Tracking Video Art: "Image Processing" as a Genre

By Lucinda Furlong

Video wallpaper ... special effects ... computer art ... high-tech video ... image synthesis ... image manipulation ... image processing—these are some of the terms that have been used to describe a type of video produced by artists who have been experimenting since the late 1960s with electronic imaging tools. None of these terms are particularly useful: they are too general or too specific, or they fall prey to the kind of value judgments and myths associated with "mindless," "impersonal" technology.

Even the most common term, "image processing," is problematic. Whereas in commercial television that term usually refers to signal-processing methods such as timebase correction, in the video-art world it has become at once a genre and a catchall phrase for every technical process in the book. "Image processing" encompasses the synthesis and manipulation of the video signal in a way that often changes the image quite drastically. It includes not only altering camera-generated images through processes such as colorizing, keying, switching, fading, and sequencing but combining those operations on synthesized—that is, cameraless—imagery as well. It has come to refer to everything from the most basic analog-processing techniques to sophisticated digital-computer graphics and effects.

And yet despite the term's breadth, "image processing" conjures up a number of very specific—often pejorative—stereotypes: densely layered "psychedelic" images composed of soft, undulating forms in which highly saturated colors give a painterly effect, or geometric abstractions that undergo a series of visual permutations. To many of the people who use these tools such characterizations are superficial and belie the range of concerns that fall within the image-processing umbrella.

Although the label is conceptually and technically inadequate, it seems to have stuck for lack of a better one to describe what has become, in effect, a separate aesthetic genre. But the categories that now divide video—documentary, image processing, performance, and installation—were virtually nonexistent at its beginnings; then all forms of video functioned homogeneously as an expression of the activism of the 1960s—as the alternative television movement. As Steina Vasulka has recalled:

> You have to understand those early years, they were so unbelievably intense.... This was the " '60s revolution." We didn't have the division in the early times. We all knew we were interested in different things, like video synthesis and electronic video, which was definitely different from community access-type video, but we didn't see ourselves in opposite camps. We were all struggling together and we were all using the same tools.[1]

Johanna Gill has observed that the desire to use communications tools to change, quite literally, the world took a number of forms—the most direct being to work with community and oppositional political groups.[2] The goals of the alternative media groups were articulated in the first issue of *Radical Software*, the publication founded in 1970 by Beryl Korot and Phyllis Gershuny that until 1974 was the mouthpiece of the movement:

> Power is no longer expressed in land, labor, and capital, but by access to information and the means of disseminate it. As long as the most powerful tools (not weapons) remain in the hands of those who would hoard them, no alternative cultural vision can succeed. Unless we design and implement alternate information structures which transcend and reconfigure the existing ones, other alternative systems and life styles will be no more than products of the existing processes.... Our species will survive neither by totally rejecting nor unconditionally embracing technology—but by humanizing it; by allowing people access to the informational tools they need to shape and reassert control over their lives.[3]

The rejection of commercial television did not manifest itself in direct social action alone. Low-cost portable video equipment was so new that using it for any purpose at all was considered radical. As part of a new kind of "media ecology," video environments (the precursor of the video installation) were created. Some were interactive situations designed to expose and circumvent the one-way delivery of commercial television. Others—inspired both by Marshall McLuhan and by Norbert Wiener's work in cybernetics—reflected these thinkers' correlations between electronic circuitry and the workings of the human nervous system. The idealism in Juan Downey's article "Technology and Beyond" is typical of what David

Antin has called "cyberscat," the futuristic jargon spoken not only by Downey but also by Frank Gillette, Paul Ryan, Nam June Paik, and many, many others:

> Cybernetic technology operating in synchrony with our nervous systems is the alternative life for a disoriented humanity.... The process of reweaving ourselves into natural energy patterns is Invisible Architecture, an attitude of total communication in which ultra-developed minds will be telepathically cellular to an electromagnetic whole.[4]

