

# TECHNOLOGY, ABSTRACTION AND KINETIC PAINTING

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There are many types of pictures and many uses for them ranging from practical applications to experimentation and to decoration. Which of them is appropriate to the electronic media and to digital computing?

Some picture makers have long since embraced the electronic media and depend on it economically such as those who work for practical and commercial ends. Those who make pictures for wall decoration or for status collecting may be hostile to it as it undercuts their economic base. One might be tempted to say that the practical arts have pioneered the use of computing and that the stodgy Fine Arts are still hiding in their ivory studios.

It is important to note however, that the practical arts and the so called Fine Arts should not be seen as unconnected categories. They differ only in their relationship to production. Some pictures are intimately linked to production such as industrial and technical drawings while others are a little less directly linked such as architectural or medical illustration. Pictures for entertainment, decoration, and illustration, though they seem to have no relationship to production, serve it indirectly. After all we educate and entertain the young so that they too can start working. Still yet there are other pictures which are experimental and their connection to production is similar to that of research and development. Thus ultimately all pictures, regardless of their distance in relation to production, serve its functioning to fulfill our needs.

Where do I as an artist locate myself in this continuum? Like many other painters, I define my artistic intentions as a search to expand the language of pictures. This follows the principles of the avant-garde and modern abstraction in the twentieth century. With such an ambition it is essential to experiment with new media. We begin by learning its technical basis so that we can discover what forms are possible based on these techniques and what new content these forms might convey. If we succeed, then our discoveries permeate all pictorial uses and become beneficial to our practical needs in production. Therefore, the artistic use of form suitable to a new technique is a progressive choice.

Technologies and media emanate out of our historic social and economic development. We use them as long as they remain economically feasible and we replace them when we have better methods. The most appropriate technique is used to create the form which will most expediently convey the ideas of the society. Of course, the most appropriate technique depends on the level of advancement of the society. Animal grease as medium and earth colors as pigments were state of the art for ancient European cave painters. The electronic gun and a cathode ray tube in connection with a CPU are state of the art in our time. Societies who have electronic media would certainly not be illustrating food procurement by drawing pictures of how to hunt bison. Instead they are more likely to be writing programs which let us do our shopping for food on our personal computers or interactive televisions. Yet they are free to imitate cave

painting for purposes other than food procurement -- a freedom the cave dwellers did not have.

With this irresistible logic in mind, painters who consider their work to be experimental must necessarily explore a medium such as computers. We do not do this exploration without knowledge of the history of pictures and pictorial form. But what is it that constitutes new form and what is pictorial form? Pictures cannot be taken as a given. We must remain cognizant of the fact that they rely on a pictorial language which has taken millennia to develop and which will develop further yet. In exploring computing as a medium, to take pictorial illusions of a three dimensional space as a none historical given is to be stuck using new technologies to accomplish old tasks. If our understanding of reality leads us to understand space as having more than three dimensions then we will develop a pictorial language to describe this greater number of dimensions.

Pictures are flat and frontal and do not show us but one side of things at one time. This is also true of moving pictures such as film, video and virtual-reality, which persuade us that they take us inside things by utilizing moving flat pictures. Yet single frames of moving pictures show us only one side of things at one time and they conform to the language of flat pictures generally. This does not mean that beyond the language of the sill frame, moving pictures do not need a further syntax for the development of visual and audible events in time.

If we wish to understand form and move it forward we cannot be mistaken about this flat frontality of pictures. In importance it is equivalent to the alphabet of the written media. The flatness and frontality of pictures is of high economic value. It is precisely this flat frontality of two dimensional pictures bearing information about a multidimensional world that is the essence of pictorial form which is pictorial language. And, in the fact that we can duplicate flat surfaces and transport them economically lies our civilization's need for pictures and for their further development.

If since the Renaissance pictures have been flat and frontal and have successfully made illusions of a three dimensional world then what is it in the form of computer pictures that is an advancement in form? After all was it not during the Renaissance that painters perfected formal methods to convey three dimensional projection (perspective), shading, direct illumination, and reflected light. Are the new ray tracing mathematicians revolutionizing this formal language of illusion or are they only expanding it and making it more useful? Furthermore, should we consider the digital transportability and electronic duplication of pictures a new quality in pictorial form or a revolution in communications.

