrees. |  |
| Montage | In Montage, several distinct writing spaces appear simultaneously, reinforcing each other while retaining their separate identities. |  |
| Split/Join | The Split/Join pattern knits two or more sequences together. Split/Join can be used when the reader's intervention changes the course of events. I disagree on this one, I do not think it should be used as a rule at places with interaction because the reader can not then make any real choices. The agency suffers because the end will be the same anyway. |  |

Table 4.4. Hypertext structures (Bernstein 1998: 21-29.)

These forms are interesting and informative, they work a bit as fuel for the imagination. But branching trees and hypertexts will only get us this far. None of the structures above give us any good way of controlling the whole hypertext structure. They can be fun to use, but if there are too many free choices then the

whole thing is lost out of our control. If there on the other hand are no real choices, like in the Split/Join –structure, then there is no point with this because the choices do not really affect anything in the long run.

Murray writes that even a story of less than a dozen branch points, with only two choices at each branching, would require hundreds of endings. Any branching story interesting enough to sustain our attention would therefore be too dense and confusing to write, since writers would have to work their way down each branch separately. Games are limited to very rigid plotlines because they do not have an abstract representation of the story structure that would allow them to distinguish between a particular instantiation and a generic morpheme. A morphological approach would require more ambitious programming and a new kind of script "primitive" writing but it would offer much greater plot variation; it would give the writer the power to tell the system how to generate variants without having to make each possible version individually. (Murray 1997: 198.) Well we are on a quest just now looking for this generic morpheme, but I do not believe it possible to just find the right morpheme. A change also has to happen in the audience and in what they expect. As I have said before, a new form of language needs to be developed around the generative order of things.

4.4.5 Algorithms as Games

Games are rapidly developing the language of new media, even though we do not really see any deep and meaningful games out there. Games are usually too goal oriented, focused on the mastery of skills and often have to end happily (Murray 1997: 140.) Indeed, I have not seen any great tragedy-games lately.

Most games, like Max Payne for example, are not really interactive. The story in them is actually linear, it just stops and waits for the player to figure out the next thing to do before it goes on. It is like reading a page in a book, and then having to solve a puzzle game before being allowed to read the next page. I do not deny that these would be entertaining, but the story is just not interactive, it is not generated according to the player's action.

Often when playing a game we also try to figure out how the system works, players often try to crack the system or fool the engine behind the game. This is cheating the system which seems to give some sort of pleasure, but it just means that the system is far from invisible or natural to the users.

The language used by games today are most often the language of cinema. They do quite well with the immersion, agency and transformation (see chapter 4.3.1), but are weak on interaction. There is a storyworld which can be even more interactive, immersive, agentic, and transformative than games. The virtual communities on the web, a visit to these can be like participating in the enactment of an improvised theatre piece (Saarinen 2001: 42.)

4.4.6 Algorithms as Intelligent

I have been talking about algorithms a lot by now, and mentioned that algorithms need things expressed as numbers. Philip Agre writes that trying to express things mathematically for the computer (mathematical formalization), is actually the same thing as Artificial Intelligence (AI) (Agre 2002: 1.) So algorithms are actually a form of AI.

With a definition like this, also chatterbots become a form of AI. Chatterbots are robots pretending to be humans chatting in a virtual community. Saarinen (2001: 9) writes that Andrew Leonard³² points out that often the term artificial intelligence is too lightly attached to bots. While the hopes for the skills of the future generations of bots run high, the development and research of AI is far from the done deal. He suggests this definition for bots: "a bot is a supposedly intelligent software programme that is autonomous, is endowed with personality, and usually, but not always, performs a service. Now I ask you would not this also be a nice definition for a story character in a digital environment?"

As an interesting note, this same definition of a bot also applies to computer viruses, they are also supposedly intelligent programmes (they fool

³² Saarinen quotes Leonard, 1998: 10-18: Andrew Leonard, 1998, Bots: the origin of new species, Penguin Books paperback edition.

systems built by humans to last their attacks), they are indeed like autonomous agents, different viruses get different personalities at least if the press writes about them, and indeed, there is a 'service' (disservice to some) which they perform. We might have some things to learn from computer viruses too.