Challenging the institution of television in the late 1960s also meant creating images that *looked* different from standard TV. Thus, "image processing" as we now know it grew out of an intensive period of experimentation that for some, in a vague way, was seen *visually* to subvert the system that brought the Vietnam War home every night. There were other motives, of course: the swirling colors and distorted forms conjured up the experiences associated with hallucinogenic drugs, suggesting that "new realities" could be electronically synthesized.[5]

Perhaps the most interesting attitude, though, in light of what was going on in the art world at the time, was the connection made between image processing and the modernist credo of exploring the basic properties of the medium. This treatment of the electronic signal as a plastic medium, a material with inherent properties that can be isolated, is central to the development of what became the image-processing aesthetic. There are many examples of this fundamentally formalist characterization, which, I think, provided a way to lend modernist credentials to an art form that was having a difficult time gaining acceptance—critical attention, funding, marketability—by traditional art institutions.

For example, in December 1971 the Whitney Museum of American Art's first video exhibition, assembled by the late film curator David Bienstock, consisted almost entirely of image-processed tapes. In the program notes, Bienstock wrote:

> It was decided ... to limit the program to tapes which focus on the ability of videotape to create and generate its own intrinsic imagery, rather than [on] its ability to record reality. This is done with special video synthesizers, colorizers, and by utilizing many of the unique electronic properties of the medium.[6]

While various people were thus engaged, however, the rules had changed. The whole idea of a modernist practice was being dismantled. The work was dismissed not so much because it was inherently "bad," but because the ideas informing it had become exhausted. No one in art circles wanted to hear about—let alone look at—video that seemed to be based on the conventions of modern painting. Robert Pincus-Witten argued that point in 1974 at "Open Circuits: An International Conference on the Future of Television":

> It appears that the generation of artists who created the first tools of "tech-art" had to nourish themselves on the myth of futurity while refusing to acknowledge the bad art they produced. Their art was deficient precisely because it was linked to and perpetuated the outmoded clichés of Modernist Pictorialism—a vocabulary of Lissajous patterns—swirling oscillations endemic to electronic art—synthesized to the most familiar expressionist color plays and surrealist juxtapositions of deep vista or anatomical disembodiment and discontinuity.... The important work, then, of the first generation was the very creation of the tool, the video synthesizer.[7]

Pincus-Witten's comments are important not only because he pinpoints one reason why this work was rejected but because he acknowledges the important role that designers and builders played in developing relatively low-cost equipment. Prior to the introduction of consumer video products, the design of video equipment was geared towards broadcasting and industry. Much of the equipment now taken for granted—color cameras and lightweight Portapaks, for example—were either unavailable or unaffordable for most people. It was even more difficult to acquire the devices associated with image processing—keyers, colorizers, mixers, and synthesizers. What's more, that equipment was usually more suitable for producing special effects than for artists' experiments. Since it was rare to find both artist and engineer in one person, artists found themselves seeking out equipment designers who, in one way or another, were mavericks within the electronics industry. As Woody Vasulka recalled in 1978,

> I discovered that in the United States there's an alternative industrial subculture which is based on individuals, in much the same way that art is based on individuals.... These people, the electronic tool designers, have maintained their independence within the system. And they have become artists, and have used the electronic tools which they had created.... We've always maintained this very close, symbiotic relationship with creative people outside industry, but who have the same purposeless urge to develop images or tools, which we all then maybe call art.[8]

With the exception of Nam June Paik's well-known collaboration with engineer Shuya Abe, the history of video as it is presently constituted has virtually ignored the work of first-generation tool designers and builders. Furthermore, although the Paik-Abe collaboration in 1970 is touted as the "first,"[9] a few people were working on specialized video equipment earlier than or at least contemporaneously with Paik. For instance, in 1969, Eric Siegel modified a color TV set so that images were distorted and colored; he then built a separate device capable of colorizing a black-and-white video image. And Stephen Beck, who completed his Beck Direct Video Synthesizer No. 1 in 1970, actually began working on a prototype in 1968. In addition, Dan Sandin completed in 1973 what he called an "image processor," a video version of a Moog audio synthesizer. Bill Etra and Steve Rutt later built the Rutt-Etra Scan Processor, a device that can manipulate the video image as it is displayed on a video monitor.