Before I answer these questions I want to state that I believe that electronic and digital methods are intersecting with visual form and resulting in a renewal of content, appreciation and criticism. Witness our presence here at this international computer conference with the art factor under consideration.

To consider what we can most learn from a new medium we need to understand what is not new in it current uses. It seems inevitable that the very first use of a new medium is the imitation of old methods. This is because the new methods are more economical and more

productive in executing old tasks. But in time, experience in using the new techniques to accomplish old tasks sparks ideas. New technologies have the potential then to teach us how to improve our work, and consequently our civilization progresses.

In ray tracing, three dimensional illusionism in computer graphics, and moving pictures there is not a pictorial form which yet adds anything to the language of flat pictures. The super three dimensional illusionism computer graphics is capable of is not new form in painting. On the other hand when we compare Renaissance painting to ancient Egyptian painting and ancient Egyptian to primitive European cave painting we do immediately note a major improvement in the pictorial power of the more recent. Furthermore when we compare Soviet Constructivism to Renaissance painting we quickly understand that a revolutionary new language of form has appeared. Each succeeding historical form added a revolutionary new method of defining space. However when we compare the three dimensional illusionism of computer graphics to the Renaissance we see that what is new is not pictorial form but rather the data base on which it relies. That is there is not a new language of form but a more sophisticated and practical application of the discoveries of the Renaissance.

Further, the transportability of digital pictures through electronic highways has not yet imparted new principles to our pictorial language. Nor indeed has the imitate connection between information and picturing yet resulted in a new visual form. Although they have definitely given us new technical methods to create pictures and to animate and transport them. This does not mean that they will not very soon spark the creation of new form. The seeds are everywhere and they will flower.

Scientific illustration, fractals and other geometric illustrations are not new pictorial form either though they may be new geometric form. Their pictorial manifestations rely on the formal principles of abstract painting adding little to it. What is new is fractals as geometry, on the one hand, the language of abstract painting on the other. Remember that the sciences have always been creative and beautiful.

These are crucial considerations for the painter to contemplate when using computers. We do not have much of a tradition with this new medium and only a small audience and an even smaller platform from which to show our work. We receive very little feedback from those who understand that we are neither designers nor scientists but rather painters who experiment. We are lost in SIGGRAPH and we can lose our focus.

As a painter who experiments and seeks to be as advanced as possible based on an understanding of history and not an understanding of art world fashion, I believe that abstract painting is the most advanced area for exploration and experimentation. I wish to make abstraction as versatile as possible an imitator of the general principles of motion that we see in reality. I reject the persuasion of many twentieth century historians and critics who believe that abstraction is unrelated to reality. I understand it to be so related and all my abstract work has a visible and easily explained basis in reality.

Abstraction deals with general principles rather than particular appearances at particular

times. The development of abstraction will allow us in time to contribute a precise visual language capable of describing general principles as genuine as the general principles of addition, subtraction and division.

Computing provoked three methods in my painterly explorations. the first was the use of programming to create kinetic paintings with sound. The results are programs performed on a computer. The second was the use of painting software combined with video to record painting sessions. the third is the use of interactive programming to automate the making of still or kinetic abstractions allowing serious painting without manual skill.

## **KINETIC PAINTING**

Kinetic paintings resulted from my first explorations with computing. When I first began considering computers I found that the practicality of software programs defeated what seemed an exciting potential in computing. These drawing and painting programs had as their goal to prove to artists that they too can be used to do perspective and shading and imitate other media such as oil or watercolor or charcoal. Their very goals were precisely those that I have aesthetically rejected as an abstract painter. I started programming with logo on an Apple and continued with Basic on an Amiga and after a year I learnt C. what the computer let me do with programming was extremely exciting. I was very high on it at first. I could not believe that technology and civilization had put this stuff in my lap.