About designing computer agents, Laurel writes that traits circumscribe the actions that an agent has the capability to perform, thereby defining the agent's potential. There are two kinds of traits: traits that determine how an agent can act (internal traits) and traits that represent those internal predispositions (external traits). People must be given cues by the external representation of an agent that allow them to infer its internal traits. (Laurel 1993: 58.) Aristotle also outlined four criteria for dramatic characters that can also be applied to computer-based agents (Poetics chapter XV.) The first criterion is that characters be "good", good characters are those who successfully fulfil their function. Second criterion is that characters be "appropriate" to the actions they perform. Third criterion is the idea that characters be "like" reality in the sense that there are causal connections between their thoughts, traits, and actions. The fourth criterion is that characters be "consistent" throughout the whole action. Formal causality suggests that it is action, and action alone, that shapes character. (Laurel 1993: 60-62.)

Nikitas Sgouros has built an intelligent system for dynamic generation, management and resolution of interactive plots. He bases his programme on the Aristotelian theory that a collision between opposite interests developed from a certain starting point will produce drama (through conflict between antagonistic forces). Sgouros' tools analyze the situation in real time and develop the story toward dramatic events based on the motives and goals of the characters. The reader, or player, is in the form of the story protagonist and he forms his character's motives in the world through choices he makes in it. The other characters are computer controlled ones with specific roles in the story (agents or bots). The programme has an own language for describing the motives of these characters in the game, for example "Intervene(+, x, y, +, g)" is a rule where x and y are characters and g is a goal in the game. The rule means that the character y seeks to satisfy the goal (or norm) g by helping character x. This rule is a behaviour primitive for a character in the cast. Every character in the story

has several of these. The programme then counts the dramatic values for different possible choices a character can do when the story is unfolding. (Sgouros 1999: 29, 31, 33.) The entire story in this system is built around character goals and descriptions of places. The interface is clearly the weakest part of Sgouros's story generator, it seems to work so that the story unfolds on the screen as text with pictures, and the user is prompted to make decisions once in a while (it seems he is mostly prompted with yes/no, attack/flee, hide/obey, dualistic options.) (Sgouros 1999: 54.) It is hard for me to imagine any feeling of free agency in the storyworld, of course we should keep in mind that I have not actually tried the system, I have just read an article about it.

Different approaches to making intelligent systems have been made. One of the first attempts at creating true Artificial Intelligence was the Cyc project. It was a project where the makers tried to define for the computer everything about everything. For example, Cyc knows that trees are usually outdoors, that once people die they stop buying things, and that glasses of liquid should be carried rightside-up. This project still exists but it has been deemed impossible to define everything important about everything³³.

John Searle argued in the 1980s that true understanding could never be achieved by a computer programme, no matter how clever, because any programme simply follows rules and thus could never understand what it was doing (Turkle 1997: 86.) It is lucky for us that it does not need to have this understanding. As I explained earlier, it is enough if the computer generates what seems to be "appropriate" action, it does not need to understand it. I will write more about this subject further down.

³³ For more information on the Cyc project go to: <http://www.cyc.com/>
[22.10.2003]

4.5 Writing for the Medium

4.5.1 Building Algorithms

*"As soon as art has become autonomous, it makes a fresh
start..."*

*(Gaston Bachelard, The poetics of space, 1958) (McCormack
2003: 3)*

Authorship in electronic media is procedural. Procedural authorship means writing the rules by which the texts appear as well as writing the texts themselves. It means writing the rules for the interactor's involvement, that is, the conditions under which things will happen in response to the participant's actions. It means establishing the properties of the objects and potential objects in the virtual world and the formulas for how they will relate to one another. The procedural author creates not just a set of scenes but a world of narrative possibilities. (Murray 1997: 152.)