As Ken Marsh pointed out in *Independent Video*, a technical how-to book of the period, these early devices operated on two basic principles: "the use of electrical signals rather than light as the source of the information to be displayed; and the extensive intermixing of signals in order to display a totally new image."[10]

Compared with the technical standards of television these devices were quite crude: because the parameters of the video signal were difficult to control, it was impossible to predict exactly how the resulting image would look. Furthermore, most of these tapes could never have been broadcast owing to their technical inferiority. But this was not crucial to most people at that time; most important was a design approach that afforded the artist flexibility. Unlike commercial production devices—in which a specific button is pushed to achieve a specific effect—these devices became interactive instruments whose possibilities could be known only through use.

All these early tool builder-artists were "pioneers," but their ultimate

impact varied. For instance, neither the Siegal nor Beck synthesizers were ever duplicated. Some of them—Beck, Siegel, and Etra—produced and exhibited tapes and were very active in the early video-art scene. But these people eventually took their skills to the commercial sector, and their activity in the video-art world diminished or ceased altogether.

The exception was Dan Sandin, who has been one of a number of individuals—among them Steina and Woody Vasulka and Ralph Hocking and Sherry Miller—who have contributed to the institutional and theoretical framework in which much of this activity has continued. All of them share the desire to place the means of production in the hands of the user, because:

> The high priests of technology use unwieldy systems to perpetuate cybercrud—the art of using computers to put things over on people. This mentality can be countered by bringing to people systems that are easily learned and used—"habitable" systems.[11]

Sandin was doing graduate work in physics at the University of Wisconsin at Madison (earning an M.S. in 1967) when he realized he "wasn't being a good physicist anymore." While producing color slides for light shows, it occurred to him that those kinds of images could be produced electronically. While doing the light shows, he became familiar with the Moog 2 audio synthesizer, and, about 1968, began thinking about what the visual equivalent of the Moog might be. It took several years to bring his ideas to fruition, for despite his training, Sandin still had to teach himself electronic design. In the meantime, he became a faculty member at the University of Illinois Circle Campus in Chicago, teaching kinetic art and interactive sculpture.[12]

For Sandin, the basic idea was to make an affordable instrument (presently about $4,000–$5,000) that would combine many functions in one tool—i.e., keying, fading, colorizing ***(Fig. 1).*** Like audio synthesizers, it would also be patch-programmable: how the different functions were combined depended on how an artist wanted to use it. Consequently, the Image Processor was set up as a series of stacked metal boxes that can be reconfigured with cables to perform sequences of functions on incoming signals.

Sandin wanted to make a device that not only would be easy to use but could be distributed relatively inexpensively. So he rejected the idea of marketing the device commercially, choosing instead to give the plans away to anyone who

Fig. 1 Dan Sandin and the Sandin Image Processor, University of Illinois at Chicago Circle, Chicago, Ill., 1978.

wished to make his or her own. After he completed the Image Processor in 1973, he began to document the inner workings of the machine with Phil Morton, an artist who had established the video program at the Art Institute of Chicago. Sandin and Morton spent more than a year redrawing the plans and making up a parts list for a kit that would be comprehensible to someone with only a rudimentary knowledge of electronics. Since then, at least twenty-five Sandin Image Processors have been built, mostly by artists, many of whom have been based at one time or another in Chicago.[13]

Whereas Dan Sandin thinks in terms of "habitable systems" designed to be easily used by artists, Ralph Hocking conceives of the equipment built under his auspices as "thinking machines." Despite the fact that Hocking's background is in art rather than science, he and Sandin have much in common. Both have been committed to the idea that artists should be able to work with video technology much the same way as a painter works with his or her materials in isolation in a studio. In this sense, they both adhere to very traditional models of artmaking.

