

A New Language for Artistic Expression: The Electronic Arts Landscape

Joan Truckenbrod

The intersection of artists and electronic technology is producing new art forms that differ from traditional art and are unique to the context of electronic technology. If we examine the process of creative expression in this context, it is clear that new modes of expressing ideas, feelings, emotions and insights have become available to artists. Thus electronic technology expands traditional means of artistic expression. However, the integration of this technology into the creative process also has necessitated the development of a *new language* that provides a context for artistic expression with new modes of communication. The elements of this new language translate the nature of electronic technology into the realm of the artist, allowing the emergence of new, experiential art forms.

A NEW LANGUAGE

Because of the uniqueness of this technology in artistic expression, new modes of artistic communication and vehicles for artistic expression are emerging. These modes of communication form a new language for artists working in this area, and a new working vocabulary stimulates new artistic visions. There have been significant examples in other fields in which a new vocabulary of elements led to dramatic changes in the art and design work produced. In architecture, a significant transformation in design and building techniques resulted from the availability of new materials like steel. Ludwig Mies van der Rohe created a new approach to structural design with his steel-and-glass buildings. These buildings represented a major departure from traditional masonry structures. The structure became the design. These ideas are extended in the work of Helmut Jahn. His State of Illinois building in Chicago has a large and dramatic interior courtyard that extends the height of the building and provides a feeling of spaciousness. The outside becomes the inside with the architect's use of the glass skin of the structure. Offices are arranged around the perimeter of about half of the building. In this design there is a definition of the function and role of a building. This definition developed out of the new language in architectural design that emerged with the availability and use of steel building materials.

Another example of a new language resulting in new design forms is in the field of jewelry design and its extension into body adornment. Jewelry traditionally has been created

from precious stones and metals. As jewelry designers have explored and experimented with new materials, such as plastics, wood, paper and polyester, a new design vocabulary has emerged. Carved polyester, for instance, gives rise to unique shapes and forms. The use of new materials also has extended the concept of jewelry to ornamentation in which body adornments also function as garments. New materials provide a new vocabulary for these designers in which innovative approaches to jewelry design are nourished.

One of the most striking examples of a new vehicle for communication or a new language of expression that expands the scope of a field is in music and its extension into electronic music. Electronic composers use a dramatically different musical vocabulary from that of traditional composers. Consequently, the nature of the process of electronic composition and the character of its sound images are a significant departure from traditional music. This set of new elements required the development of a new language, which facilitated the creation of innovative musical compositions. The evolution of electronic music is analogous to the evolution of two-dimensional, three-dimensional and four-dimensional electronic arts. Electronic devices provide a new mode of creating sound and new methods for creating and synthesizing sound images. Using these devices musicians can create sounds that could not be created with traditional instruments, opening up new dimensions of sound imaging and music composition.

Musicians can create sounds or sound images in a number of ways using electronic technology. Sound images can be created by digitizing sounds in the real world. Voices, notes played on instruments or noises, such as crumpling paper or popping open a soft-drink can, can be captured and manipulated for sound composition. In addition, sounds can be created by constructing the shape of a waveform that represents a sound. Thus, there are new acoustic elements available to artists and composers.

ABSTRACT

Are artists and electronic technology in harmony with one another? What is the character of the interface between artists and electronic technology? It is clear that electronic technology has made available to artists new modes of expressing ideas, feelings, emotions, insights, events and information and thus has expanded traditional means of artistic expression. However, the author observes, the integration of this technology into the creative process also has led to the development of a new language that provides a context for artistic expression with new modes of communication. The elements, the vocabulary, of this new language translate the nature of electronic technology into the realm of the artist, allowing the emergence of new experiential art forms. The language consists of elements that describe the creative process and influence the character of the final artwork. By means of electronic technology, this language can be used by artists to express and communicate multi-dimensional experiences involving sound, image and movement, permitting the expression of previously impossible syntheses and transformations of ideas. The resulting art is alive, responsive and interactive. Artists become choreographers synthesizing the numerous dimensions of human experience. The issue of how to get the spirit and soul of the artist into the computer—and back out into the world—is manifest in new visions of artistic expression in the electronic arts.