What the computer would provide would be a means for using formulaic patterning, as a system for assembling multiform plots. The electronic system might be able to generate more variants than the author could ever read in a lifetime (let alone write individually), but since she would have specified all the important details and all the rules of variation, the computer would be merely the instrument of the author, an extension of her memory and narrating voice. (Murray 1997: 212.) It is a beautiful vision which Murray is painting here, but there are no clear solutions in how to do a thing like that yet. The way this problem has been approached so far means either that there is an extremely huge work in the rules to be defined or then there is a really small world to act within. There is nothing wrong with small worlds, we are simple beings, or can at least be entertained by simple stories, and as Laurel (1993: 145) points out, thanks to well-internalized dramatic convention, we can enjoy (and believe in) even one-dimensional dramatic characters. So there is hope for the algorithms, even if they demand reducing multifaceted things in the world into simpler models of

how things could work. Still I am hoping for functioning ways to use fractal-like generativity combined with chance and randomness as a way to get variation into the generative world, and build it believable and of at least seemingly infinite width.

There have been discussions about removing the human part from the task of creativity already earlier. Photography overcame in its time subjectivity in a way undreamed of by painting, a way that could not satisfy painting, one which does not so much defeat the act of painting as escape it altogether: by automatism, by removing the human agent from the task of reproduction (Bolter, Grusin 1999: 24-25.) Now computer graphics adds the algorithmic mathematics of John von Neumann and Alan Turing to the Cartesian geometry. Computer programmes may ultimately be human products, in the sense that they embody algorithms devised by human programmers, but once the programme is written and loaded, the machine can operate without human intervention. Programming, then, employs erasure or effacement, much as Stanley Cavell and others describe the erasure of human agency from the production of photographs. Programmers seek to remove the traces of their presence in order to give the programme the greatest possible autonomy. All the different classes of programmers are simultaneously erased at the moment in which the computer actually generates an image by executing the instructions they have collectively written. (Bolter, Grusin 1999: 27.)

A problem is building meaningful stories, with real emotions in them, real drama, in a generative world. New genres of electronic stories should focus on textured relationships rather than on puzzle solving and gunfights writes Murray (1997: 193.) It is important to remember that any abstract story system ultimately refers to the sorrows and pleasures of human life and that the story of any event depends heavily on who is doing the telling. A storytelling system that further calcifies the distortions of stereotypical thinking would be as destructive as the most bigoted and bloodthirsty bard. We humans already do enough mechanical thinking without enlisting machines to help us. (Murray 1997: 199-200.)

How could the author retain control over the story and still offer interactors the freedom of action, the sense of agency that makes electronic

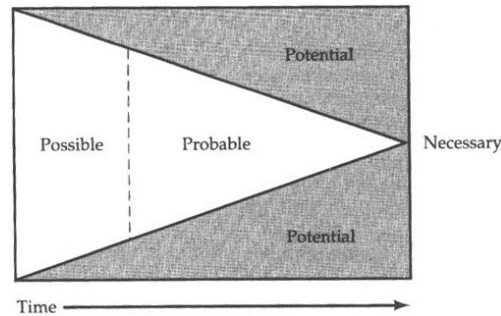
engagement so pleasurable? (Murray 1997: 187.) When discussing interactive worlds, it is good to remember that as good as every application on a computer is interactive. So there are things to learn starting from how regular applications work. When a play (programme, interface) is working, audience members (users, viewers) are simply not aware of the technical aspects at all, you forget the programme itself and use it for its purpose. Even a spreadsheet programme could in a sense be like plays or movies: When you are engrossed in one, you forget about the projector, and you may even lose awareness of your own body (Laurel 1993: 15.)

Coincidences can help to establish probability, but they are ineffective when they appear to be arbitrary. People commonly assume that coincidences in noncomic representations have causes that will be revealed; that is, they are more than "random" accidents. In fact, seeming coincidences stimulate people to look for causal connections. Aristotle posits that any action can be "universalized" simply by revealing its cause; that is, understanding the cause is sufficient for understanding the action. Works of fantasy provide an obvious example of how universalization via causality works. (Laurel 1993: 80.)

I gave many algorithm-clues in the chapters under "Building on Tradition", they were things to consider. I will not give any concrete rules how to build perfect algorithmic storyworlds, just clues and things to consider. When building these mathematical algorithms, remember that numbers and behaviour are not enough; some charm is also needed to make someone a particular character (Murray 1997: 231.)

