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RHYTHMS, The Aesthetics Of Electronic Painting

SUMMARY:
This paper focuses on kinetic abstraction as a painting expression appropriate to computing. It begins by describing the futuristic ambitions of early twentieth-century painters to create movement. The way in which the forms of computing fulfills those ambitions is substantiated by comparing the two kinds of art. The third section presents some of the artists who program paintings.

Painters who consider computing find two directions of work possible. On the one hand they can use it to support and automate work in other media . On the other, they can use computing as a medium for new work.

Painters study a new medium because they intuit that it can hold new content better than old media. Once understood, materials are applied to create visual forms that themselves hold the meaning of a painting. The essential search, then, is into painting itself. By using computers, painters might push the art of painting into new realms, and in so doing, they would cause computing to mature as a visual medium.

When painters examine computing as a medium they find a striking resemblance to abstraction. It echoes the writings of artists from the first decades of the twentieth century. It has potential for visual motion noisy enough to fulfill their most futuristic dreams. In this paper, the realization of s such a form is called kinetic abstraction.

Before the development of abstract form, many musicians/inventors hoped to create visual music. They felt that music had a hidden visual reality that they might externalize. Late in the nineteenth century, Alexander Wallace Rimington built a piano like machine which he called the "Colour-Organ." It was electric and its fourteen-octave keyboard was connected to lens and filters and ark lamps. It projected only colored light and did not produce sound but was accompanied by a piano in performance It was so remarkable that as many as one thousand people attended a private demonstration in London in 1895.

In 1922, after the development of abstract form, in the early decades of the century, Thomas Wilfred performed on his own color-organ called the Clavilux. It had taken ten years to perfect at an exorbitant expense. What was extraordinary about the Clavilux was that it projected moving colored shapes and was intended as a visual show, independent of music, even though it was often accompanied by musical performance. Wilfred composed special pieces for his organ. One reviewer described such a performance as "an Arabian night of color, gorgeous, raging, rioting color... lances of light darted across the screen to penetrate shields of scarlet or green or purple." Wilfred is the first inventor whose experiments matured enough that he might be seen as the first kinetic abstractionist.

THE INNOVATORS OF ABSTRACTION

The first abstractionists created a form that departed from the illusionism perfected by Renaissance painters. Many Cubists, Futurists, Orphists, Rayonists, Suprematists, Constructivists, members of DeStijl, and other associated groupings felt driven to write about their discoveries.

Although their ideas are imprecise and often contradictory, the tone of their essays is exciting. They understood better those ideas which they rejected than those which they were developing. They rejected the past which is easier to know than the future They embraced the modern world of technology and industry as Unberto Boccioni wrote "The opening and closing of a valve creates a rhythm just as beautiful but infinitely newer than the blink of an animal eye." They stressed that painting was based on reality.

Movement and time were central themes Words and phrases such as "pictorial dynamism," "Rhythmic Simultaneity," , "vibration," "go round and round the object," "speed," "action," "quest for space," "the fourth dimension," and many others like them are mentioned often in their essays. Rendering things frozen as seen from a stationary viewing eye, did not fulfill their wish to depict the motion and noise of industrial cities. They wanted to open the second eye and put both in motion.

In Du Cubisme written in 1912, Jean Metzinger and Albert Gleizes write, "Today painting in oil allows us to express notions of depth, density, and duration supposed to be inexpressible, and incites us to represent, in terms of complex rhythm, a veritable fusion of objects, within a limited space." In "The Realistic Manifesto" Naum Gabo asserts, "We affirm in these arts a new element, the kinetic rhythms, as the basic forms of our perception of real time." The Futurists talked about sound and wanted their paintings to be noisy. They supported a new futurist music as Umberto Boccioni wrote, "We do not draw sounds, but their vibrating intervals "

The pioneers of abstraction were enthusiastic about the future. Supporting the revolutionary hopes of the working class, they point to those new ideas that have given optimism to our entire century. Although they created a profound renewal in form and content they could not do so for the technology of painting Until the advent of the computer the only technology available to painters for the creation of abstract movement, alone or with sound, was the color organ or mechanical animation – the latter recorded on film. Those methods invited limited exploration by painters.

COMPUTING'S POTENTIAL FOR ABSTRACTION

Computing is an adaptable technology. It can mimic different media and replace their more primitive technologies. In word processors and spread sheets, the software designer provides simulations of the tools of creative writing and bookkeeping. Paint programs simulate the tools of easel painting. When we are given an icon of a brush or a pen or a spray can, we are supposed to make believe that the mouse is like its predecessors.