The way I work with the computer to create kinetic paintings is the same as with other painting media. I begin intuitively and type some initial program commands. I compile and link this initial small program and run it to evaluate. It is like putting some shapes on an empty canvas and then backing up to see what you have accomplished. After judging the results I react intuitively adding, adjusting, or deleting parts. I repeat this cycle of programming, compiling, linking, running, judging, and changing until the art work becomes a complete idea.

The end result is a program which when run creates a painting on the monitor which unfolds in time and possesses a stereo sound accompaniment. To me the medium is the computer and therefore electronic and digital. The program is like a recipe which can recreate the art on demand. Hard output from the computer such as prints, videotapes, photographs, and slides are a natural efflorescence of this medium. But, I view the program as the primary painting.

Formally, what has happened in my work on the computer is that the form of digital information and programming have influenced the language of abstract pictures. My first explorations with basic looked like basic. They were linear in the logic of their development in time. The simplicity of basic and the joy of working with the medium caused these early paintings to be high and happy. They resemble a birthday party. When a bit later I began to use C my paintings looked more like C. They were more unified and logical in their unfolding and they possessed certain rhythmic repeats all of which were based on the structured nature of C and the layering of routines which it allows.

Programming logic and digital structure influenced the form of both sound and image.

Loops, switches, the layering of routines, logical pathways, and the many types of variable, influence the sequence of events. There is an unmistakable way in which a loop, for example, will cycle through a set of visual and audio events. It contributes a fundamental flavor to the artwork, a flavor which deserves to be fully exploited because it is not available in other media and is, therefore, bound to be enlightening.

### SOUND AND SHAPE

The computer gives me the ability to imitate the way things sound in addition to the way they appear. that is, it allows a more complete imitation of the general principles of motion. Things we see make a sound when moved or when we move past them. for example, we have learn from experience that there are certain sounds peculiar to metal as there are certain shapes, colors, and highlights also peculiar to them. thus, in my work, adding sound to shape and color is not an attempt to correlate music and the visual arts (1) nor is sound used as a musical accompaniment. that is, it is not a marriage of several distinct art forms such as in opera or theater or film but rather the exploitation of a known dimension of visible shape not yet fully used in painting.

Coupling sound with abstract shape has defined a new method in kinetic painting which depends on this natural audible attribute of objects. Sound in my kinetic pictures signals or reveals the visual rhythm. Although my ability to manipulate sound is very primitive, its presence adds a dimension of reality. It is like the first day of spring after a long winter when you first open the windows and hear the sounds of the street long since muffled by winter. Conversely, soundless kinetic paintings make me feel deaf -- as though a window had been closed and we have become a step removed from reality.

In terms of programming the sound statements and the visual statements are interdependent. Often the duration of sound is used to time a visual change. And conversely, visual activity is used to control the duration of sound. Occasionally I use the same variable within bounds to control both the frequency of sound and the behavior of color. There is nothing mysterious about how sound and shape coordinate. My simple goal is to imitate the rhythms of contemporary life.

### UNFOLDING SHAPE IN TIME

If we walk around a still life or notice the motion of the street around us we can see the negative shapes between objects and the shapes of those same objects shifting. They fluctuate, stretch, compress, disappear, reappear, fade, and they make sounds. Finding a language to describe this modern perception of reality was the great gift of Cubism. Their paintings are a historical step toward a view of space and time in relative terms. On this basis painters built abstraction's ability to convey the general motion of things rather than their particular appearance at one time from one spot -- as though frozen in time and space.

With the computer we are able to expand this investigation. We can create shapes which grow and shrink and interpenetrate and gradually change colors. We can provoke our viewers to

remember their own experiences with contemporary reality during the unfolding of the picture. Visual gesture, unfolding in time, will be recognized by viewers as a parallel to their own experiences of contemporary rhythms.