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99

Sound sequences and music are created by combining and manipulating these electronic sound images. Sound is malleable and can be transformed easily. Sound images can be stretched or compressed in time by changing the frequency and the amplitude of the waveforms. Sound pieces or musical compositions can be edited in a manner similar to text editing or image processing. Segments can be cut out, moved around, repeated and reversed. Various aspects such as the octave, volume and speed can be changed easily. Sounds also can be mixed and repeated in various combinations to create new sound

landscapes. For example, digital sound can be mixed with speech or sounds from the natural world. Mixing can be accomplished either by layering sound images on audio tape or through digital mixing, in which the sound waves of each individual sound are actually mixed together to create an entirely new sound. With electronic devices, musicians are working with a new vocabulary of sound images, using new tools and methods for transforming sounds and composing musical scores. This language of sound composition is analogous to, and part of, the new language emerging in electronic arts.

A NEW VOCABULARY

Electronic technology provides a new communication landscape for creative expression in the arts. The electronic media are alive—titillating, experiential. The elements of this new landscape are malleability and transformability, responsiveness and transmittability. Artists create, synthesize and communicate experiences using this technology in a variety of ways. Artists communicate ideas and emotions by creating images, movement and sound with a variety of devices. Video digitizers and optical scanners facilitate visual communication with computers. Sound digitizers allow the artist to capture any type of sound image or event and transmit it to a computer. Electronic gloves and three-dimensional digitizers allow the artist to capture gestures: movement of the hand, arm or body sculpts in space, communicating form as well as movement to the computer. Emotions can be transmitted to a computer through the use of alpha and beta wave sensors. Thus electronic arts are experiential, for artists express ideas through visual images, sound sequences, body movement and emotions. Using electronic technology artists create experiences for the audience or participants that include visuals, sound and movement—individually or in conjunction with one another. Thus the electronic arts studio is a multidimensional studio environment that facilitates the creation of *experiential* art forms.

Malleability and Transformability

An important aspect of this new language is image and sound processing. Digital images and sound are infinitely malleable; consequently we have unlimited power to sculpt, shape and mold experiences into new forms. For example, any figure, object or environment recorded with a video camera or scanner can be transmitted to the computer, displayed on the screen and manipulated. In addition, the use of this video digitizer allows artists to create their own 'lenses' by specifying the way in which they want to see the world. Images can be captured as normal pictures, high-contrast images, contour maps or outlined figures. Scanning digitizers capture images during a time segment that allows the artist to create stretched, compressed or smeared images as well as multiple

Fig. 1. (a) *Syllogism*, digital photograph, 24 × 26 in, 1986. (b) *Encoded Myth*, digital photograph, 24 × 26 in, 1987.



images in one frame. Changing the lighting during the scanning time creates unusual figure distortions. Images created in this manner are unique to computing systems.

In my own artwork I am processing and synthesizing images that express the complexities and dynamics of the relationship between parent and child. My current work confronts the fragmenting effects of differing behavioral roles. We assume various roles, as mothers, daughters, artists and friends, that push and pull us in different directions. Roles, as expected patterns of behavior, support certain behaviors and inhibit others. Consequently, they act as templates pre-determining behavior that may or may not correspond to personal goals, dreams and fantasies. My work involves the process of resolving the multiplicity of roles, synthesizing personal experiences into a multidimensional model. The layers of patterns and screens in my images represent different roles and their undulating positions (see Fig. 1 and Color Plate A No. 1). At various times one of these 'role-planes' becomes predominant. Other time these planes recede into space, taking a secondary position. These role-planes also can act as an interference in some images as they block out or hide figures. The computer provides a vehicle for synthesizing these behavioral roles into digital portraits, making visible the complexities of psychological spaces that emerge between the multiple modes of behavior. My images are sensitive to the conflicts between roles and express the hidden dimension of the ongoing struggle to resolve these conflicts. The image in Fig. 2 expresses the anguish of the AIDS (acquired immune deficiency syndrome) epidemic and the trauma of the barriers between people that are necessitated by this disease. Plastic is used to separate people in times when people need closeness and support, representing the distancing between people that is occurring in this crisis.

