PART FIVE:
TELEVISION AS A CREATIVE MEDIUM

"Art has operated in the gap between what we know and what we dream. The gap is closing quickly: what we dream is often what we see. Television will serve to bridge the gap and to guide the way toward a more successful environment. The eyes replace the me's and we arrive at a condition where what we show becomes what we say."

EDWIN SCHLOSSBERG

On July 20, 1969, approximately 400 million world people watched the same Warhol movie at the same time. As iconographic imagery goes there's no appreciable difference between four hours of *Empire* and four hours of *LM.* There even were similar hallucinations of redundancy in our sustained hot cognition of NASA's primary structure. The bit-capacity of that Minimal hard-edge picture plane without gray scale was really amazing. We were getting a lot of information in dragtime across space-time. And they called it *Tranquillity.*

The first moon landing was the first global holiday in history. They even mounted the camera at an Orson Welles heroic low angle to catch Beautiful Buzz Armstrong the Archetypal Spaceman coming down the ladder to recite his historical speech: ". . . one giant step for mankind." But few commentators remarked, then or later, that mankind hadn't moved an inch. No one said how really convenient it was to sit there in your home, looking directly at the moon dust, listening simultaneously to four or five conversations separated by a quarter-million miles, getting metabolic information about the Buzz Armstrongs in a closed-circuit loop that extended humanity's total brain-eye out around the moon and back. Who needs telepathy?

The growth of television has been phenomenal. In 1948 approximately 200,000 American homes had television sets and 15 television stations were broadcasting regularly. In 1958 there were 520 stations broadcasting to sets in 42 million homes. Today there are tens of thousands of broadcasters, and approximately 100

million homes have television sets. There are 14 million color sets alone in this country. In fact, there are more television sets in American homes today than telephones, bathtubs, or refrigerators. Television antennas bristle from the rooftops of ghetto shacks that don't even have plumbing. An estimated quarter-billion television receivers are in use around the world. Yet, because of political sovereignties and profit-motive selfishness, more than one-third of humanity is illiterate.

Television, like the computer, is a sleeping giant. But those who are beginning to use it in revolutionary new ways are very much awake. The first generation of television babies has reached maturity having watched an average of 15,000 hours of television while completing only 10,000 hours of formal education through high school. Yet television itself still has not left the breast of commercial sponsorship. Just as cinema has imitated theatre for seventy years, television has imitated cinema imitating theatre for twenty-five years. But the new generation with its transnational interplanetary video consciousness will not tolerate the miniaturized vaudeville that is television as presently employed.

At London's Slade School, the German-born video artist Lutz Becker observes: "This purely electronic medium with its completely abstract rules does not have its own art form which should develop within the scope of new technologies and their almost chaotic wealth of possibilities. A new art form is not only the result of new technologies, but also the result of new thinking and the discovery of new orders."

But no new orders are to be found in the economic society's use of the medium it created. "A country that is chiefly interested in turning out consumers and producers," wrote Robert M. Hutchins, "is not likely to be much concerned with setting minds free; for the connection between selling, manufacturing, and free minds cannot be established. Such a country will transform new opportunities for education into means of turning out producers and consumers. This has been the fate of television in the United States. It could have been used for educational purposes, but not in a commercial culture. The use of television, as it was employed in the United States in the 1960's, can be put in its proper light by supposing that Guten-

berg's great invention had been directed almost entirely to the publication of comic books."[1]

A major portion of America's creative energy is siphoned off into television's exploitation of the profit motive: "Few messages are as carefully designed and as clearly communicated as the thirty-second television commerical... Few teachers spend in their entire careers as much time or thought on preparing their classes as is invested in the many months of writing, drawing, acting, filming, and editing of one thirty-second television commercial."[2]

[1] Robert M. Hutchins, *The Learning Society* (New York: Praeger, 1968), p. 127.
[2] Peter F. Drucker quoted in: Gerald O'Grady, "The Preparation of Teachers of Media," *Journal of Aesthetic Education* (July, 1969).

The Videosphere

I have found the term "videosphere" valuable as a conceptual tool to indicate the vast scope and influence of television on a global scale in many simultaneous fields of sense-extension. Like the computer, television is a powerful extension of man's central nervous system. Just as the human nervous system is the analogue of the brain, television in symbiosis with the computer becomes the analogue of the total brain of world man. It extends our vision to the farthest star and the bottom of the sea. It allows us to see ourselves and, through fiber optics, to see inside ourselves. The videosphere transcends telepathy.

Broadcasters now speak of "narrowcasting," "deepcasting," "minicasting," and other terms to indicate the increasing decentralization and fragmentation of the videosphere: regular Very High Frequency programming (VHF); Ultra High Frequency special-interest programming such as educational television or foreign-language stations (UHF); Community Antenna Television (CATV); Closed-Circuit Television (CCTV); Videotape Recording (VTR); Videotape Cartridges (VTC); Electronic Video Recording (EVR); Satellite Television (COMSAT, INTELSAT)—all of which amount to a synergetic nonspherical metaphysical technology that drastically alters the nature of communication on earth.

Although the emphasis now is on the EVR cartridge and videotape cassette as being revolutionary developments in communication, the more likely possibility is that CATV and the videophone will provide unparalleled freedom for the artist as well as the citizen. In addition to regular broadcast programming, CATV operators may establish subscription systems through which customers might receive as many as eighty channels of color programming not available to the VHF or UHF audience. Much of this programming obviously will constitute the kind of personal aesthetic work to be discussed in this ook. CATV subscribers may lease receivers with high-resolution

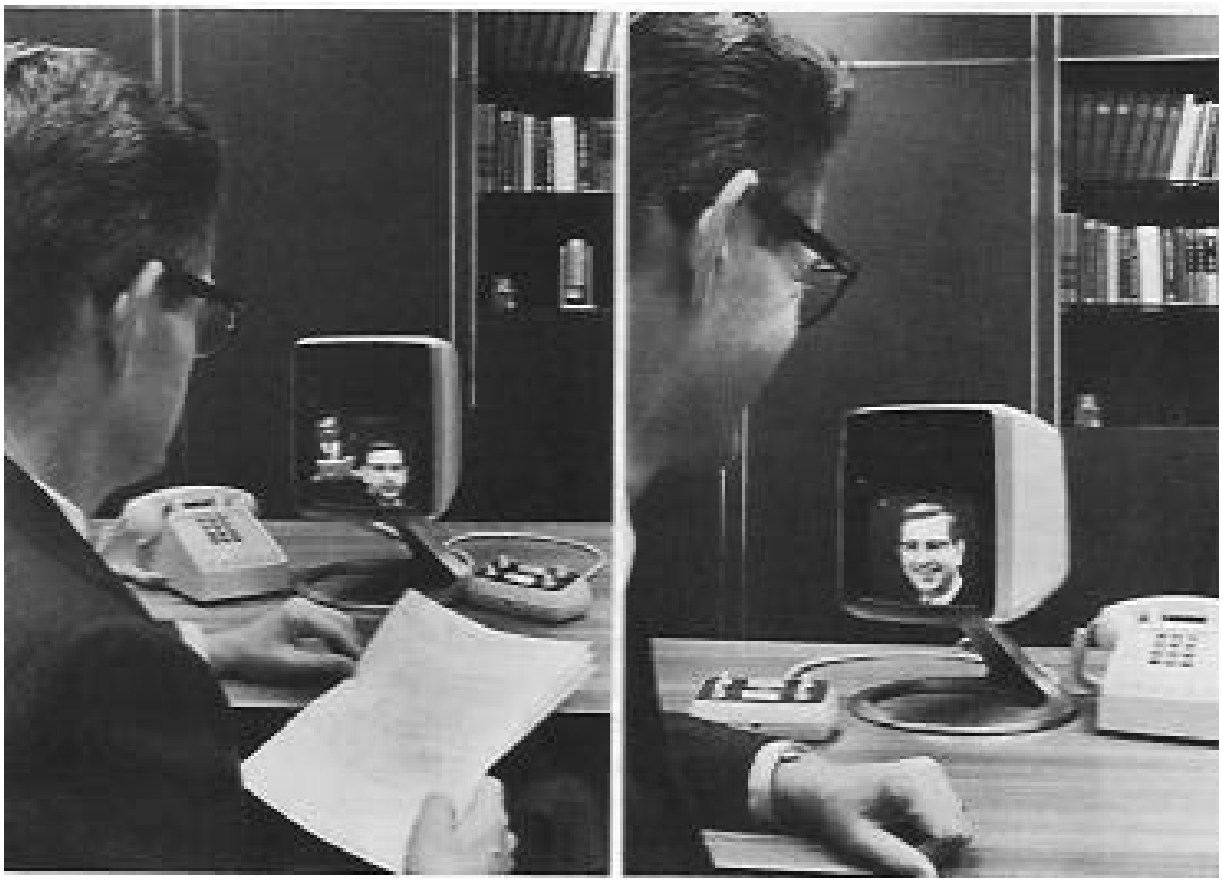
1,000-scan-line pictures, compared with broadcast TV's 525 scan-lines.[3] In addition to providing videofax newspapers, magazines, and books, CATV will allow "visits" to friends, shops, banks, and doctors' offices without ever leaving the comfort of one's home. CATV systems are now being developed to transmit programs to home VTRs while a family is sleeping or away from the house, to be replayed later.