As painters who explore, understanding the potential of the computer without the mimicry of software has high value even though this value will serve a distant future. It is important to understand that the computer can be made to behave as though it had a lens in it It does not. Making it behave that way to creates three-dimensional illusions through software is very important to production but not to the explorations of painters.

The monitor produces flat color and infinite space more readily than perspective and shading. And what is more, these colors are actually luminous. When turned on, an empty screen resembles the space of the sky in that it does not appear limited by perspective. We do not feel that we are looking into a room or at a wall but into something seemingly infinite. Luminous flat color and infinite backgrounds are primary parts of the visual language of abstraction. Robert Delaunay described the new space as "endowed with vastness (we see as far as the stars)."

Visually the monitor is a descendent of television which is a product of video In historical order, the antecedents of video are film, photography, and finally painting. In painting the frame is a window through which we see the world The boundaries of a visual work of art are the most basic and most significant of its formal methods.

The relationship of abstraction to the rectangle of the picture is a difficult one. As both abstraction and the monitor descend from three-dimensional illusionism, they inherited the rectangle as window frame. Since abstraction does not utilize single views then the rectangle as a window, through which we look while stationary, contradicts the dynamism of abstract space. These issues have been with abstraction since its beginnings They are issues that future electronic technology might help us resolve. The development of high-quality LCD panels of large size, for example, might soon become available. I can imagine a kinetic painting on several panels of non rectangular shape

When we look at programming form we find a language that resembles modern life It is electronic and mathematical, making it similar to our culture today which includes all production, cities, distribution, and transportation. The resemblance is not accidental; it lies in what is intrinsic to both. For example, a function is like a factory: raw numbers or raw materials go in, work takes place, products come out. The essence of programming is much like the essence of the modern world which the first abstract artists sought to express

The simplest graphics commands construct images reminiscent of early abstraction. They create a line out of a set of sequenced dots and a shape from sequenced lines. As they are created the very heart of contructivist formal aesthetics is realized. In 1912 David Burliuk wrote, "Painting is colored space. The simplest element of space is the point. Its consequence is line. The consequence of line is surface."

What is important to abstraction is that these images lack perspective and shading and while the program runs they impart an illusion of motion. Abstract motion does not rely on the geometric relationship of the viewing eye directed to a perpendicular picture plane. Optics and the lens in film and video do the work of the viewing eye of perspective. Thus the possibility of animated images, freed from the formal dictates of a lens, is a critical condition for kinetic abstract space. Animated motion through a lens produces a kinetic three-dimensional space. The two are different.

In 1920 Paul Klee wrote "When a dot begins to move and becomes a moving line, this requires time. Likewise, when a moving line produces a plane, and when moving planes produces spaces." Motion itself and not simply the illusion of motion in a static painting, was on the mind of many of the early abstractionists

In the mid 1980s the Amiga was capable of producing sound A combination of electronic sound and picture has the potential to realize new forms We as painters can now look at the world knowing that later when we paint, we will be searching our intuitions not only for how things looked but how they looked and sounded simultaneously.

Thus the computer, with its flat luminous color and infinite space and its potential for moving abstract shape without the use of perspective and shading and without a lens, is imminently suitable for the development of the futuristic dreams of the earliest abstract painters. Furthermore, the combination of

sound commands with visual commands in one program particularly realizes the ambitions of the Futurist painters to represent simultaneously their many impressions of reality.

DEVELOPMENT OF THE NEW FORM

Early abstractionists considered the illusion of three-dimensional space, perfected in the Renaissance, to be inadequate for the new historical task in painting. The two formal pillars of three-dimensional space, shading and perspective, were not able to hold the new subject matter of a world in motion Consequently, abstract painters abandoned them.

Perspective was first replaced by superimposed views of objects. As the artists analyzed the results, they began to see the possibilities of a new space and arrived at a synthesis where objects seen from one stationary point of view disappeared.

When illusions of stationary objects disappeared, most depth clues of a measurable space disappeared. Known objects impart information of their specific size and establish a scale for measuring space Without them shapes lose their measurability. They relate only to each other and to the background. They become unstable and seem to move back and forth in space – to "push and pull" in relation to the picture plane.

Thus the foreshortening of shapes and diminishing size, the two pillars of perspective, were abandoned. Their departure left the background seeming more like the sky than a wall. The background took on a sense of an infinite depth rather than a hard finite surface. The new space was based on the interaction of shapes on an infinite background as is defined by the Suprematist paintings of Kasemir Malevich. Within this space, line and color and texture also changed their behavior.