Sound images as well as visual images are malleable. Students in my Experimental Computer Imaging class are currently exploring the nature of sound images and are creating sound landscapes by manipulating and layering sound images. I have students expressing ideas through sound in three ways and then synthesizing these sounds into a sequence or composition. Initially students work with



Fig. 2. *Free Radical*, digital photograph, 24 × 26 in, 1987.

speech synthesis software, creating sound images or patterns using words, phrases or poems. By changing the tone, pitch, volume and accent they create interesting electronic sound images. In addition, they experiment with the sound of the repetition of letters and sets of letters. This process creates innovative sound images. Next students use an audio digitizer to capture the human voice and sounds from the natural world. These sounds are translated into a digital format and can be manipulated and processed. There is an interesting acoustical contrast between synthesized speech and the digitized voice that students explore and develop in their sound compositions. Finally, students work with music composition software to compose musical scores. Students approach this portion of the project visually as they create patterns on a grid or draw curves that represent the placement of sequences of notes. Using this software students can edit sound sequences through repetition, changing octaves and changing positions of notes.

After these three types of sound images are complete they are layered together on an audio tape into a sound landscape that undulates in time. Depending on the score created by each student, various types of sound fade in and out at different times in the composition. These sounds also can be digitally mixed to create totally new sound images. In addition to the sound landscape, students create vis-

ual images that correspond to the sound landscape. These visual compositions integrate the text from the audio tape with visual images. The students working on this project are beginning students in the electronic arts; they use Macintosh computers.

In addition to individual images and sounds, artists use computers to transform one type of experience into another type of experience. For example, sound can be transformed into images or images into sound sequences. Sound also can be transformed into movement in kinetic sculpture as sound can be used to create movement in a kinetic sculpture. Electronic technology provides a unique opportunity for artists to create art forms by transforming one type of experience into another.

Responsiveness

The interactive nature of electronic technology allows artists to create responsive environments or installations that engage participants in unique means of expression and communication. I have created an installation that uses the interactive nature of computers to create a responsive environment. This piece will be installed at the exhibition *Images du Futur '88, Art et Nouvelles Technologies* in Montreal during the summer of 1988. This project, titled "Expressive Reflections: Reflective Expressions", forms an 'experiential mirror' in which the voice and image of a participant undergo simultaneous related transformations. Par-

ticipants experience their own speech transformed and played back through speakers and their own image transformed and concurrently displayed on a video screen. In this project I have fashioned an environment that transforms the world, giving the participants new ways of experiencing themselves through sound and image simultaneously. This installation provides an interactive experiential environment involving the essence of human experience expressed through sound/voice and facial images. The participant expresses an idea or feeling verbally and the installation captures the person's speech with an audio digitizer. At the same time the person's facial expression is captured using a video digitizer. The sound image—a word, phrase, song or noise—is then processed or changed and transmitted back to the participant via a computer program, to create a sound landscape that undulates in time. The visual image is simultaneously transformed and repeated on the display screen.

Initially the participant's voice is digitized and played back in its original form so the participant recognizes that a personal sound landscape is being formed with his or her voice. The voice pattern is manipulated, transformed and repeated to create a sequence of short sound landscapes. For example, the sound image is played more slowly, faster, backwards, upside-down, up an octave, down an octave and in combinations of these variations. The order of these sound transformations varies with each participant to create a sense of mystery about the nature of the phenomenon. Simultaneously the participant's face is digitized to capture the facial expression that corresponds to the expression in the voice. The digitized face is displayed on a series of video monitors and then is transformed in synchronization with the sound undulations. The image processing techniques used on the facial images include the formation of outlines, contour maps,

negative and positive images, high-contrast images and various color transformations. The combination of sound and image provides an experiential mirror that captures the essence of an expression and creates multidimensional views of each participant.

Transmittability

Another element in this new language is the potential for transmitting an image or experience globally via telephone or satellite. That electronic arts are alive implies that images, sound and movement can be communicated anywhere in the world or into space. Ideas and experiences can be communicated instantaneously anywhere. These transmissions can be interactive since the receiver can work with an image and return it to the sender. In Vancouver in 1985 the Digicon Conference sponsored an international concert performed interactively via satellite by musicians in Canada, Germany and Japan. Theatre and dance events as well as contemporary performances can be choreographed involving performers who are in different geographical locations. Video teleconferencing has significant potential for innovative real-time performances that link distant locations. Another potential for electronic arts is the use and programming of public-access television stations. Art events can be created for distribution to a broad public audience. This is a very different context from traditional gallery exhibitions.