It is estimated that ninety percent of American homes will be wired for CATV by 1980, primarily because "demand TV" or "telecommand" systems are expected by about 1978. By this process one will telephone regional video-library switchboards, ordering programs from among thousands listed in catalogues. The programs will be transmitted immediately by cable, and of course could be stored in the home VTR if repeated viewings are desired. The videophone will be included in a central home communications console that will incorporate various modes of digital audio-visual and Xerographic storage and retrieval systems. New developments in videotape recording will be crucial in this area.

There are two key phases in information storage: recording and retrieval. Retrieval is perhaps more important than recording, at least at this early stage. Retrieval systems are more difficult to perfect than recording devices. Nam June Paik has illustrated this problem with the difference between the English alphabet and Chinese characters. "Retrieval is much quicker with Chinese characters," he explains. "You can record (write) quicker in English but you can retrieve (read) quicker in Chinese. One is retrieval-oriented, the other is recording-oriented—but you read more than you write." Thus it is quite likely that video-computer systems will be available for home use with one-inch videotape, half devoted to video information, half to digital storage codes.

After some twenty-five years of public television, we are just now developing a sense of global unity that is destined to affect directly the life of each individual before this decade is past. We have seen that technology already is fragmenting and decentralizing broadcast

[3] Electron beams in camera-tubes and picture-tubes scan the screen in 525 horizontal lines from top to bottom. This is standard in the United States. Associated with this is what are called "lines of resolution." Since microwave broadcasting tends to dissipate the coherence of a signal, it is composed of only approximately 320 lines of resolution by the time it reaches home receivers.



The Picturephone: "A completely new video environment and life-style." Photo: Bell Telephone Laboratories.

television. Soon entertainment and localized functions of the video-sphere will be handled by CATV and videotape cartridges, leaving broadcast television free to perform vital new tasks. Large communi-cations conglomerates such as RCA, CBS, ABC, CBC, BBC, Euro-vision, Bell Telephone, AT&T, and COMSAT are now planning net-works of planet analysis that will result in television as a constant source of global metabolic and homeostatic information.

Direct satellite-to-home television has been technically feasible for some time. Scientists at Bell Telephone and COMSAT anticipate fifty domestic communications satellites in orbit by 1977. The total system will be capable of 100,000,000 voice channels and 100,000 television channels.[4] Hughes Aircraft engineers estimate that within the decade individual roof-

[4] *Videa 1000 Newsletter*, Vol. 3, No. 3 (New York: Videa International, January, 1969).

top antennas will pick up twenty-five to thirty channels from "local" satellites in addition to whatever video information the home may be receiving from CATV and videotape cartridges.[5]

Existing satellites now deliver photographs and video images with such high resolution that "COMSAT typesetting" is possible. A CBS satellite system employed by the military to flash reconnaissance photos from Vietnam to Washington reportedly resulted in color qualities "as good or better than *National Geographic."* In 1969, RCA engineers began work on video cameras and receivers capable of 10,000- and possibly 12,000-scan-line resolution. Also in that year, RCA officials proposed that NASA's TIROS M meteorological satellite could be converted into an "earth resources" vehicle to help overcome food shortages and combat pollution problems. Equipped with special high-resolution 5,000-scan-line cameras in a 500-mile orbit, the satellite would yield picture resolution equivalent to 100 feet above ground. Higher resolution would be possible, officials announced, but some countries would complain of "invasion of privacy.

On the receiving end, the next few years will see the development of transistorized sets with 500-hour rechargeable batteries; TV sets that can screen 16mm. movies through the color cathode tube by using built-in telecine systems; so-called spectral color 3-D television without Polaroid glasses; four-by-six-foot cathode tubes only one foot thick; self-correcting color receivers that will correct even broadcast errors; one-gun color sets that will eliminate three-gun registration problems; stereo TV; new color TV projection systems that will project six-foot color images with brightness and registration equal to studio monitor equipment; two-dimensional laser color TV; tubeless TV cameras smaller than a man's hand, coupled with TV receiving tubes the size of a quarter. And it is estimated that the flat wall-size plasma crystal screen will be distributed commercially by 1978.

Individual personal expression through videotape has begun only recently, and the artist who works with videotape as his own personal medium of expression is still quite rare. However, new developments in small inexpensive portable videotape recording systems will completely revolutionize this mode of artistic freedom.

[5] *Ibid.*

As early as 1968 several firms demonstrated prototype low-cost home VTR systems in the thousand dollar price range. It is expected that by 1973 one will be able to purchase a color TV camera, color VTR unit, and color display console for less than $1,000. By comparison, similar equipment in 1970 ranged from $11,000 (Sony) to $50,000 (Ampex).

However, within the next few years we'll witness the growth of video cartridges and cassettes into a market greater than that presently enjoyed by books and records. The potentials are so impressive that Jean-Luc Godard, possibly in a moment of passion, once vowed to abandon his feature-film career to make "instant newsreels" via portable videotape equipment. The first serious competitor to Columbia's EVR system will be Sony's videotape cassettes for home VTRs, to be marketed by 1973. At approximately the same time RCA will introduce its "SelectaVision" unit, which will play pre-recorded tapes through any TV set using a safe low-power laser beam and special scratch-proof vinyl tape. Virtually all video hardware manufacturers are developing their own versions of the videotape cartridge storage-and-retrieval system.

Meanwhile a whole new area of feature film cartridge projection systems has developed to compete with the video cassette market. Kodak, Bell & Howell, Fairchild, and Technicolor have demonstrated cartridge projection systems for home viewing. Zeiss-Ikon has developed a compact textbook-size cartridge projector for 300-foot cassettes of 70mm. film divided into twelve separate image tracks to produce two hours of color sound movies in stop-motion, slow motion, and reverse, using a capstan drive instead of sprockets.

It is now obvious that we are entering a completely new video environment and image-exchange life-style. The videosphere will alter the minds of men and the architecture of their dwellings. "There's a whole new story to be told," says video artist Scott Bartlett, "thanks to the new techniques. We must find out what we have to say because of our new technologies."

Cathode-Ray Tube Videotronics

The underlying principle in creative use of videotronic hardware might be called "video synthesizing," just as we speak of sound synthesizing in the Moog process. There are no special restrictions inherent in the video signal as opposed to the audio signal. Anything that can be done with sound can be done with video if the proper hardware is available. The basic ingredient of alternating current is identical in both processes, and represents potential for as many variations as the equipment will allow. Just as the new filmmaker seeks to synthesize all the elements of his technology, so the video artist attempts to synthesize the possibilities of his medium in the creation of electron synaesthetics.

Since present television studio equipment was not made for the purpose of aesthetic experimentation, artists have been forced to work within parameters that amount to video imitation of cinematic techniques: electronic equivalents of cinematic wipes, fades, superimpositions, and traveling mattes. There are, however, certain advantages in working with video systems to achieve variations of these effects quite unlike their cinematic counterparts, and with considerably less expenditure of time and effort.

The Television Camera

In standard photography a photosensitive emulsion on a strip of acetate is exposed to lens-focused rays of light that form an image in the emulsion. A similar principle is involved in television except that the image is translated into coded electronic-signal information and is then "erased" to make way for another image. Inside every TV camera, instead of film, is a photoconductive camera tube. These tubes are called variously Image Orthicon, Vidicon, Staticon, and Plumbicon, depending on the chemical makeup of the tube's photosensitive surface, which is called the photocathode screen. For many years the Image Orthicon was the standard camera tube. Recently, however, the Plumbicon, whose photosensitive surface is composed of lead oxide, has become the popular camera tube.

According to how much light is focused onto the surface of the

photocathode screen, each tiny photosensitive element becomes electrically charged, building up a "charge pattern" across the screen proportional to the lights and darks of the televised scene. This charge pattern is swept across, or "read," by a beam of electrons emitted from a cathode gun in the camera tube. The beam neutralizes each picture element on the photocathode screen as it sweeps across, producing a varying electric current that corresponds to the pattern of light and shade in the televised scene.