The astute reader wonders what is the difference between this unfolding of shape in time and ordinary animation or film. The difference is the same as that between abstraction and three dimensional illusionism. What I describe is the changing of abstract visual parts, their growing and their transformation. There is not a point of view or a viewing lens nor is there a resulting three dimensional illusionism present. Things do not move in relationship to a stationary seeing eye or in relation to a recording lens. this is not a motion that can be recorded with a camera or a camcorder. Rather it is the visualization of the growth and motion of things seen by our eyes as we move and that which is abstractly understood by our minds as we contemplate what we see.

### THE PICTURE PLANE

The third new method is the electronic picture plane with its shifting complexity and mercurial qualities. It is impossible for hard copy or traditional painting to compete with the motion and luminosity of the monitor as a picture plane.

This picture plane has a memory. There is a magic in the way things return to the screen after they disappear. We are provided with a fast pace of changing images and huge amounts of data in a way that imitates our experience of the pace of modern cities and modern information. The speed of shifting shape as we view a concourse below from an over-fast escalator, or the changing imagery of plate glass shop windows are not the stuff of impressionist painting; yet they can be computed into our modern pictures. Scenes of lower Manhattan such as the hum of the big escalators descending to the Jersey trains, the commotion and gaiety of the lunch hour crowd, the neon light and the moving letter signs, can all comfortably live on a monitor screen as picture plane. Their mercurial rhythms are at ease here as they can not be in any other medium.

In contrast to traditional painting's surface color the monitor possesses an actual luminosity that is wonderful. We have always described abstraction's color and light as being self-luminous. the monitor fulfills this beyond the maddest dreams of the first true abstract painters -- the constructivists.

Kinetic painting, therefor, has helped me move forward in three significant areas. These are: The combination of shape and sound, the gesture of pictures unfolding in time based on the intersection of programming logic with pictorial form, and in concepts of the picture plane. I do not consider these to be a new formal language but rather visual methods which may with much future exploration on a social level bear some fruit.

### PAINTINGS IN PROCESS

My second exploration involved video. It was inspired by the work of Roberto Matta which I saw in 1988 at the Venice Biennial (2).

Matta's videos were made using ready made painting software and video recording techniques. The pieces were composed of drawn lines shown in rhythmic sequence. It seemed as though we were watching a master draw. An image of the artist working was not present -- only his intellectual process. Nor was there an intention to present a process which led to a final picture. Rather it was the shifting and changing of the space, masterfully manipulated with lines and marks, that was the obvious subject.

Inspired by Matta I attached a VCR to my computer and began drawing with a paint program one night. My paint program allows me to hide the menu and to change colors and pen width through the keyboard while drawing with the mouse. thus with one hand on the mouse and the other shuttling between the keyboard and the pause button of the VCR, on that first night, I recorded six hours of painting work onto one hour of video. The result is a slightly edited recording of a long painting session.

There was a liberation from the expense and difficulty of mixing paint and from the problems of unwanted muddy color mixtures. I could mix a pallet of 36 colors, more than most abstract paintings contained, and proceed to paint without the physical drag of pigments. I could save anything that seemed beautiful onto disk and overcome the fear of destroying preliminary accomplishments. This gave a certain joy and freedom to the results.

This way of working with the computer taught me a lot about the creative process. I discovered that my working habits follow a wave pattern. I begin the painting with seeds of ideas and they develop. As the painting improves and nears completion there always seems to be one more thing that will make it perfect. A certain ambition or obsession prevents us from leaving well enough alone. Each attempt at completion only reduces the expression we were so near attaining. Eventually the painting is destroyed and a new stage is begun. The destruction seems to be an inevitable process liberating us from the hesitation we experienced when we felt so near discovery. Thus, just when the painting looks like a disaster the freedom of destruction gives birth to new combinations of form and new seeds of ideas are born and the painting begins to improve again.

This up and down motion of construction and destruction is a phenomenon in the creative process which I believe most painters experience. what the computer has contributed in this case is productivity. It would have taken many many years of experimentation with media, which present far more physical resistance and expense than a computer, to arrive at the same understanding of one's own creative limitations and process.