The action of a play again consists of a series of incidents that are causally related to one another. Dramatic potential refers to the set of actions that might occur in the course of a play, as seen from the perspective of any given point in time. At the beginning of a play, that set is very large. What could happen begins then to be constrained by what actually does happen. Over time, dramatic potential is formulated into possibility, probability, and necessity. (Laurel 1993: 68-69.) This is visualized in Picture 4.5 which shows a "flying wedge". A plot is a progression from the possible to the probable to the necessary. It might also be that this is a way all action and life itself (the world)

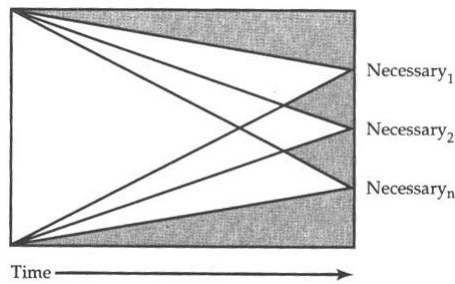
is perceived by us, but this does not make any difference as to the dramaturgic potential.



The shape of potential over time in human-computer activities is similar to the flying wedge Picture 4.5 (Laurel 1993: 70)

Laurel's possibility, probability, and necessity bare some similarities with Mika Tuomola's and Maureen Thomas's concepts of Choice, Chance and Destiny, used in Thomas's workshops and based on the primeval notion of Chance and Destiny, and on our more contemporary possibility to choose somewhat. These elements of an interactive story are the user's possibilities to make choices, the share that chance has in the action and how much is always destined to happen (the compulsory events.)

Picture 4.6 shows Laurel's "flying wedge" in interactive forms. In human-computer activity, the shaping of potential is influenced by people's real-time choices and actions, pruning possibilities and creating lines of probability that differ from session to session and person to person. The "flying wedge" can be pointed off in different directions, thus increasing the programme's potential for many whole actions. (Laurel 1993: 72.) Picture 4.6 does not actually need to be interactive with any humans, the figure also portraits how the logics of how a generative piece could evolve while the piece is presented. The choices or generations the programme makes limits the possible next generation of material. In shift interaction is between both the user and the programme itself. The user can press shift or open the chest, the programme interacts with its rules of what it could show next depending on what has already been shown and on what audio-material is playing and the user can on top of this also interact through his mental interpretations of the experience.



Picture 4.6 (Laurel 1993: 72) The "flying wedge" in interactive forms.

Whatever has been fantasized about creating creative computer-programmes, one thing is sure, as Murray writes (1997: 208) the author is needed in the process, the computer is only a performance instrument (Murray 1997: 208.)

4.5.2 Considerations on the Medium

This research concentrates on the language of "multimedia". Not film and not theatre, but because multimedia itself is still only developing its own language, I think the best way for me to contribute is exactly through these old media. Like Bolter and Gruisin said, every new media always has to define itself in relationship to earlier media (Bolter, Gruisin 1999: 28.) The language of the new media is algorithmic, and here I will look at some things to consider as to the nature of the medium.

The scriptwriter for new media has a dualistic role, he needs to have understanding of both the possibilities and limitations the computer puts up when building the storysystem, and also he needs to understand the dramaturgy and composition of a good narrative.

The tools used for building a story defines the environment for action, in our case at least a part of the tools are computer-programmes, and actually, the elements of action and environment are usually the result of more than one programme. The potential of these programmes is again shaped by the hardware,

which also the performance of the programmes and media material is dependent on. Laurel (1993: 44) writes that in theatrical terms, a programme is analogous to a script, including its stage directions. The programme code is equivalent to the words in the script.

When programming it is important to remember that already the media-elements follow some sort of logics, and vice versa. One can not just throw arbitrary logics on top of other arbitrary logics, the whole needs to be taken into account. The rhetoric is the end, the way the final work is presented.

Laurel (1993: 64) writes: Graceful beginnings and endings for human-computer activities is needed. Two rules of thumb for good beginnings: the potential for action in that particular universe is effectively laid out, and that the first incidents in the action set up promising lines of probability for future actions.

All manipulation of time and space on the level of narration makes it less transparent, i.e. weakens the immersion (immediacy) of the experience. At the same time sequencing events can be a central way to create and sustain suspense, i.e. does the story unfold chronologically A-B-C or are there jumps like C-B-A or perhaps C-A-B? (Reetala, Heinonen 2001: 26.)