As each photoconductive element on the screen is scanned by the electron beam and relinquishes its information, it is said to be "wiped clean" and can therefore respond to any new light image it may receive through the camera lens. This charge-forming and systematic "reading" is a rapid, continuous process with the entire photocathode screen being charged, scanned, and recharged thirty times per second to produce a constant scan-line pattern of 525 lines resolution, the standard in the United States.[6]

The Television Receiver

The video picture signal thus produced is subsequently amplified and cabled through a video switcher/mixer console in the studio control room where it is transformed back into a picture on monitors that operate like home television receivers. Cathode-ray tubes in television receivers are called "kinescopes." In them, a cathode gun like the one in the camera tube sprays the phosphor-coated screen with a beam of electrons synchronized with the exploratory beam in the studio camera. The phosphor coating glows in the path of the beam as it scans the picture tube. Horizontal and vertical "sync pulses" keep the two beams in step.

A beam of constant strength would produce a white rectangle of fine horizontal lines, which is called a "raster" and is the basic field of the picture. But if the beam's strength is varied, the trace-point brightness is varied also. When the video signal is made to regulate the picture tube's beam, a pattern of light and shade can be built up on the screen's phosphor corresponding to the distribution of lights and darks focused through the camera lens—thus a duplication of

[6] Gerald Millerson, *The Technique of Television Production* (New York: Hastings House, 1961) and Howard A. Chinn, *Television Broadcasting* (New York: McGraw-Hill, 1953).

the televised scene. This picture fades and is continually replenished by the rapidly-scanning beam so that we see a clear, complete image. In relatively low-resolution systems such as the 525-line U.S. standard, a so-called rolling effect of the scan-lines can be detected on the picture tube. In high-resolution systems of 1,000 to 5,000 lines, however, the resulting image is unflickering and extremely clear.

The same principles are involved in color television except that four camera tubes are incorporated inside each camera: one each for the basic colors red, blue, and green, and one black-and-white tube for use in aligning and resolving the three colors. In color television receivers, three cathode guns instead of one are used to scan the phosphor screen, electronically "mixing" the palette according to the distribution of hues in the televised scene.

De-Beaming

The electron beam scanning the photocathode screen in the television camera requires a certain strength, a certain amount of electric current, in order to reproduce the image completely with sharp definition and contrast. Controls on the camera called "gain control clippers" are provided to assure that the beam is receiving proper energy to reproduce the image. By deliberately starving the electron beam of its required current, highlight details are washed out of the picture, causing the image to be retained or smeared in the camera tube. Any motion occurring in the brighter areas of the televised scene will produce a lingering smear of the image similar to the phenomenon of retinal persistence in human vision, but slower and longer lasting. Accidental beam-starving often is noticeable in musical programs when brass instruments develop flaring jelly-like trails as they move. Deliberately causing and exaggerating this effect is known as "de-beaming" or "rolling off the beam."

In color television, beam energies can be controlled in any of the three primary color tubes inside the camera simultaneously or separately. This means that the smear will be in one or all of the three colors and their combinations. Thus a human face or figure can be made to have brightly-colored outlines or ghost images that seem to stick to the screen as the figure moves. In addition, the three color tubes can be deliberately de-aligned from the coordinating black-and-white tube, producing three separate color

images moving together in time but spatially differentiated, as sometimes occurs accidentally in offset color lithography.

Keying and Chroma-Keying

The video equivalent of cinematic matting is called "keying." As in cinematography, the purpose is to cause one image to be inserted into another image so that the background image is effectively obscured by the insertion. Cinematic matting is mechanical whereas video keying is electronic. There are two basic methods of keying: "inlay keyed insertion" (static mattes and wipes), and "overlay keyed insertion" (traveling mattes). Inlay keying involves a picture tube displaying a plain white raster on its screen, which is seen through a transparent masking plate (or "cel") by a lens focused onto a photo-tube that triggers a switching circuit. We select part of Camera One's picture to be matted out and make an opaque mask (cardboard, etc.) to cover the corresponding area on the cel over the inlay tube's raster. The switching circuit automatically blanks out that area in Camera One's picture, allowing the rest to show through wherever the circuit "sees" the inlay tube's raster. Camera Two's picture is automatically inserted into the matted area. Numerous wipes are possible simply by moving a mask over the inlay tube's raster. These wipe masks may be manually or electronically operated. Or they can be photographed on motion-picture film, which is then run through a telecine projector whose video signal triggers the switching circuit.

In overlay (traveling matte) keying, the switching circuit senses the scale of grays in a televised scene. Clipper controls on Camera One are adjusted to select the particular gray-scale level at which a keyed insertion from Camera Two is desired. This level of luminosity is known as the "switching tone." If a white switching tone is selected, Camera Two's picture will be inserted into Camera One's picture wherever the circuit "sees" the switching tone or a lighter one. If a dark tone is selected, the insertion will be made wherever the circuit "sees" that tone or a darker one. The shape of the insertion is determined by the shape of the switching tone areas in the scene. There must be a marked tonal difference between the inserted subject and its surroundings for the switching circuit to operate effectively. For example: Camera One shoots a dancer in

black leotards against a white backdrop; Camera Two shoots a striped pattern. If a white switching tone is used, the dancer will be seen against a striped background. If a black tone is used, the dancer's body will be filled with stripes and the background will remain white.

Ordinary use of keying as described here usually results in the same sort of unconvincing, tacky visual effects as are generally produced by traveling mattes in movies: that is, a scene in which two images are trying unsuccessfully to be one. The problem lies in general insistence on "clean" mattes. Tonal differences of at least fifty percent on the gray scale must exist between the subject and surroundings, otherwise the switching circuit reaches points where it cannot distinguish between forms. This results in image-breakthrough and ragged "fringing" of matted edges, destroying the desired illusion of "objectivity." In synaesthetic videographics, however, keying is employed purely for its graphic potential in design information. Since there's no attempt to create the illusion of a "foreground" figure being inserted into a "background" field, image-breakthrough and edge-fringing are no longer a problem. In fact, they are deliberately induced through a technique called "tearing the key."

If there is no second video source, all areas of a scene above a white switching-tone turn black and all areas below a black tone turn white. If the scene contains a wide range of gray-scale tones with little contrast a great deal of image-breakthrough and edge-fringing will occur to the point where one cannot distinguish between the two. Electronic metamorphosis has occurred. If the scene is a medium close-up of faces in low contrast and a white tone is used, all facial highlights will turn black while all lower gray-scale values will remain normal. If a black tone is used, facial shadows will flash white while lighter values reproduce normally.

If the clipper, or sensor of the gray-scale level, is adjusted up and down the scale instead of being left at one level, the result is a constantly "bleeding" or randomly flaking and tearing image. This is called "tearing the key." In the scene just described, this would result in a constant reversal of dark and light tones and a general disintegration and reappearance of the image. If a second video source is used, which happens to be the same image we're seeing,

except through another camera, the result is a bizarre solarization effect of flashing outlines and surfaces, or a composite in which an image appears to be inside of itself.

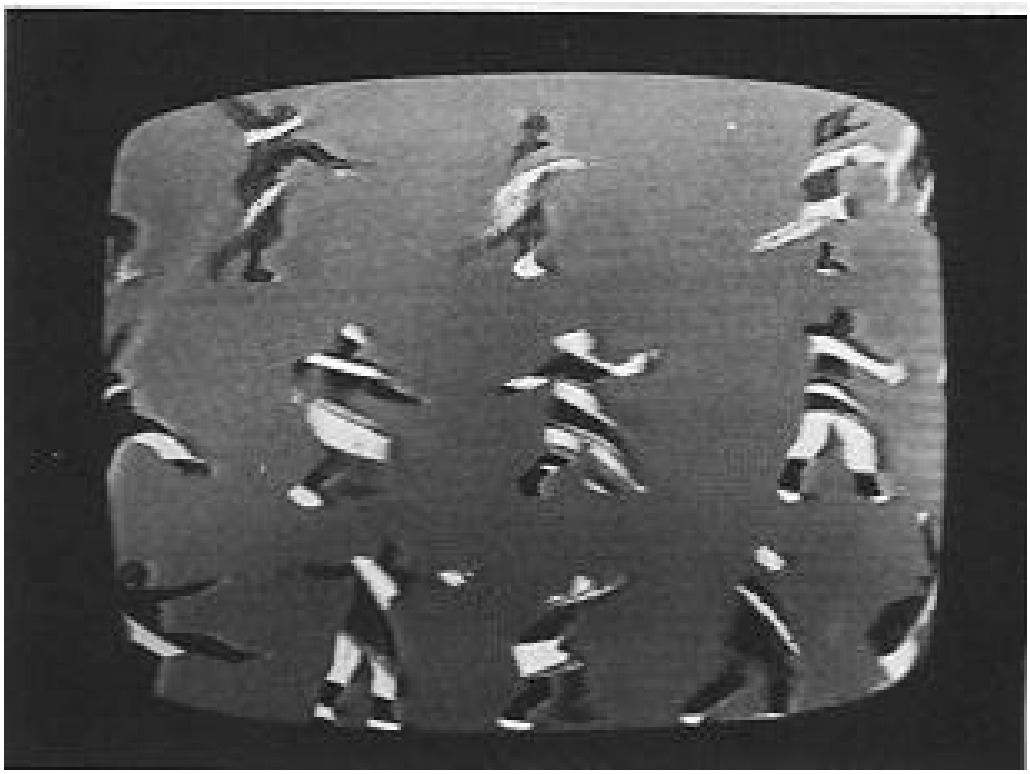
Gray-scale keying is possible also in color television, flaring and intermixing colors based on their gray-scale luminosity. However, Chroma-Key, although limited in some ways, provides certain advantages in color video work. Chroma-Key does not sense gray-scale luminosity but rather color hues. Any combination of the red, blue, and green primary tubes can be selected as the keying hue. Whenever a background is a particular hue, it will be keyed out and a second video source will be inserted. Any combination of colors in the spectrum can be used, but blue is normally employed because it is most opposite to skin tones and therefore provides the widest margin for "clean" mattes. If a blue-eyed girl is in front of a blue background and the Chroma-Key is set for blue, "holes" will appear in her eyes into which any other video source—including another image of herself—can be inserted.