In three-dimensional illusionism line is the outline of stationary objects. In abstract painting line is a path of movement, a record of dynamic actions. The pioneers recorded this new use of line. In 1912 the Futurist Larinov wrote, "A ray is depicted provisionally on the surface by a colored line." In 1920 Paul Klee equated walking through an unplowed field with a line traversing a field. Umberto Boccioni called this new use "the dynamic line/force." And Naum Gabo wrote, "We affirm the line only as a direction."

In the early stages of Cubism, color was not important. A type of simplified shading was used to differentiate surfaces. In Synthetic Cubism and later on with the clearer emergence of a truly abstract space, as in the paintings of Kasimir Malievich and Piet Mondrian, color became significant. In relation to color it is important to recognize that if the artists make paintings conceived in motion, then to record one instant of illumination on a colored surface is contradictory. Shading contradicts abstract motion. In abstraction luminosity replaces illumination.

Thus abstractionists reject shading, the venerable chiaroscuro of the Renaissance. It is replaced by flat areas of color which act in relation to each other to create an ambiance of luminosity. In 1912, in a letter to August Mache, Robert Delaunay wrote "Direct observation of the luminous essence of nature is for me indispensable...observation of the movement of color." Larinov wrote that the Neofuturists replaced the static surface of a painting with a light-colored moving one.

The elimination of the object as seen from one point of view meant that the content of painting changed. Literary narrative and metaphor were replaced by the general principles of motion that connect objects. Abstraction cannot paint a portrait of the rich patron but it does describe distribution, rhythm, growth, development, and similar motions. It did provide the formal language which scientists now use for multi-dimensional illustration. Thus a new world of meaning opened to abstract painters who clearly felt the "liberation of the Great Art of Painting from the alien traits of Literature."

THE INTERSECTION OF COMPUTING AND PAINTING

Can the computer, with its potential for motion, self-luminous color, memory, and programming, be used to push twentieth century abstraction into newer formal realms not possible in static painting? Given the formal history of abstraction and the present state of the art of computing, the answer should be yes. They are perfectly suited. Can kinetic abstraction become as useful a way of imaging the world as Renaissance illusion? Yes!

It is at this point in our logic that the heart of the issue lies – at the point where we have done our historical and technological homework and begin our work to expand the visual language. As we learn to program, we need to remember that it is form in painting that we explore. Music, mathematics, geometry, and programming are not painting While they have their own beauty and their own avant-garde of creative practitioners, the goals of these various abstract processes are different from those of painting. They hold a different kind of content and cannot replace the usefulness of painting.

Connecting visual material with sound began with musicians whose perspective was that of music. It brings us to the question of whether we are adding visual material to music, sound to pictures, or trying to combine two wholly separate media with millennia of history behind each.

Most explorers hope to discover a principle that when fed into a machine would externalize what they believed was imagery inherent in music. They called their work 'visual music'. Some recent explorers have tried to find a principle that would generate both sound and image and thus guarantee their equality and coherence Some artists come with a background in painting, like myself, and consider that sound is an attribute of shapes as experienced in reality and thus is another of the dimensions of painting

ARTISTS WHO PROGRAM STATIC ABSTRACTION

In the following cursory survey no value judgment about the efforts of my fellow artists is intended nor is the survey complete I briefly describe their work and make formal distinctions.

Artists who produce static pictures are generally interested in series of images that test controlled variables. The repetition and complexity of nature, with its seemingly infinite variation, is made part of the aesthetics of computed pictures through recursion. Artists working in this way generally use plotters to make black and white line drawings. As algorithmic painters they are more developed than those who do kinetic work.

Two artists who produced a mature body of algorithmic computer drawings were Collete S. Bangert and Charles J. Bangert. Their collaboration began in 1967. The beauty of their work is first artistic, then algorithmic. It invokes the principles behind natural complexity. They are pleased when viewers cannot tell the difference between drawings done by hand and those drawn by plotter. However, it is precisely the visual qualities, brought about by the medium of programming, that is most beautiful in their work.

In 1982 Roman Verostko began to develop a program he calls

Hodos which directs a plotter armed with pens and brushes to paint. The results are wonderful glowing painterly spaces made up of calligraphic strokes He believes that "The computer ... is altering the way we perceive the world." Verostko wrote, "If you are able to describe the artistic procedure, however uniquely individual, it will be possible to write the code." It points to the fact that most of our work is algorithmic by nature If we become conscious of the procedures, then we have gained insight and are ready to advance our work.