The rhythm in drama is always and everywhere present, and the rhythm and tempo are bound to each other. Repetition can be seen as an example of the deconstructive capacity of rhythm: Slight repetition can focus the narration, create intensity and emphasize the importance of the repeated factor in the whole or to give it the status of universally applicable. Extreme repetition again is capable of losing the original meaning or at least to bring into the centre of attention the quality of expression and the connection between expression and contents with its questions. (Reetala, Heinonen 2001: 27.)

Preventing people from introducing new potential is essential in the creation and maintenance of dramatic probability (Laurel 1993: 100.) The world needs to be limited, but constraints should limit not what the audience can do, but what they are likely to think of doing (Laurel 1993: 105.)

Creativity arises out of the tension between spontaneity and limitations, the latter (like river banks) forcing the spontaneity into the various forms which are essential to the work of art. The significance of limits in art is seen most

clearly when we consider the question of form. Form provides the essential boundaries and structure for the creative act. (Laurel 1993: 101.) People probably want - in games and other computer systems - a limited world, where the rules are simple, and where the causal relations among events are clear, and not noisy as in "real life".

Symmetry is a kind of pattern. We derive pleasure from patterns in representations, and we also sometimes expect certain kinds of patterns to occur. Although there are many reasons for emphasizing one modality over another, we tend to expect that the modalities involved in a representation will have roughly the same "resolution". A computer game that incorporates breathtakingly high-resolution, high-speed animation but only produces little beeps seems brain-damaged. (Laurel 1993: 164-165.)

A problem with expressing everything with numbers is that the cognitive model of emotions quickly becomes absurd if we for example try to apply it to the emotional states of humans (dislike of Barney=1; dislike of Hitler = 10), and it seems the very antithesis of what we value in literature, which is the careful examination of ambiguous situations open to multiple interpretations (Murray 1997: 231.)

A way of building different dramaturgic situations is to track the information the spectator knows. It creates different moods and genres depending on if the spectator knows more than (>), the same as (=), or less than (<) a particular character at a particular time in the story. For example:

Spectator > Character yields suspense

Spectator = Character yields mystery

Spectator < Character yields surprise

(Branigan 1996: 75)

The manipulation of information (showed to the audience) establishes causality and probability, and it is the basis of such audience responses as suspense, surprise, and catharsis (Laurel 1993: 82.)

The impact that new information has on people is dependent on not only the information itself but also by how it is revealed and how it interacts with existing knowledge and expectations. (Laurel 1993: 90)

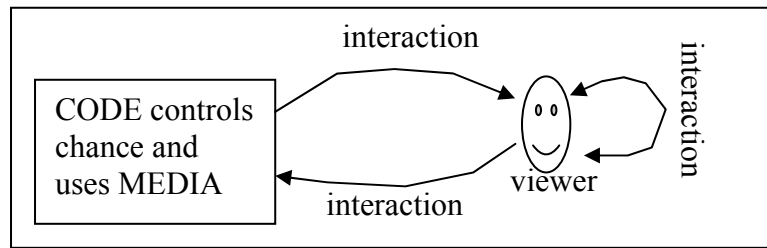
It is also important to keep in mind that all plot, character, time and space have to be treated as a whole when making a generative piece. Any piece concentrating on just one of these will not be a whole. In addition to these also algorithms, visuals and hardware need to be treated as a whole. The storytelling system on a computer always sets limits, which is a good thing as long as these limits are taken into account.

5. Conclusion - The Nature of Generativity

What have we learned about generative pieces? We have learned that the levels of order are the central questions when writing for the medium. It is important to restrict the framework for chance to be let loose in. When making a generative piece, it does not need to imitate life to its full extent; it only needs to be believable, and we do believe in even one-dimensional "stupid" dramatic characters and absurd events coherently presented as I pointed out in chapter 4.5.1. This means that on the algorithmic level, chance needs to be restricted and on the level of enactment, the presentation needs to rely on the viewer's imagination and not just serve readymade lifelike imitation to the viewers.