In July, 1968, WCBS-TV in New York featured the Alwin Nikolais Dance Company as part of its Repertoire Workshop series. The dance composition, *Limbo,* was designed especially for Chroma-Key effects and thus provides an excellent example of a certain approach to this technique. In one scene of *Limbo* a man is threatened by disembodied hands and arms. He is tossed aloft by them and, according to the program description, "all of life's little problems are thrown at him." To achieve this effect the principal dancer and the chorus were positioned in front of a blue backdrop, all on the same camera. The chorus members were dressed completely in blue except for their hands and arms. Using a blue Chroma-Key, this meant that wherever there was blue in the picture, the background camera shooting smoke would show through. Thus the hands and the principal dancer appeared to be floating through smoke clouds. At one point, the hands appeared to pull confetti and streamers out of nowhere and throw them in the air. The colored confetti was concealed with blue confetti covering the top of the pile. It was invisible until it was pulled out in the open.

In another segment, serial rows of running dancers were suspended in green space. The inside of the dancers' bodies was a

Chroma-Key video matting makes arms of Alwin Nikolais dancers seem to float in space. Photo: WCBS-TV.

series of wavy stripes that moved from right to left to accentuate the effect of motion. Two cameras and three videotape recorders were used. In this way, three separate "takes" of one row of dancers were combined in the final image. On take 1 the camera framed the dancers at the top of the screen. The dancers were placed against a large blue canvas backdrop that curved down to the floor, permitting even lighting so that the dancers' full figures could be matted. The background was a green slide that appeared wherever there was blue in the picture. The outlines of the dancers cut the "hole" in the matted green slide, and these "holes" were filled by another camera shooting a revolving drum with painted stripes on it. This was recorded on videotape 1 (VT-1). This was played back to the studio where a wipe was used to combine the first level of dancers on tape with a second level of dancers now being framed live in the center of the camera. The resulting composite of two rows of striped dancers was then recorded on VT-2. This was played back to be combined

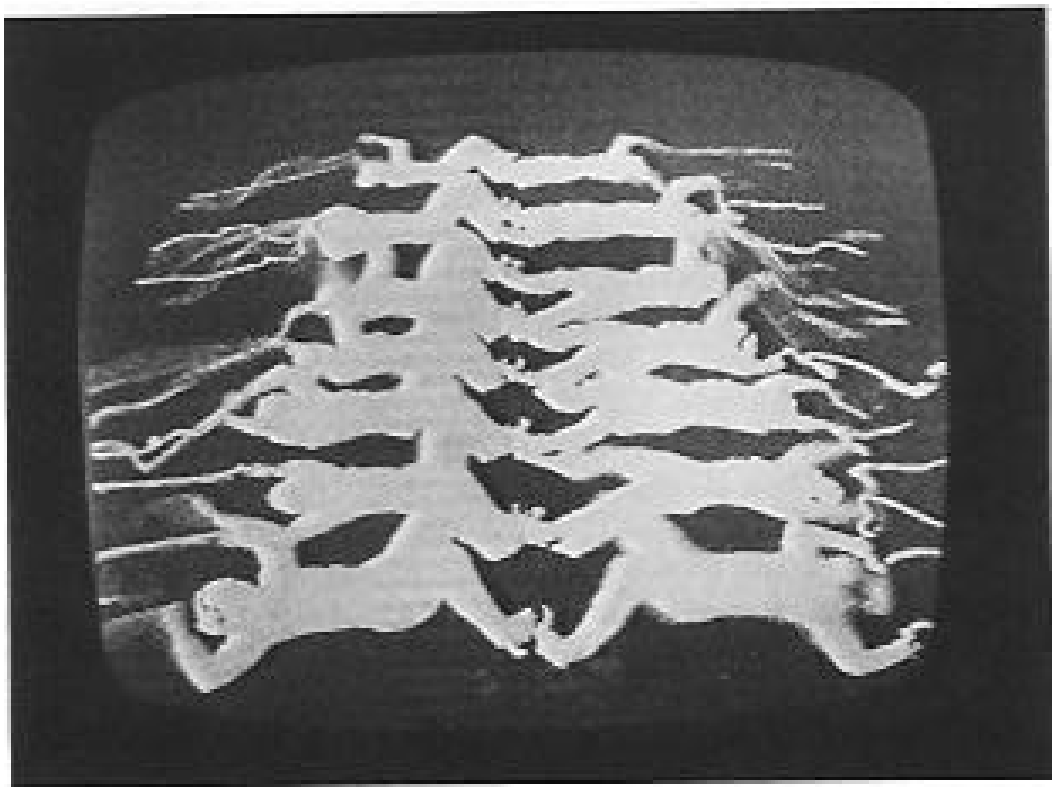


Two cameras and three VTRs were
used to suspend candy-striped dancers
in green space. Photo: WCBS-TV.

with the third level of dancers using the same process. The total effect was recorded on VT-3.

In another vignette the dancers were to represent the torments of everyday living, from crawling sensations to jangling nerves. The final effect was of two lines of dancers, toe to toe, lying side by side on clouds and water, holding long tapes above their head to represent nerve endings. The outlines of bodies and tapes were filled with red. The segment was done in two takes. The first take was tape-recorded with the dancers lined up on the right side of the screen. On the second take, the dancers moved to the left side of the screen. The tape was played back and combined with the live action using a vertical wipe. Later this effect, plus goldfish and crawling ants, was inserted inside the body of the principal dancer.[7]

[7] Technical descriptions of the *Limbo* program were provided by Herb Gardener, WCBS-TV Studio Operations Engineer, in *How We Did It,* a publication of the WCBS-TV Repertoire Workshop, New York.



Two VTRs were wiped together in this composite scene from the *Limbo* program. Photo: WCBS-TV.

While demonstrating the nature of Chroma-Key, these examples also clearly show how a purely electronic medium with an unexplored range of possibilities has been used to imitate the older discipline of cinema, and to express an archaic intelligence that insists upon "objectivity" and linear development in graphic forms. The rigid adherence to "clean" matting implies disdain toward what is obviously the unique property of video keying: "metamorphosis," not overlay or insertion. The new consciousness seeks the transformation of realities whereas the old consciousness ventures no further than a timid juxtaposition of "objective" realities that retain their traditional identity. The fact is that there exists no cinematic equivalent of video keying. Tearing a key in grays or colors produces graphic designs of unique character, blending form and color in a manner virtually impossible in any other medium. Video keying is inherently synaesthetic; such a claim can be made for no other aesthetic medium.

Feedback

If a microphone is placed too close to its amplifier it squeals. If a television camera is positioned too close to its monitor it squeals also, but it squeals visually. This visual noise, like audio noise, is called "feedback." Video feedback may be intentionally induced and carefully controlled to produce graphic effects possible only through this technique. The most common effect is the infinitely-repeated image similar to the infinity effect of fun house mirror chambers. This can be done with one, two, or three cameras shooting into the same monitor that displays their output. One or two cameras can shoot into a monitor that displays their output in addition to an image from a third camera. There are a number of combinations based on the principle of the squealing camera.

Telecine Projection

Because it is the video equivalent of a cinematic optical printer, the "telecine projector," commonly known as the "film chain," plays an important role in the production of synaesthetic videotapes or videographic films. It is a device that projects slides or films directly into television cameras whose signals are sent through a switching/mixing console and then are broadcast or videotaped. Telecine movie projectors are modified to project at the video rate of 30 fps instead of the cinematic rate of 24 fps. (A video "frame" is the amount of signal information produced in the thirtieth of a second required for the camera-tube electron beam to scan the photo-cathode screen one time.)

Since certain limitations are inherent in the physical and technical characteristics of a live studio setup, the film chain offers many advantages in the production of videographics where image control and graphic integrity are extremely important. The video signal from a film chain is "live" in the sense that a slide or movie is being re-recorded live. Thus it is possible to televise scenes that have been prestylized and could not exist live in front of a studio camera. These may then be combined on videotape with normal studio scenes.