Hocking, a cinema professor at the State University of New York at Binghamton, founded the Community Center for Television Production in 1970. The Center grew out of a video program he'd been running at the university since 1969. Hocking, a potter, sculptor, and photographer, became interested in video after meeting Paik in New York City at the Bonino Gallery Show in 1968. Shortly after his arrival in Binghamton, he began to buy video equipment, and set up a program called Student Experiments in Television.

At Paik's suggestion, Hocking applied to the New York State Council on the Arts, which was just starting to fund video, for money to set up a facility off campus. The Center, which got a whopping $50,000 grant the first year, had three functions: educating students at the university through internships; providing local individuals and community groups with access to equipment; and providing artists with a facility for experimentation. Paik was one of the first artists to use it.[14]

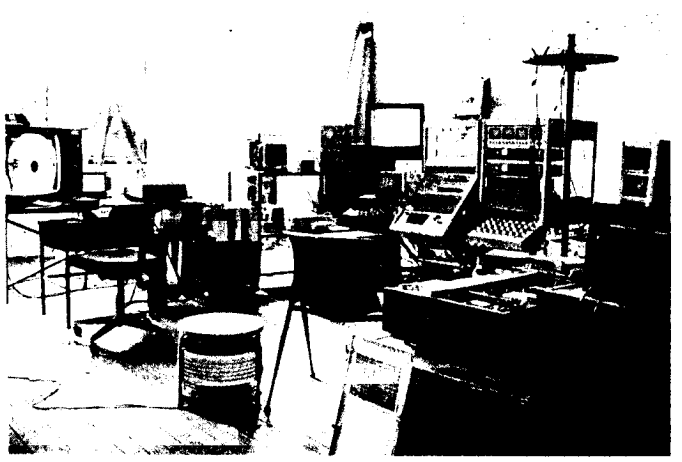
In the mid-seventies, as more community groups began to buy their own equipment, and because a student video facility was set up at the university, the Experimental Television Center, as it was now called, narrowed its focus. Hocking and Sherry Miller embarked on two related projects: research and development of low-cost specialized video-processing equipment and the establishment of artist-in-residencies. As a result, over the past fourteen years a number of people with electronics backgrounds have built various devices for the Center and for themselves, under the tutelage of the designer David Jones. Recently, more sophisticated digital machines have been incorporated that have expanded the system's imaging capabilities.[15]

The idea behind the development of the equipment was to have devices that could be connected in several ways so that different kinds of images could be created, manipulated, and combined. The system has thus been refined from a technically crude configuration that could not produce a recordable output to one that now produces a signal stable enough to conform to commercial technical standards.

Hocking's idea of "thinking" machines has to do with the way that Hocking and Miller intend people to use their equipment, as well as their conception of the artist. In contrast to commercial production facilities, there is no pressure to make a final product. At the Center ***(Figs. 2 and 3)*** artists can hole up for short periods of time and immerse themselves in their work. The process of experimentation is most important. Also in contrast to most film and video production, which is collective, production of tapes is seen as an isolated activity.

It is this conception of the artist and artmaking that has contributed most of the direction of image processing as a formalist enterprise. As Sherry Miller, Assistant Director of the Center, has described it:

> Electronic image processing uses as art-making material those properties inherent in the medium of video. Artists work at a fundamental level with various parame-



Figs. 2 and 3 The Experimental Television Center, Owego, New York

ters of the electronic signal, for example, frequency, amplitude, or phase, which actually define the resulting image and sound.[16]

Hocking and Miller are not alone in their support of technological experimentation with all the ensuing formalist implications. In fact, Woody and Steina Vasulka are probably the best-known practitioners of this kind of video. Since 1969, the Vasulkas' interest has been in understanding the inner workings of video as a kind of electronic phenomenon. As Woody Vasulka has stated: "There is a certain behavior of the electronic image that is unique. . . . It's liquid, it's shapeable, it's clay, it's an art material, it exists independently."[17] Video's plasticity was explored by many artists, but the Vasulkas took a fairly didactic and conceptual approach. They were fascinated by the fact that the video image is constructed from electrical energy organized as voltages and frequencies—a temporal event.