The language of new media is changing, which means that also what we think of as a story will have to change. Even story structure itself will probably change. Linear stories might very well have found their match, even if I do not think linear movies as they are will disappear. It is just that enhanced movies with some little tricks in them do not really offer anything new. Several simultaneous camera-angles, split-screens or an alternative ending or two are not interactive or generative in any real sense, whereas it is exactly generativity which can bring about something new and innovative to storytelling (as argued in chapter 4.3.)

When presenting a piece, the flow of the whole in our memories is what builds the narration. The audience remembers the last clause and the general flow of things (the Kuleshov effect, see chapter 4.3.2) whereas the programme has its own memory. As an example, Shift remembers not to repeat itself and some rules for what it can show. In the presentation these memories mix and interact with each other. There is always interaction happening in the viewers head, and possibly in the memory of the programme as well, if the programme takes input from the user and reacts to it. The digital era gives us new potential for manipulating and challenging these interactions.

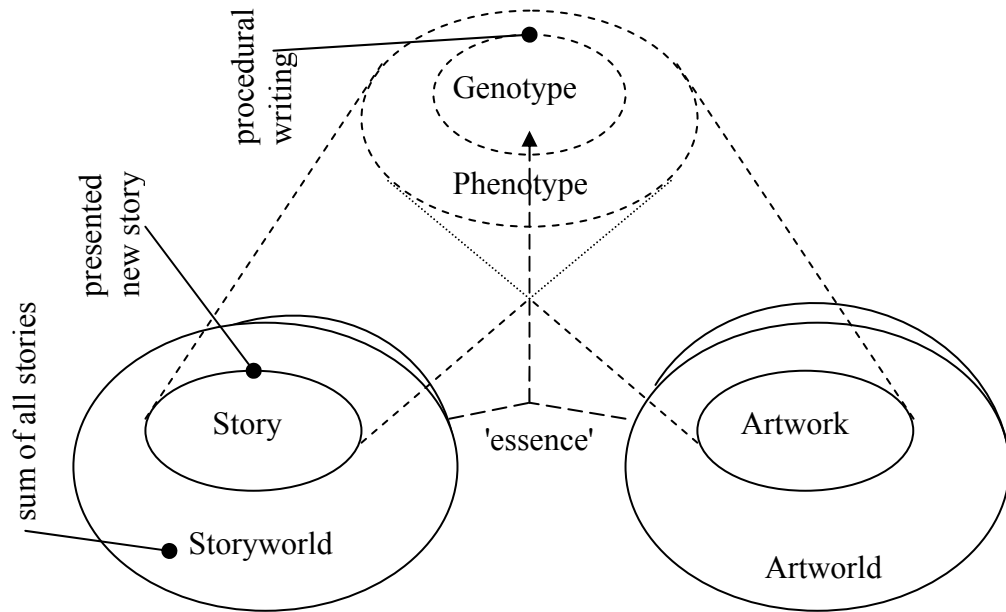


Picture 5.1 – Interaction taking place

I believe that the fractal order has a lot to offer us when building generative storytelling systems. This is actually not even a new metaphor after all. Already over two thousand years ago Aristotle wrote that tragedies should be constructed to be a whole, as an animal is built out of parts to be one whole organism (Aristotle, chapter VII.) So already Aristotle compared the composition of a play to that of compositions in nature, and I do believe nature follows some sort of generative fractal-like order. The difference is that Aristotle does not use the repetition of one part when creating new forms. Still these new ideas in storytelling, borrowed from the new ideas in quantum physics, are not so new after all.

The author in electronic media is a procedural writer (see chapter 4.5.1.) It means writing the rules for the text to appear as well as the text itself. The phenotype (see chapter 2.6.2) of these pieces becomes bigger than the genotype is. In procedural art theories again (see chapter 3.4.2) the Artworld looks at artworks through the credentials of the person who has baptized it as art. Once presented to the Artworld it will affect all future artworks made within the same Artworld. No one can do what Duchamp did anymore and not even Duchamp could have done what he did a hundred years before his time (see chapter 3.9.) In picture 5.2 I show the procedural authoring, where the 'essence' of all artworks made before goes back to the genotype of a new generative piece. This 'essence' is what we have been looking for, something common to all the works of art (see chapter 4.4.1). A new story is always evaluated in accordance to other stories, as is also a new work of art compared to the ones before. Propp (see chapter 4.4.1) classified some static story elements and his findings is a part of

this 'essence'. His findings should be found in the genotype of other stories in the same genre.