Most film-chain cameras employ Vidicon tubes, which can be controlled just the same as studio floor cameras. In fact, film-chain

vidicons often are more flexible to work with, since studio cameras are fine-tuned and one frequently is forbidden to alter their adjustments. De-beaming and keying film-chain cameras produces a very different effect, a more subtle effect than the same techniques in live studio cameras, for the simple reason that film loops can be fed through the system. Film loops allow one to rehearse, as it were, the precise moments at which a certain effect is desired. Endless takes can be made with the same image, an advantage not possible in studio situations. For tape-mixing purposes, monitors show which film-chain images are upcoming, and several film chains can be synchronized for mixing onto one tape.

Slightly different procedures are involved in using film chains for the production of videotapes as opposed to videographic films. The primary difference is in the ability to manipulate colors. In film-making, the usual procedure is as follows: Original footage is shot on 16mm. or 35mm. high-contrast stock from which a workprint is made. This print may then be edited in the usual fashion or fed directly into a video system through the film chain. High-contrast stock is used to overcome the image-breakdown effect of video scan-lines, and to retain image quality as much as possible through the three separate stages of videographic filmmaking: original footage, videotape, and kinescope (videotape images recorded on movie film). This process would tend to obliterate the subtle shadings of slower, more sensitive film stocks.

Once the high-contrast work print is formed into loops and fitted into the film chain, it can be processed through the video mixing/switching system, augmented by de-beaming, keying, wipes, and compounded with other video sources, either live-action, tapes, films, or slides. The final master tape may be edited before a kinescope is made. Assuming that the imagery has already undergone three edits—first as original footage, then in film-chain mixing, then as a master tape—a fourth edit may be performed on the kinescope footage. This is then processed through an optical printing system where color is added.

Since video colors reproduce poorly onto film, most videographic films are shot in black-and-white with color added optically after video processing is completed. However, as in the case of Scott Bartlett's *OFFON* and *Moon*, color can be added to black-and-white

film by running it through a three-gun, color film chain. The color is induced electronically through the video circuit and appears on tape. The same reproduction problem remains when a kinescope is made of this color tape, and the final color print must be augmented in optical printing. Videotronically-induced colors are desirable for their unique qualities of electron luminescence, which cannot be duplicated in chemical photography.

Since synaesthetic videotapes are made with no intention of transferring them onto film, color reproduction is no problem. Tapes may be composed entirely through the film chain from looped film information, or composites of film, live action, slides, and other tapes. Color or black-and-white film stocks may be used since videotape color in a closed-circuit playback situation is always superior to the incident-reflected light of movie projection.

Videotronic Mixing, Switching, and Editing

The television switching/mixing console, described by Stan VanDerBeek as "the world's most expensive optical bench," is an array of monitors and switching circuits by which different sources of video information are selected, mixed, and routed in various ways. Within its basic ingredient—alternating current—exists the potential for an art of image-synthesizing that could exceed the boldest dreams of the most inspired visionary. Yet, because the equipment was neither conceived nor constructed for aesthetic purposes this potential has remained tantalizingly inaccessible. Traditional use of the video system to imitate cinema is, in the words of one artist, "like hooking a horse to a rocket." Still most artists are quick to admit that even this limited potential of the television medium has not been fully explored.

Most video systems are capable of handling only three image sources at once. Although any number of sources may be available—most larger systems accommodate approximately twenty-four—the maximum capacity for viewing is any combination of any three of those sources. This is an absolutely arbitrary limitation based only on the intended commercial use of the equipment, for which three video sources are perfectly adequate. A few systems can accommodate four video sources at one time. Still fewer, called "routing switchers" or "delegation switchers," have five available

sources, each of whose five input terminals is fed by five more so that the image potential becomes any combination of any five-times-five video sources. This is a positive step in the direction of video synthesizing.

Compounding this image limitation is the cumbersome and unwieldy physical layout of the switching console itself. The primary reason is that video hardware has been design-oriented around the literary narrative mode of the cinema it imitates. It is built to accommodate a literary instructional form in which the elements are relatively simple and linear. In reality, the unique capabilities of video are perhaps even further from the narrative mode than cinema. No amount of written instruction could communicate the complexity of technical and intuitive maneuvers involved in the synaesthetic videographics we are about to discuss; and even if that were possible, no engineer could spend the time required to read and carry out those instructions: the program would never reach the air. Video hardware has been designed around a depersonalized instructional motive whereas it clearly should have been designed to accommodate personal aesthetic motives since all technology is moving inexorably in the direction of closer man/machine interaction and always has been.

The result of this traditional perversion of the medium is that any attempt at creativity becomes extremely complex and often flatly impossible. Even relatively simple effects used commonly in movies —such as dissolving from one matted title to another matted title— are not possible with normal switchers. The desired effect is a background scene over which title credits, either static or in motion, dissolve from one set of words into another set of words without changing the background. In video this requires a very elaborate device called a "double reentry switcher" with six rows of push buttons for each video source. Combinations of any of two- or three-times-six buttons must be used in order to get the effect on the screen.

Assume that one wishes a video image in which colors are automatically reversed while blacks and whites remain the same; or reversing the blacks and whites while colors remain unchanged; draining a picture of all colors but one or two; enhancing only one or two colors so that they become vivid while other hues in the scene

Stan VanDerBeek at work in "the world's most expensive optical bench," the mixing/switching control room at WGBH-TV, Boston, Massachusetts. Photo: Gene Youngblood.

remain stable; warbling a picture so that it looks like shimmering water; composite wipes, so that the edge of the wipe moving across the picture is not a hard edge but rather modulated by the audio or modulated by gray scales or colors; numerical camera controls that would cause one portion of a scene to grow larger or smaller according to the control setting. All of these things are possible in existing video technology, yet are not available to the artist in the form of a mixing/switching console. Moreover, they are potentially possible in a totally random and instantaneous fashion, whereas much labor and many hours are required to achieve the same effects in the cinema.

In addition, there is no reason that video switching must be push-button controlled so that the operator of a common master-control switcher must select combinations of approximately one hundred and twenty buttons. Effects could easily be tone- or voice-actuated, or controlled by hand capacitors, photoelectric cells, or correspond-

ing pairs of voltages for transition effects. All of this could be realized in integrated circuitry, reducing the mammoth proportions of existing switchers by many times. Delegation or routing switchers could accomplish with twelve buttons what now requires more than a hundred.

The potentials of a video system are so vast that it becomes physically impossible for one person to have them accessible to him in a workable manner. This is where video-computer symbiosis becomes necessary. Virtually every possible alternative can be programmed into a computer, which then can employ them in a specific programmed order, or within random or semirandom parameters. Computer-controlled switchers can and will be designed that allow simultaneous processing of the video source by computer program, audio modulation, and manual override. In this way all desirable features of synergetic technology would be available: the randomness of a computer, which can be infinitely more "random" than any human; the video being semicontrolled by its own audio; and finally the artist manually overriding the whole system. Thus it would be possible to preset all conceivable combinations of alternatives for one video source, which could be actuated by one button or one audio tone. These capabilities not only exist within the scope of existing video technology, they are virtually inherent in the nature of the medium.

Until recently the one major advantage of cinema over video was sprocket holes and frames: that is, the ability to do stop-frame animation. For many years the closest that video could come to this was the digital method of videotape editing such as the Ampex Editec system or the EECO system. These methods involved the digital timing of the videotape cue track in hours, minutes, seconds, and frames. Thus it was possible to pre-edit a videotape session by setting a dial, or to do post-editing and single-frame animation, though extremely time consuming and lacking precision. Remarks video artist Loren Sears:

> One of the hardest things to do is stop the recorders and try to sync them up again. So the goal is to go from start to finish in planned lengths but still keeping the tape recorders running. So I tried doing some animation with an Editec system. You can animate by presetting anything from one to thirty-six frames,

and there's a manual override that keeps repeating the same frame as long as you hold it down. You lay down a cue track and set the machine going in an automatic mode. It has a seventeen-second cycle time in which it rolls to a stop, backs up and lays down a pulse where it's to pick up next time. It took about four hours to do twenty or thirty seconds of animation, whereas in film that's all instant with the single-frame button. This is exactly the reverse of other aspects of video-versus-film, in which video is much more expedient. It's an extreme example, but it's something that film can do easily and there's no advantage of doing it in television; you waste time, and you can be more creative in film.

However, greater animation control and simplicity is now possible in video through computer-controlled color disk recording such as the Ampex HS-200 system. It provides all of the editing freedom that previously was possible only with film, plus the ability to pre-program the insertion of cuts, wipes, dissolves, and other effects exclusive to video—all instantaneously, with the push of a button. Digital identification and retrieval of any frame within four seconds allows skip-framing and stop-motion at normal, fast, and slow speeds in both forward and reverse modes. Apart from this positive note, I have stressed the limitations of the video system as an aesthetic medium because they need to be emphasized, and because the many positive aspects of videographic art will be quite clear in the pages that follow.