Initially, they selected two properties peculiar to video. The first had to do with the fact that both audio and video are composed of electronic wave forms. Since sound can be used to generate video, and vice versa, one of the first pieces of equipment they bought was an audio synthesizer. Many of their early tapes illustrate this relationship of sound and image—one type of signal determines the form of the other.

Their second interest entailed the construction of the video frame. Because timing pulses control the stability of the video raster to create the "normal" image we are accustomed to seeing, viewers rarely realize—unless the TV set breaks—that the video image is actually a frameless continuum.

Although the Vasulkas had initially focused on these two basic areas, they began to expand their repertoire of effects by commissioning various people to build specialized video equipment. Between 1971 and 1974 they made numerous tapes utilizing these tools in increasingly complex combinations ***(Fig. 4)***. These were the kinds of tapes that—with their colorful swirls of abstract imagery—were dismissed by many critics because they looked like a moving version of modern abstract painting, which was then becoming unfashionable. For the Vasulkas, however, their work was based on various manifestations of electromagnetic energy rather than on abstract art.

They began to think of these manifestations as a kind of language, and their work with video hardware as a "dialogue with the tool and the image, so we would not preconceive an image separately, make a conscious model of it, and then try to match it. We would rather make a tool and dialogue with it."[18] Throughout the 1970s, the Vasulkas produced an enormous body of work designed to reveal the inner workings of video. In 1976, the began work with Jeffrey Schier on a digital video system that would allow a computer to perform various operations on two video images by using mathematical logic functions. Depending on which logic function is operating, the numerical codes—and hence the images—can be combined in different but absolutely predictable ways. Such combinations revealed the system's inner structure and also constituted what Woody Vasulka called a "syntax."

> What was surprising to me was to find that the table of logic functions can be interpreted as a table of syntaxes. . . . Because the logic functions are abstract, they can be applied to anything. That means they become unified language, outside of any one discipline.[19]

What was important about this device was its capacity for performing various complex operations—zooming, multiplication of the image, keying, etc.—in "real time." This made it possible for a video signal to be digitally processed as it passed through the device—practically instantaneously—in contrast to the kind of computer imaging in which a program is entered and one must wait minutes, or hours, depending on the program's complexity, for the computer to perform the operation.

The work of these members of the first generation of video artists differed quite markedly from the slick "special effects" of the industry. The equipment they built, the facilities established, and work produced have served both as models and points of departure for those who came afterward.

Notes

This article is adapted from two articles originally published in *Afterimage* in 1983. Since they were written, owing to a number of factors, more artists routinely use image-processing techniques, resulting in tapes than can only be loosely defined as "image processing." Less descriptive, the term has become virtually obsolete. Some of the ramifications of these developments are elaborated in "Getting High Tech: The 'New' Television," *The Independent*, Vol. 8, No. 2 (March 1985), pp. 14–16.

1 Quoted in Lucinda Furlong, "Notes toward a History of Image-Processed Video: Eric Siegel, Stephen Beck, Dan Sandin, Steve Rutt, Bill and Louise Etra," *Afterimage*, Vol. 11, Nos. 1 & 2 (Summer 1983), p. 35. Although the various groups and individuals considered themselves part of one "movement," their goals proved to be quite contradictory in practice. In New York, the differences began to rigidify when the New York State Council on the Arts (NYSCA) started funding video in 1970–71, and applicants felt compelled to formalize their interests. Because the Council could not then (and cannot now) award funds directly to individuals, there was a scramble to form nonprofit organizations in order to benefit from available funding.