It is also important that what was recorded was the result of the intellectual and intuitive process of painting and not the appearance of a painter in person putting the paint on the canvas. The intellectual expose devoid of personal ego has a value that is typical of computers.(3) The retarding effect of ego on criticism is eliminated. The process holds an impersonal mirror up to our habits in ways that cannot be denied. It reminds me of when we first heard our voices on sound recording media some years back and failed to recognize ourselves. Now we know ourselves better as we see ourselves and our thoughts so effectively reflected in this media.

Watching our work from a long painting session compressed onto video can teach us more than several years of trial and error with oil paints and with cautious criticism. It is an example in painting of the productivity of computing.

### **PAINTING WITHOUT MANUAL SKILL**

Recently I started working on a PC and found Visual Basic. I had often wanted to write an interactive program based on my kinetic paintings and on ideas of chance, but the programming task it involved kept me delaying. Visual basic jumped that hurdle for me. I began to program buttons for other users who might sit at the computer and enjoy what I so much enjoy when I program.

The result was an interactive program which allows users to create sophisticated still or kinetic paintings without programming knowledge or manual drawing skills. All that is needed is to click the buttons on the menu. This is different from normal paint programs in that the painting is automated. You need draw nothing nor cut or paste anything. You click the buttons and enjoy the results. Those who are afraid and hesitant find the program intimidating. but a lot of people love to push buttons and switches and they enjoy the rewards. With time they learn to trust their intuitions and come up with their own abstract painting expression.

As I programmed the different buttons I found that the process of providing parts to be mixed by a combination of chance and intuition forced me to analyze the components of an abstract painting. This analysis and its complement in the organized results are made possible by digital computing.

An example of the process of analysis and reorganization is the way I created a color menu. In considering the nature of color in abstract painting we note its relationship to light and color in reality. thus I mixed several palettes of 500 colors each of which imitates a time of day, an atmospheric condition, a geographic location, or a habitation such as neighborhood. The menu reads: high noon, morning, city lights, grays plus, etc. Once the user selects one of these conditions the colors which are used to execute all consequent shape activity will utilize this palette.

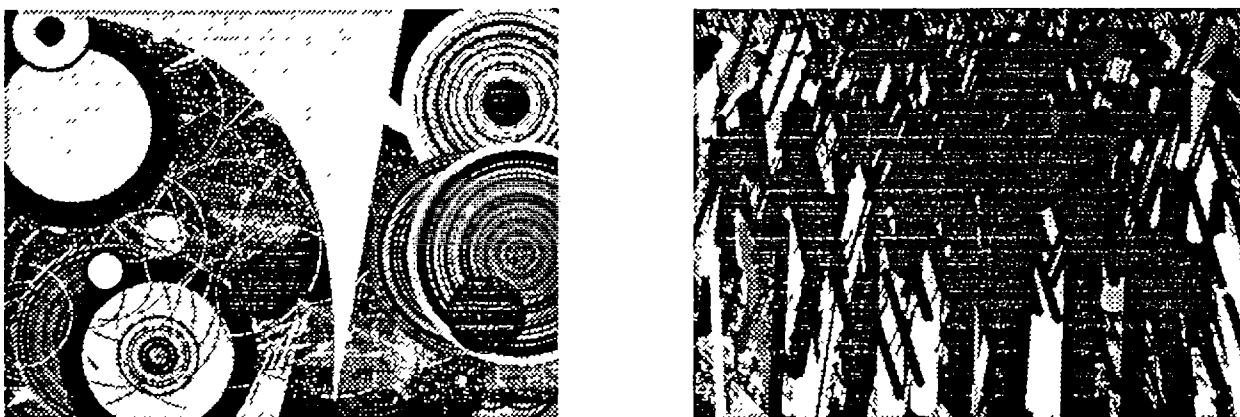
Another menu titled 'atmospheres', not yet complete, allows the user to select 'rain' or 'fog'. Yet, another menu allows the choice of color backgrounds as initial ground for the painting. Other than menus there is a frame made up of buttons which when clicked create other results. Some are devoted to shape creation while others to lines and line groups. some act subtractively while others act additively. One set of buttons which create line groups are intended to imitate the appearance of branches. In them scale and orientation and distribution possess qualities peculiar to trees.