Synaesthetic Videotapes

VT Is Not TV

It is essential to remember that VT is not TV: videotape is not television though it is processed through the same system. The teleportation of audio-visual information is not a central issue in the production of synaesthetic videotapes; rather, the unique properties of VTR are explored purely for their graphic potential. An important distinction must also be made between synaesthetic videotapes and videographic cinema: the videotape artist has no intention of transforming his work into film.

"I've come to find out that there's a lot of difference between seeing something on a TV screen and seeing it projected," explains Loren Sears. "The two-dimensionality of the movie screen as simply a surface for reflecting a shadow is quite obviously incident light. Television doesn't have that two-dimensional quality at all; it doesn't strike you as a surface on which something is being projected, but as a source. It comes as light through a thing."

It is perhaps not surprising that the most important work in synaesthetic videotape has been done through affiliates of the National Educational Television network (NET). In 1967 an experimental video workshop was established at NET's San Francisco outlet, KQED, with funds from the Rockefeller Foundation and the National Endowment for the Arts. Two years later the workshop had become the National Center for Experiments in Television, with a grant from the National Corporation for Public Broadcasting.

In 1968 KQED became involved in a third project. In collaboration with San Francisco's Dilexi Foundation, the station provided facilities and assistance to artists commissioned to work in the video medium. Some of the most impressive videotapes to be seen anywhere resulted from this project, notably Terry Riley's *Music With Balls* and Phil Makanna's *The Empire of Things.*

Meanwhile, that same year, NET's Public Broadcasting Laboratory (PBL) produced a program of video experiments by six artists including Allan Kaprow, Nam June Paik, and Otto Piene. The show, called "The Medium Is the Medium," was produced at WGBH-TV in Boston, where later in 1969 Stan VanDerBeek became the first of

several artists to take up residence under a three-year Rockefeller grant. He was followed by Nam June Paik.

A new breed of television management is evolving as teledynamic video consciousness saturates the noosphere. Since the fundamental art of television rests in the hands of the broadcaster—the ability to move information through time and space—his attitude toward the medium is a matter of cardinal importance. We know what most broadcasters think of the medium; in the following pages, in addition to discussing artists and their work, I hope to present a new attitude from a new generation of TV management. Until videotronic hardware becomes inexpensive enough for individual use it is the producers, directors, and station managers who make today's video art possible. Brice Howard of the National Center, John Coney of the KQED/Dilexi programs, and Fred Barzyk of WGBH are exemplary of the new vision in television.

Videospace: The KQED Experimental Project

With few exceptions, most of the work produced during the first year in the experimental workshop was black-and-white videotape. The approach seemed balanced between use of the medium for its kinaesthetic design potential, and the medium as vehicle or environment for some other aesthetic content. Artists in residence included a composer, Richard Feliciano; a poet, Joanne Kyger; a novelist, William Brown; a painter-sculptor, William Allen; and a filmmaker, Loren Sears.

In addition, various guests were brought in throughout the year, participating from one week to three weeks. These included Ellen Stewart of the Cafe La Mama theatre troupe; Paul Foster, one of the playwrights who had come out of that workshop; Eugene Aleinakopf, an expert in television law; Maurice Freidman, a theological philosopher, particularly known in the United States for his English translations of Martin Buber; Robert Creeley and Charles Olson, poets; and Joel Katz, a New York psychiatrist.

The two most vital functions were performed by Robert Zagone who was resident director of the actual videotaping sessions, and Brice Howard, organizer and administrator of the project. I asked him what answers had been found to the project's two questions: What is the nature of the medium? Can an artist work in it?

BRICE: Yes, the artist can work in television. Of course it's quite a different system from that of the artist. Artists generally are one-to-one people. They and their medium are in direct contact. But the television system engages a great many people; any product of that system is the product of a number of people. No single human being can make anything in television. And of course television equipment is not easily available to the artist either.

GENE: One possibility is working through the medium of the cassette videotape cartridge rather than a broadcast system.

BRICE: No question about it. But it s a long way off, not so much technologically and commercially, but philosophically. The kind of work going into the EVR cartridge now is institutional. The artist will be the last to participate.

GENE: And what have you discovered about the nature of the medium?

BRICE: Where I'm having the greatest difficulty in reporting this occurrence is in discovering ways of separating the medium from its broadcast, distribution characteristics. Television has been a broadcast system, and for that reason its technology and its practice grow essentially from that logic, the logic of distribution. We accepted the inference that we were not obligated to produce anything. And because of that, all kinds of things happened. If we had started out by saying "let's make a program" it would have been a pretty redundant or repetitious thing.

GENE: In your estimation the technology is separate from the practice?

BRICE: The emphasis so often gets centered in the technological. I want to take it away from the technology because it really is not that. So frequently I find myself saying, when confronted with technical questions, "It is not technology; it is *attitude shift* that is making this happen." Indeed, there is no technology in any of the experiences we've had that is greater than that which exists in any standard television studio. We went after our goal from a different place. For instance, you can experience some of our material and feel that you're discovering an enormously rich technical breakthrough, when as a matter of fact what you're experiencing is

process. And the same process would be with clay, paint—anything. In this case the material just happens to be the electron. All the tapes have no post-editing, are records of process, records of discovery, untouched, nonobjective, nonprogrammatic. Very often the most meaningful moments were those in which some incredibly remarkable, mercurial connection was occurring among a number of people, and the process was constantly feeding back upon it.

GENE: Were certain visual effects deliberately sought?

BRICE: When you describe a particular visual effect achieved in our work it must be remembered that there are so many other elements involved. Television has been fed by four currents of recent history, and one not so recent: cinema, radio, journalism, and theatre. And the characteristics of these histories affected the making process. You mention a specific effect and I might tell you that keying is the technical means by which you acquire that effect. But in order for that effect to be genuinely valuable we have to add theatre's part, journalism's part, radio's part, and film's part. Then keying becomes something meaningful.

GENE: What effect does radio have on keying?

BRICE: It has to do with the architectural space in which the experience occurred. You see, the fascinating character of the space in which some of the sources of the mix are acquired is that it's a space of a different order. The television studio is affected architecturally by the influences of theatre and radio. For example, the audiometrics—the acoustical character of that situation—is very much influenced by microphones which preceded television. And how sound pickup sources affect the order of masses, planes, volumes, compositions, so on. Very frequently the imposition of that technology, which has nothing to do with the experience you're seeking at the moment, is there nonetheless and has to be taken into consideration, forcing certain kinds of compromises. For example there's no reason that an omni-directional acoustical transducer cannot be devised to pick up all the sound in all the 360-degrees of cubic space within the studio. But there isn't one. And that's partly a factor of radio and partly a factor of film.

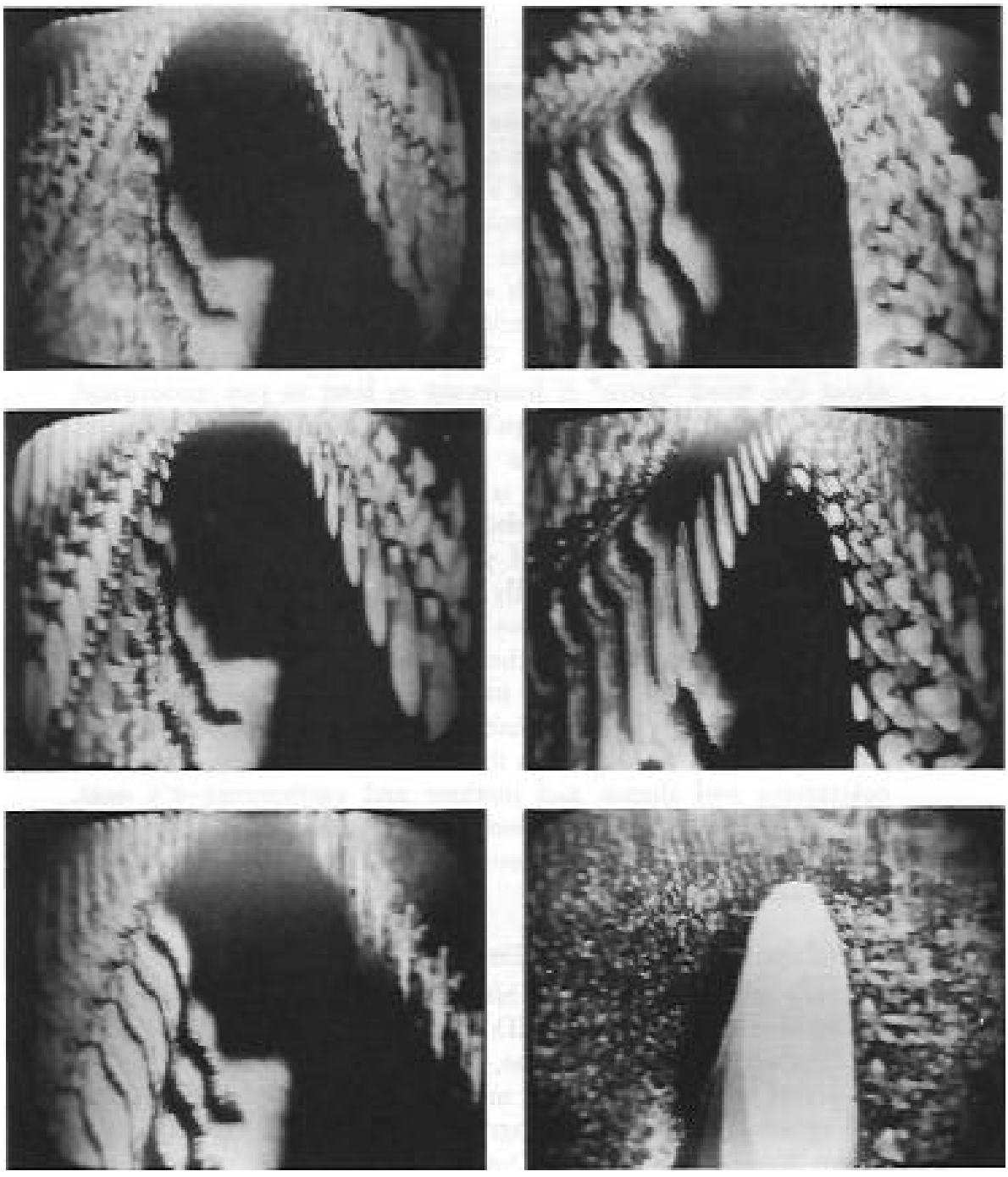
The architectural space itself is very close to theatre, from which film derived its basis, etcetera, etcetera. And indeed in a conven-