Manfred Mohr, who has his beginnings in jazz improvisation, opted for the control computing can give his creativity. An illusion of a cube is used as a basic element, which he then subjects to transformation. Processes such as adding, subtracting, sequencing, combining, restricting, framing, orienting, and more produce black and white paintings and drawings. The entire process from algorithm to hard copy is under intuitive control.

COMPUTED KINETIC ABSTRACTIONS

The first recognized master of kinetic computer imagery with sound was John Whitney. "I asked repeatedly what visual elementals might match the scales of tones of music...free to explore, I soon found that for the first time in history, visual periodicity and harmonics were accessible to dynamic manipulation through the instrument of computer graphics " A visionary, Whitney went directly to the heart of his curiosity and found himself building and inventing electronic machines.

In "Permutations," (1968) and "Arabesque," (1975) he delineates a marvelous and exciting new world. One senses a master choreographer. The movements are reminiscent of ballet. The shapes follow the dictates of formal geometry more than those of abstract painting. Movement is three-dimensional and the ambition for a more polished three-dimensional shaded space is apparent.

In 1968 an important exhibition marked the emergence of electronic as distinct from mechanical kinetic paintings. It was sponsored by Experiments in Art and Technology in collaboration with the Brooklyn Museum and with the Museum of Modern Art. What is pertinent to the subject of this paper are the abstract works which were based on computer programs. At the time these pieces were called "computer-generated films." Aaron Marcus, Duane Palyka, and Stan Vanderbeek in collaboration with Kenneth C. Knowlton, exhibited geometric abstractions. All of them utilized geometry in the way Whitney did. A later film by Vanderbeek called "Euclidean Illusions," (1979) uses geometric form and delineates all movement in a three dimensional space with perspective. However, Vanderbeek later published "Spectrum 6" which was more abstract in its space.

CONTEMPORARY KINETIC ABSTRACTIONISTS

In 1979 Robert R. Snyder began designing and building an image processor connected to an equal-tempered keyboard. He described it as being able to produce five colors in as many areas of the screen. Snyder, a musician, attempted to control a "luminous envelope" structured to coordinate with musical events. His videos are not abstract, although his keyboard image processor is capable of it. His work is significant to the development of kinetic painting performed in real time with musicians.

Bryan Evans is primarily a musician searching for "one principle as the generative device for both music and graphic materials". He describes an algorithmic "black box" which produces output translatable by various artists into their respective media. To integrate sound and picture, he focuses on mathematical and fractal principles. His work then is an attempt at visualizing music. The color of his shapes is variegated and graduated in lighting Its shifting is beautiful. This graduation gives the illusion of shading that hampers the interaction of shape and color in an abstract space

Lynn Pocock earned a degree in computer science followed by one in computer graphics She considers her work to be visual music and her "interest has been to represent the structure and emotional content of music in a visual form." It is balanced between the two. She has used the methods of artificial intelligence to model the work of Wassily Kandinski Another project uses a stream of musical information which is analyzed and which, through a rule-based system, is made to select from a pool of graphical fragments. As the stream is processed, the graphical events are sequenced. Pocock's work is not all abstract. Her contributions in the use of artificial intelligence to formulate a method whereby sound and picture can be manipulated simultaneously is significant.

Primarily a visual artist, Edward Zajec creates kinetic paintings that take music as a point of departure. His kinetic painting titled "Chroma," 1987, is made up of four sets of static pictures. Each set contains six to twelve pictures. Principles that he calls "thematic dissolves," "dimensional upgrades," and "thematic transformations" are then used to cause forms to interact Zajec is aware of abstract motion and very concerned with the "articulation of color and form in time." He is also conscious that this motion is different from animation created as though seen through a lens He writes that "to animate means to orchestrate the flow of color passages in time, rather than to choreograph the motions of objects in space." Of the kinetic painters mentioned, his is the only work which matches the definition of abstract form outlines in this paper.

CONCLUSION

In kinetic abstract painting, computer technology has not been sufficiently explored by painters for sophisticated formal methods to develop. The visual language for such painting is still nascent.

The four formal attributes that are apparent at present are the rhythmic sequencing of noisy shapes and lines in time, the visual manifestation of digital programming form, the influence of memory on sequencing, and kinetic color Kinetic color is when the color of shapes changes in real time Snyder called it "time-variant color progressions."

The marvelous new technology is here capable of fulfilling the most optimistic dreams of the pioneers of abstraction Why are there only a few practitioners? Maybe it is because, unlike the pioneers of abstraction, we do not yet have reason to dream with enthusiasm about a future society. We do not yet know a new content that might invigorate abstract kinetic painting.