There is a special set of buttons devoted to negative/positive space, to grounds of relative distance, and to visual curtains. They result from an analysis of the organization of abstract paintings. In composing paintings we always consider the presence of shape in relationship to the rectangle of the picture which is formally a representation of our field of vision.



There is a variety in the scale of shape which depends on the way we see the world when we walk through it. The larger shapes in our field of vision are things such as parts of the sky, expanses of land or road, large buildings, and things very near our eyes. In our field of vision these large shapes can be expanses behind things, which we describe as negative space, chopped up by things which lie nearer to us and which we describe as positive space. These major shapes are always in flux and interact not only with each other but also with the myriad types of smaller shapes such as objects, animals, people, and leaves of trees, all of which are themselves in motion.

In reaction to this understanding of visible reality demonstrated by abstract painting, I programmed a set of visual activities which can be these major positive and negative shapes. Thus some buttons cycle through a set of 8 or more such shapes which together form a unified negative/positive image. When mixed with the products of other buttons they act as background expanses and or large positive foreground shapes. Together they make an abstract illusion of the world we see when walking through it



*Two Examples Produced by This program*

Since all the buttons cycle through a set of shapes with variables which themselves cycle through a given set of conditions, and since all shapes cycle through the 500 colors of any given palette, the chance of a painting repeating is remote to the extreme. I have not yet seen the same painting twice in this program. Of course even though the possibility is remote it is nevertheless present.

Thus using interactive programming to automate the making of abstract paintings has provoked the analysis and reconstruction of its form. this is an analysis of how artists use nature and reality as a source from which to extract general principles that they then use in making their art. Colors, atmospheres, textures, types of shape, methods of addition or subtraction, sequencing and rhythm, major divisions of the picture's surface as negative/positive shape, all can be menu driven to create a pictorial art which does not require manual drawing skills.

### **WHAT WE PAINTERS NEED IN A NEW COMPUTER**

In order that more painters and students may participate in programming, we need from

software companies a programming interface that is easy to use but which has a substantial set of graphic commands rather than just two or three. We need to be able to control color and shape and line and texture and changes therein. We also need a versatile set of sound commands which allow us to program all aspects of sound including approach, duration, frequency, timbre, and decay. We need windows without borders, titles, buttons, or menus. We need multiple windows and slices thereof which we can manipulate easily. We also need windows with a transparent background color which we can overlay on other windows like sheets of glass or sheets of acetate. It would be nice to easily manipulate four or more transparent windows each of which might have some visual elements. This will allow us to program shapes that appear in the background or in the middle grounds instead of constantly appearing in the foreground.

If software has menus we should be able to hide them with a keyboard command. We should be able to work on a painting without menus in view.

In hardware we need a computer with a good quality sound card, good speakers, microphone, headset, CD ROM, and a lot of memory. For color 255 are plenty and 65000 is luxury. We do not need millions. A bigger screen, high quality video connection to record our work and the ability to playback video onto the same computer monitor to check our work would all be of great help. All this hardware is easily available today but not in one computer.

We also need printers which can print on acid free 90 lb and 120 lb. paper stock with dies which are light-fast. A printer which allows us to use our own water color paints would be ideal.

## NOTES

1. There are those who do very methodical experiments attempting to find a direct relationship between music and pictures. Some dream of finding a system whereby any musical composition will automatically reveal a hidden visual face. I believe this is misdirected experimentation. The source of both our pictorial and visual ideas is material reality. It cannot be replaced by a methodical correlation of the meaning of shapes and the meaning of sound.
2. The four video pieces by Roberto Matta were: "Auto-Elasto biographie", 1988; "Oeramen", 1988; "Pas-sez-moi la quillotine", 1988; "Passez-moi le souffle", 1988; Video, paint-box, n.m. Shown at the XLIII Venice Biennale, 1988.
3. In education the gap in authority between teacher and student is not a matter which always benefits learning. There are too many teachers who misuse their power. The removal of this burden by the computer improves learning for many students by removing negative personal interference. However, the good teacher is an irreplaceable treasure.