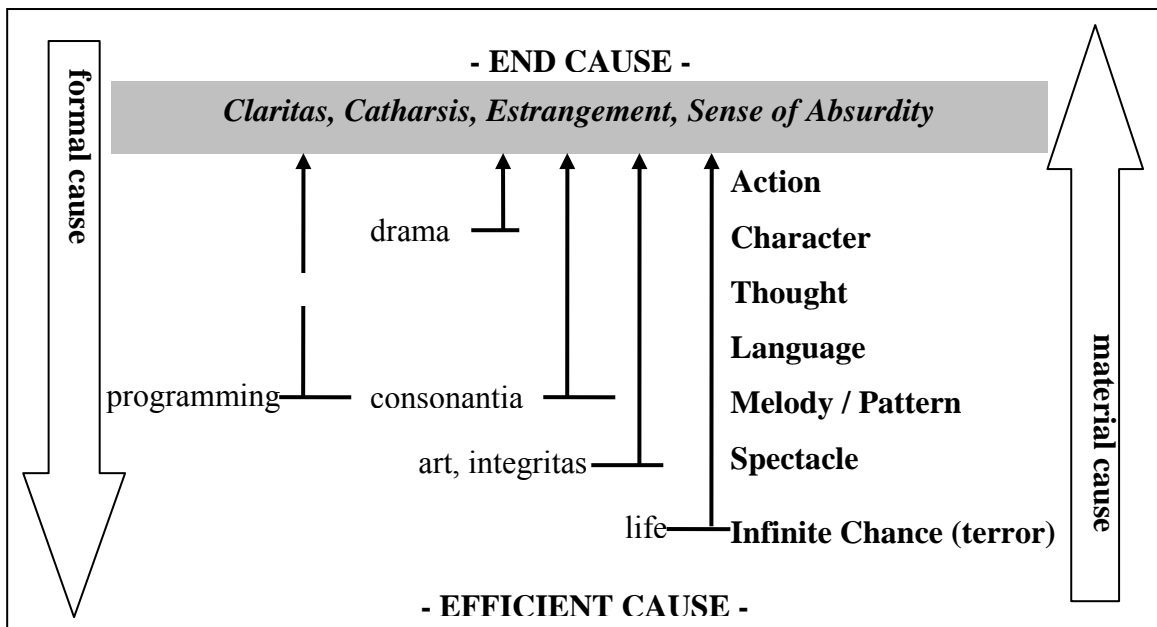
Picture 5.2 – A cycle of procedural creation.

Every new work always affects the order of the Artworld itself. As the order of the Artworld keeps changing and evolving in this generative process, we are moving towards the "ultimate" work of art. The ultimate work of art is nothing constant in my opinion; it is something which changes from time to time. I would compare it to paradigm shifts within the Artworld, making a resemblance to the theories of the "Scienceworld" by Thomas Kuhn³⁴. The ultimate art of the next paradigm in the Artworld might very well be the one where monkeys are bashing randomly at typewriters, to use the same metaphor as I did in the beginning.

The games of chance that Monod referred to (see chapter 2.2) is what Joyce calls pity, and absolute uncertainty again is Joyce's terror. "Pity is the feeling which arrests the mind in the presence of whatsoever is grave and constant in human sufferings and unites it with the human sufferer. Terror is the

feeling which arrests the mind in the presence of whatsoever is grave and constant in human sufferings and unites it with the secret cause" (Joyce 1982: 227.) These are all connected to the dramaturgic theories, especially to the fear and pity of Aristotle (see chapter 4.2.1.)

Picture 5.3 shows an interpretation of how different terms by Aristotle, Joyce, Brecht, Bohm and Laurel are connected to each other (see chapters 4.2.1, 3.8, 4.2.2, 2, and 4.2.3.) The picture is based on table 4.2 earlier, which is Laurel's interpretation of Aristotle's six qualitative parts of a tragedy (see chapter 4.2.1.)