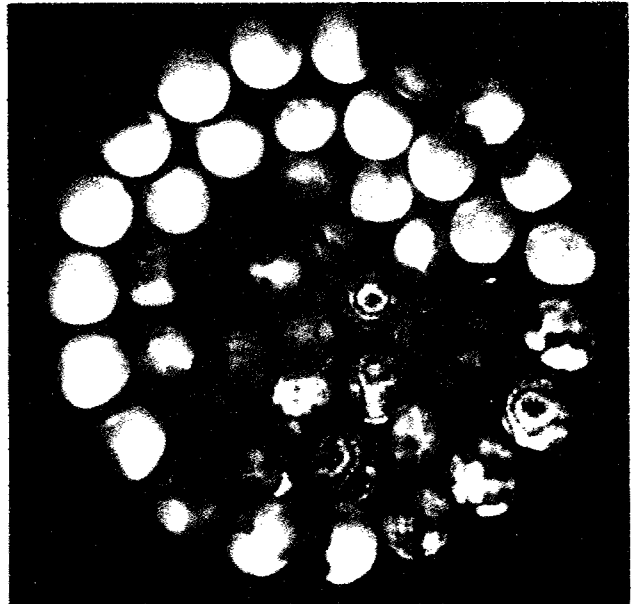
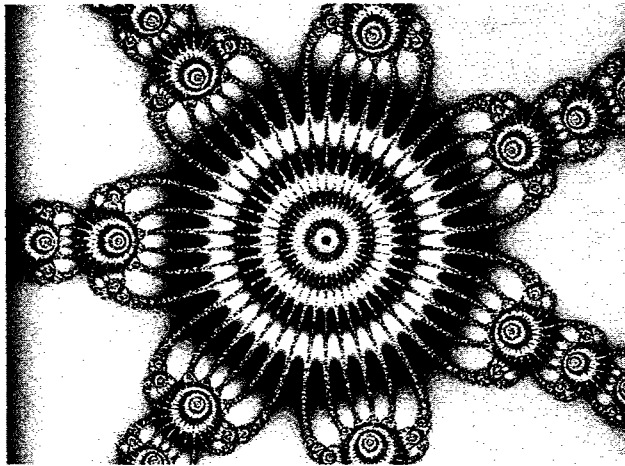
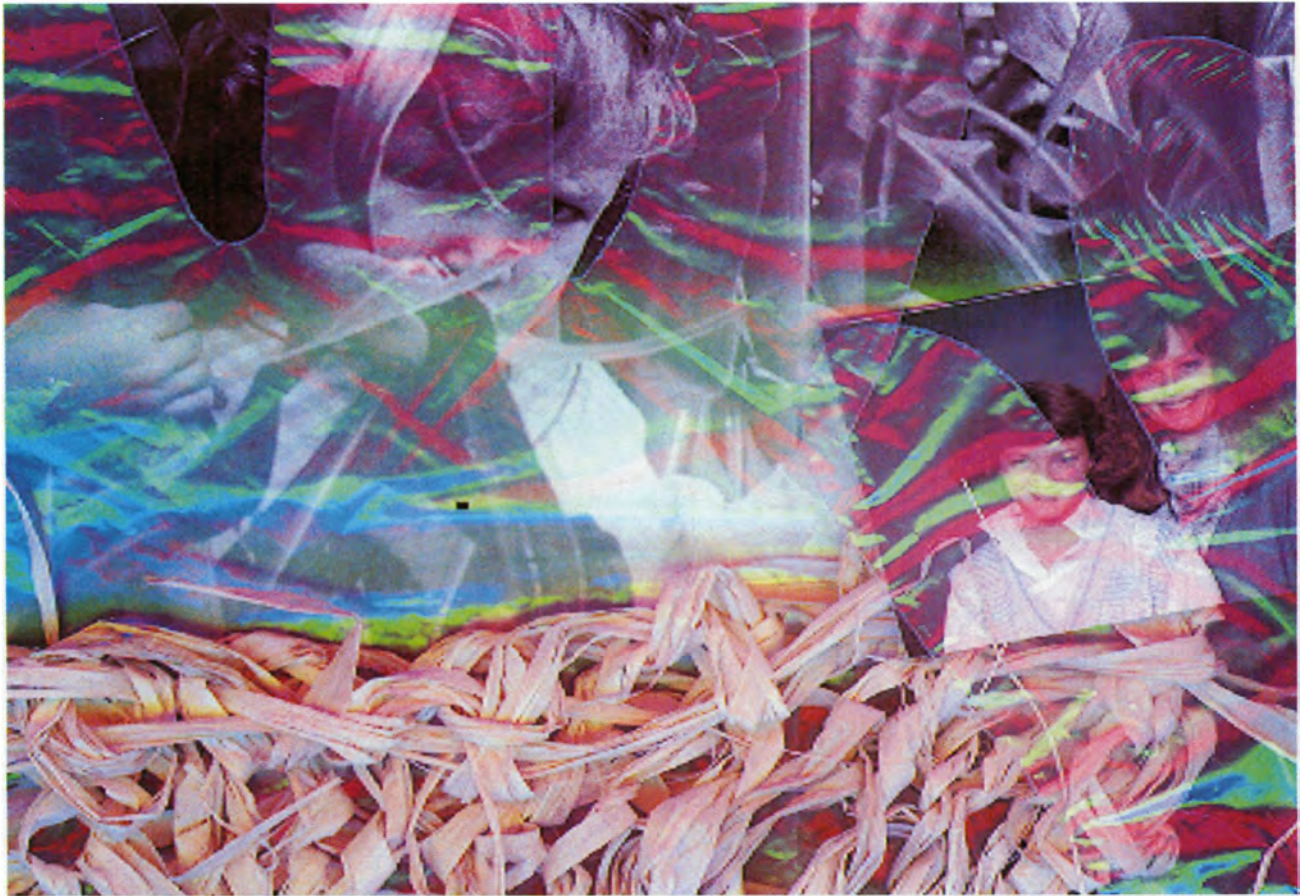
NEW ART FORMS