tional studio, ask a so-called set designer, stage designer, television art director (all those terms apply to the same man in television; all those terms are used in television), you ask that man to fix you an environment and more frequently than not he'll fix you an environment that looks like it's on a stage. Indeed you can almost see the proscenium arch. Now the cubic space with which you are dealing in this newer mode of television is of a different order entirely. The only space which is valid is the space on the surface of that monitor. Whether or not one wants to argue about the word "space" is irrelevant as long as you understand the intent. I'm saying that it isn't in the studio, it's in the monitor. Now, the monitor screen has some remarkable characteristics. Among other things, it itself is information irrespective of anything you put in it—sign, symbol, rhythm, duration, or anything. It is delicious all by itself, if you want to enjoy it, though its matter is apparently of a totally random character. It is different, for example, from the reflective surface, which is a movie screen, off which light bounces with the image intact. But television is an electronic surface whose very motion is affecting the motion that you're putting into it. And what is really the richest part of television, less its technology, less its cubist nature, less its incredible colorations and shapes and motions and excitements—it's *now,* it's capturing the damned *actual* with all of its aberrations. Television will help us become more human. It will lead us closer to ourselves.

Robert Zagone: The Music of Electrons

Virtually all of the project's black-and-white tapes, plus a one-hour segment of a regular KQED color program called *West Pole,* were directed by Robert Zagone, one of an increasing number of video artists who approach the medium from the side of the new consciousness. ("I *mixed* the programs," Zagone said. "We don't use the term 'director' any more.") Out of more than forty hours of tape approximately fifteen hours were considered relevant. Of these I have selected two for discussion here.

The first is a brief but devastating exercise in feedback techniques, which was among many effects accompanying a poetry recital by Robert Creeley. This particular episode involves the gradual

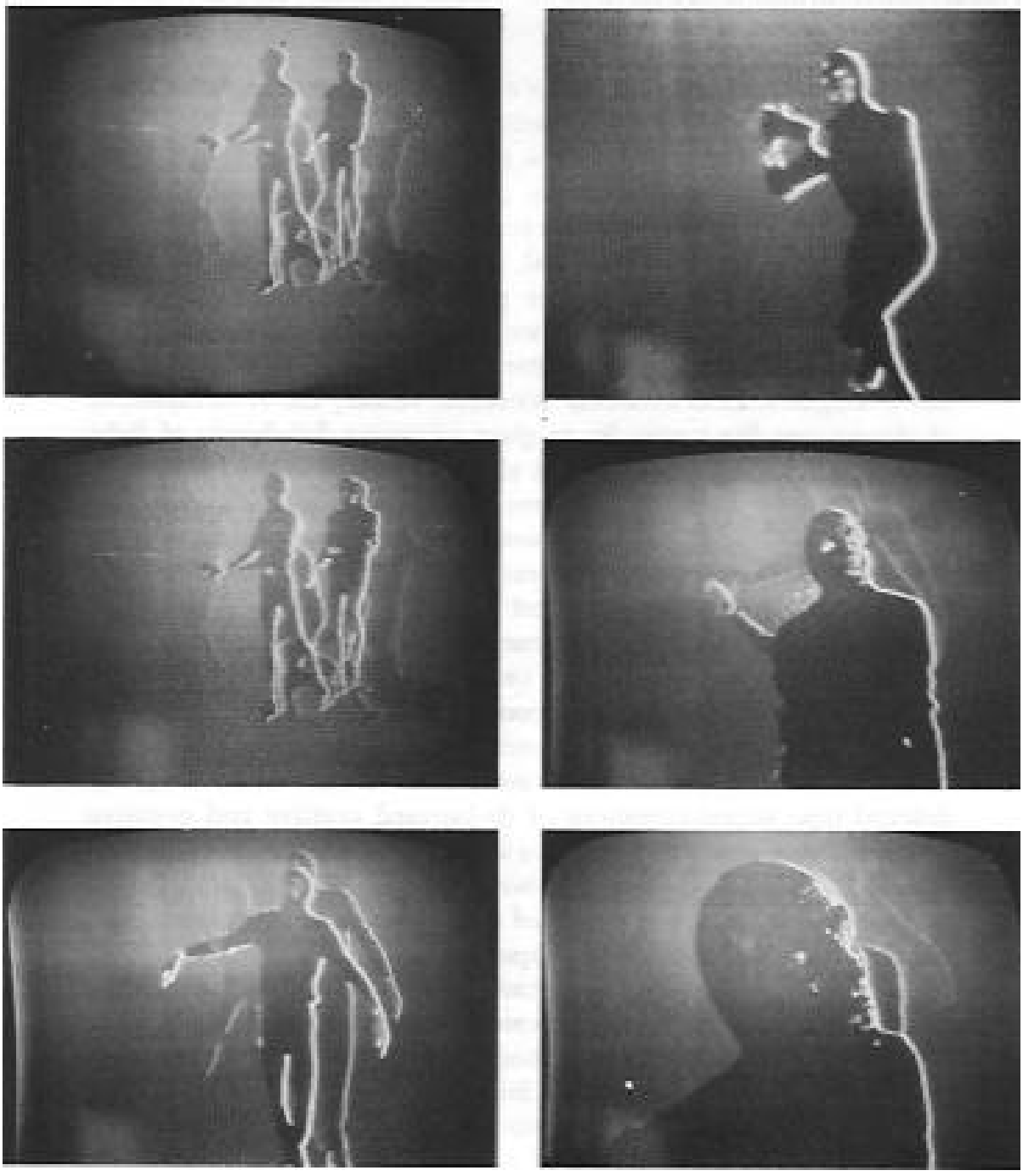


Multiple-camera feedback techniques produced this disintegration of form in *Videospace* at the KQED Experimental project.

disintegration of the poet's profile in silhouette. In addition to the figure, other image sources included multiple translucent plastic surfaces being fed into a monitor that was taking images from still another source. At one point all three cameras shot the same monitor that displayed their images.

The result is an almost visceral, physical quality to the image as endless waves of flaking matter peel away from the silhouette, slowly at first, then faster and more chaotically, with ever-increasing convolutions of geometrical patterns. A kind of serial nightmare, like a magnetic field suddenly rendered visible, the reverberations of chiaroscuro flip hectically in giant sweeping flak bursts of light until a shimmering white glow is all that remains of the image of a man. "It's really a matter of where your head is at with respect to the technique," said Zagone. "I would say that it would take eight months to achieve in film the same effects that took us one minute and forty-five seconds with Robert Creeley's recital. And even then the texture would never be the same."

Like most videographics, the immediate impression is of seeing something that one has never encountered before, except perhaps in dreams. This was even more pronounced in Zagone's interpretation of a solo dance sequence involving a male dancer in six levels of delayed tape superimpositions of de-beamed positive and negative images. Three cameras taped the dance simultaneously as Zagone mixed. At first the dancer is silhouetted in black against a white field. A second and then a third image of himself, delayed and slightly staggered with each superimposition, appear like ghosts who follow him through his routine. Suddenly the background becomes dark and the dancer develops a glowing white outline or halo; his facial characteristics become ominous with huge white eyes and exaggerated features. Still more delayed images appear until there are six figures of the same dancer seen simultaneously at various points in time, like visual echoes. The richness of the image was varied with each superimposition, causing some images to stand out while others fade almost into nothingness. Finally, as though trapped in some video world where space and time are out of register, the dancer looms large and close, peering into (out of) the camera (monitor) as though to examine the "real" world of men.