2 Johanna Gill, *Video: State of the Art*, New York, Rockefeller Foundation, 1976, quoted in ibid.

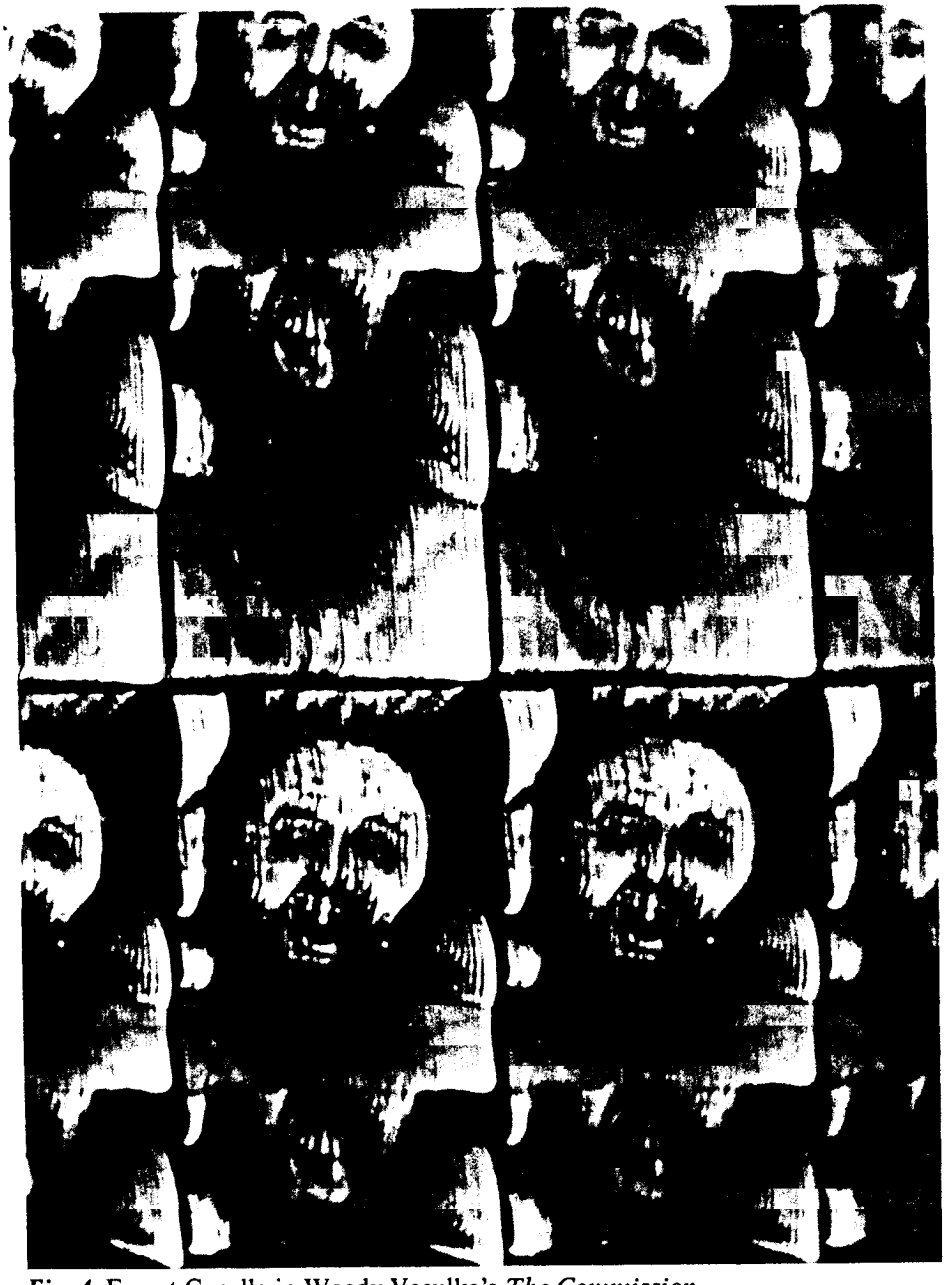


Fig. 4 Ernest Gusella in Woody Vasulka's *The Commission*

3 From inside cover of *Radical Software*, No. 1 (1970), quoted in ibid.

4 Juan Downey, "Technology and Beyond," *Radical Software*, Vol 2, No 5 (1973), p. 2, quoted in ibid.

5 In 1967, A. Michael Noll, a pioneer in computer imaging at Bell Labs, proposed one way this synthesis might occur: "the artist's emotional state might conceivably be determined by computer processing of physical and electrical signals from the artist (for example, pulse rate, and electrical activity of the brain). Then, by changing the artist's environment through such external stimuli as sound, color and visual patterns, the computer would seek to optimize the aesthetic effect of all these stimuli according to some specified criterion." See: "The Digital Computer as a Creative Medium." *IEEE Spectrum* (October 1967), p. 94.

6 David Bienstock, program notes for "A Special Videotape Show," Whitney Museum of American Art, 1971. Quoted in Lucinda Furlong, "Notes toward a History of Image-Processed Video: Woody and Steina Vasulka," *Afterimage*, Vol. 11, No. 5 (December 1983), p. 12.

7 Robert Pincus-Witten, "Panel Remarks," in *The New Television*, ed. Douglas Davis and Allison Simmons, Cambridge, Mass., The MIT Press, 1977, p. 70, quoted in Furlong (cited n. 1).

8 Quoted in Furlong (cited n. 6). Vasulka is referring to people like Eric Siegel, Stephen Beck, Bill Hearn, Steve Rutt, Bill Etra, George Brown, Shuya Abe, Dan Sandin, Don MacArthur, and younger people like David Jones, Richard Brewster, Jeffrey Schier, and Ed Tannenbaum—all of whom have designed or built electronic imaging devices for artists.

9 See: Martha Gever, "Pomp and Circumstances: The Coronation of Nan June Paik," *Afterimage*, Vol. 10, No. 3 (October 1983).

10 Ken Marsh, *Independent Video*, New York, 1973, p. 129.