Artists have new visions of artistic expression in the electronic arts studio. The new language of electronic arts is used by artists to express and communicate insights and sensitivities, to synthesize multidimensional experiences and to create a metamorphosis of ideas, images and experiences. Not only can the artist make statements individually in each of the areas of imaging, animation in form or video,

kinetics, performance and sound composition, but the synergism of the computer studio allows artists to create experiences that involve a number of these components simultaneously. Computers offer artists the potential to convey the complexities of everyday life and culture. Images can be layered and synthesized in a manner that parallels the fabric of contemporary life. We live in an experiential world in which sound, speech, music, image and movement affect us at all times. Two-dimensional artwork attempts to represent our environment but does so in only one medium—a visual image; similarly, a concert represents only one facet of our environment. Since the computer allows the artist to choreograph sound, images and movement simultaneously, artistic expression via computer moves closer to the multidimensional experiences of our lives. The electronic artist will be akin to the Renaissance person exploring the fiber of human experience. Computers allow artists to create intimate, interactive relationships with their environment by synthesizing a multitude of sensory stimuli and sculpting this artistic sensitivity and perception into new art forms.

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COLOR PLATE A

No. 1. Top. Joan Truckenbrod, *Time Knit*, digital photograph, 24 × 26 in, 1988.

No. 2. Bottom left. Brian Evans, fractal image created using Newton's method for finding roots of the equation $f(x) = x^7 - 1$. The RGB triplet measure for this image is 1:1:1 with total intensity at half of full.

No. 3. Bottom right. Richard Wright, *Parameter Space*, software: artist's software in 'C'; hardware: VAX 11/785, Gems Framestore, Dunn Film Recorder; format: 35-mm slide of computer-generated image. 1987. A fractal sine function was used to solid texture map a conical arrangement of spheres. Computer algorithms can take arbitrary sets of data and fuse them together to create an object that possesses the quality of tangible reality.