Picture 5.3 Poetics of generative narration

Here is an explanation to the picture:

The end causes are at the top of the picture (see chapter 4.2.3.1.) At the bottom there is the efficient cause, i.e. the skills of the makers. The elements are the formal cause of all those below it, and each element is the material cause of all those above it.

³⁴ From: Kuhn, Thomas S. *The Structure of Scientific Revolutions*, University of Chicago 1962

Action – the whole action, as it is collaboratively shaped by system and user. The action may vary in each interactive session. The interaction can happen through input from the user to the programme, or just in the user's head. There is always interaction on some level.

Character – Bundles of predispositions and traits, inferred from human and computer agents' pattern of choice. Drama is the action of the characters.

Thought – Inferred internal processes of the characters leading to choices. Characters can be of human or computer origin. Thought is built in the viewers head, he only sees action.

Language – The selection and arrangement of signs, including verbal, visual, auditory, and other nonverbal phenomena when used semiotically. This is hoped to be as movable as possible, so limitations are needed. The language should work in many different situations.

Melody – The pleasurable perception of pattern in sensory phenomena. The programming language creates patterns in the generated spectacle. (Note that programming itself is lacking thought.) Consonantia is rhythm, pattern (see chapter 3.8), for example it could be the organisation of some database-material.

Spectacle – The sensory dimensions of the action being represented: visual, auditory, kinesthetic and tactile, and potentially all others. This is read through everything the viewer has experienced before. Integritas (see chapter 3.8) is

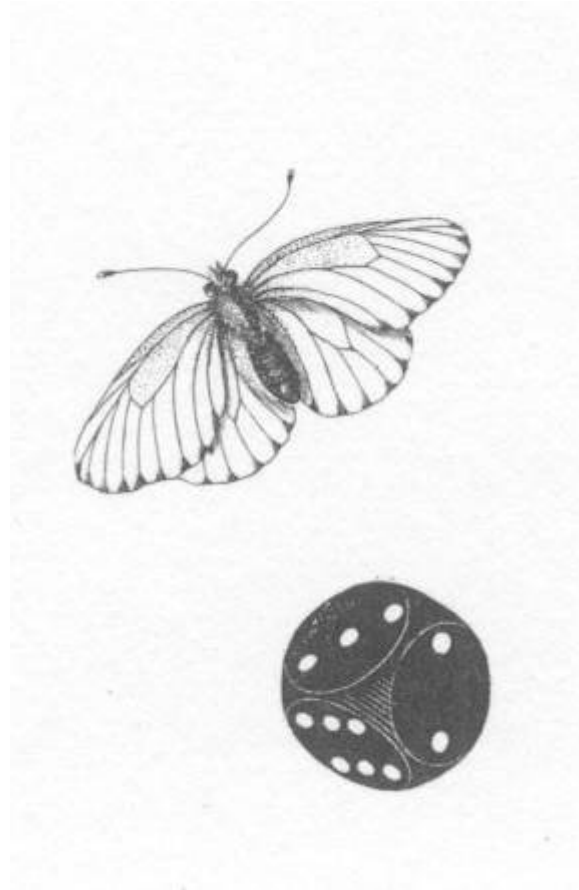
what is chosen to be presented forth (like Duchamp's Fountain as an example.)

Infinite Chance – This is life, the uncontrollable and infinite source for all creativity. The source of the Joycean terror of unexplainability expressed in, for example, many pieces of absurd drama and tragedy.

These two interpretations might show us some ways to handle the monkeys referred to in the beginning, as well as raise even more questions than have been previously presented. However those questions are not in the scope of this hopefully compact collection of various theories.

Before our eyes is fought a battle of symbols... for there can be theatre only from the moment when the impossible really begins and when the poetry that occurs on the stage sustains and superheats the realized symbols.

— Artaud, Antonin (1996), *The Theatre and Its Double*, John Calder Pub Ltd



Picture 5.4³⁵ – A summary

³⁵ Picture is from Eric Zimmerman's *Life in the Garden* (mentioned in chapter 3.2.2.)

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