11 Joint statement by Dan Sandin, Bob Snyder, and Tom DeFanti, quoted in Diane Kirkpatrick, "Chicago: The City and Its Artists: 1945–1978," exh. cat., Ann Arbor, University of Michigan, 1978, p. 38.

12 Sandin got involved in video in 1970 during the student protests that resulted from the Kent State killings. Because the art department was one of the few not to shut down, it became the student "mediahouse." Sandin was among those who videotaped political meetings which were shown live over closed-circuit TV.

13 The capabilities of the image processor were further enhanced when Tom DeFanti, a computer scientist who had developed Z-Grass—a user-friendly (i.e., the computer graphics language is greatly simplified), interactive, computer graphics system with a video output—joined Sandin at the Circle Campus. Together they set up the Circle Graphics Habitat—a facility in which students could interface Sandin's processor with DeFanti's system. The computer could be used not only as a controller but as a generator of images that could be fed into the processor.

14 If Paik inspired Hocking to establish the Center, Hocking did much for Paik. When Shuya Abe was building the Paik-Abe Video Synthesizer at PBS station WGBH, Hocking made several trips to Boston with equipment. Hocking also built Paik's *Video Cello* and *Video Bed*, the latter piece conceived by Sherry Miller. Hocking's role in these projects has never been cited in any of the massive historical material published on Paik.

15 Over the past three years, Jones has developed printed circuit boards that can perform a variety of image-processing functions. These boards can be interfaced with any 64K personal computer. The project, funded by the New York State Council on the Arts, is intended to provide artists with the means of setting up their own studios.

16 Quoted in Furlong (cited n. 6).

17 Ibid.

18 Ibid.

19 Ibid.

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