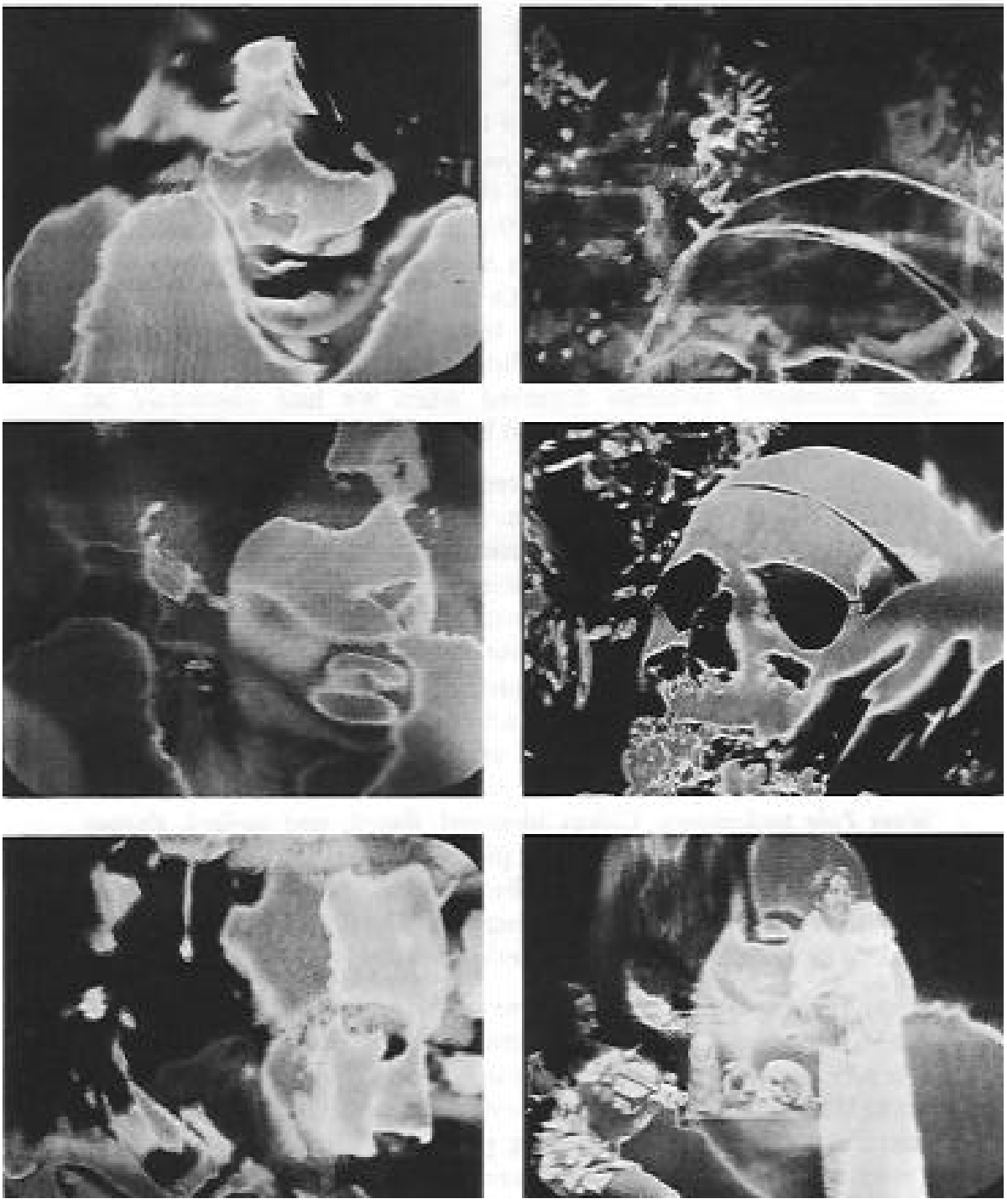


Six levels of delayed videotape super-impositions of de-beamed positive and negative images were combined in this experiment at KQED.

"The technique is satisfactory," said Zagone, "but requires immense sophistication on the part of the user. You must constantly be thinking in advance—where will you be five superimpositions from now? How will you deal with the tape at that point with respect to the images you're creating now? We had no plan for that sequence ten minutes before it began. The conceiving of it took place as it happened in the cathode tube. It's all in the electrons. The effects exist nowhere but where you see them. It's not in clipper levels or blanking pulses or blacks and whites—that's not where it's at. The most successful moments occurred when we had absolutely no preconceived notion of what would happen."

In May, 1968, Bob Zagone directed two half-hour segments of KQED's *West Pole,* featuring a rock concert by The Sons of Champlin. Even for young filmmakers of the San Francisco/Berkeley area, where synaesthetic cinema is part of the life-style, this initial exposure to pure video amounted to a revelation. An article in the rock newspaper *Rolling Stone* described the show as "more psychedelic than underground movies." The realization that something so common and "public" as a television set could be the source of virtually unprecedented visual experiences was the beginning of a new socio-technical awareness that is now common, as are the *West Pole* techniques. Colors bloomed, flared, and melted; shapes disintegrated and intermixed; the picture-plane was demolished in a cascade of spectral brilliance—the *Bonanza* fan, who knew that television was capable of something more, finally saw that potential in all of its phosphorescent shimmering beauty.

GENE: What were you reaching for in the *West Pole* work?
BOB: I just wanted to fuse the electronic music with electrons. Video is very close to music and rock music is very close to video.
GENE: What effects were you particularly pleased with?
BOB: Tape delays and de-beaming, primarily. We had been working with refinements of those techniques regularly for six months.
GENE: There's a fabulous scene where the fellow is singing: green gaseous clouds move across his mouth, and when he opens his mouth to sing, the inside is intense red.
BOB: That's a combination of tape delay, feedback, de-beaming, tearing the key, and the black-burst generator which suffuses any color with black.



Loren Sears: Sorcery. 1968. VTR. Black and white. 30 min. "I wanted to express a feeling of entrapment in the electronic environment."

Loren Sears: The Sorcery of Neuro-Aesthetics

Loren Sears regards television as an extension of the central nervous system, and thus employs the term "neuro-aesthetics" to indicate the unique character of videographic art. Sears produced seventy-five minutes of experimental videotapes as an artist in residence at KQED in 1968. The best was called *Sorcery,* which he codirected with Bob Zagone. "Every medium," Sears explained,

> has a fundamental means of operation. In film it's sprocket holes, registration, optics, frames. The characteristics of television are different. In both cases, however, there's a strategic way of using the medium effortlessly. *Sorcery* was an attempt to go right through the medium using what it can do easily.
>
> It occurred to me that if media are extensions of the central nervous system, it's like you're taking on an extra load. There's more of yourself to deal with, because while you're putting things out of it, you're also taking them back in. So I'm certain there are hallucinations which occur entirely within this realm. It has its own ability to create, its own importance, its own way of seeing things. It shapes the world-view information that's put in and taken out of it. So I wanted to do a very intuitive piece that would express a sense of the video mode of operation. I wanted it to evolve without a script simply from camera techniques, mixing techniques, a set, two people clothed in an odd fashion, some props like death's heads. So I put Joanne Kyger and Chuck Wiley, with his violin, in front of a rear-projection screen for slides.
>
> I wanted to express a feeling of entrapment in the electronic environment. You watch television and all you know is what's going on in television. That's all you really find out. There's no way to tell if that's really what's going on in actuality. It was pretty difficult to think of a way to suggest that, so I just told Chuck and Joanne that they were totally trapped in this milieu and their problem was to try to get through it somehow to outside reality through some kind of divination. They were left alone in the studio with these instructions and two cameramen who had been given shooting patterns to follow. They ad-libbed their way through it. Chuck played his violin. And what happened was that they began to feel it. It began to work on them.

Through de-beaming and keying of one camera while a second camera was on tape-delay, an ominous sense of the video environment was generated through most of *Sorcery.* Relatively representational images slowly disintegrated into swirling diaphanous lines and

clouds of light. The death's head melts into vague outlines through which are seen smoky crumbling faces and ghostly superimpositions. Long sections of the half-hour tape are composed of swirling lines as sounds and voices are heard as though from another world. Humans interact with clouds of electrons, which seem finally to engulf them.

"Any medium can be transformed by the user," Sears said. "The paradigm for it all is music. There's the music of the medium, which means it also has a muse. We can learn from it. Television has been used as an attraction, a come-on, an effect. Nothing used for effect is an art." Just as in his synaesthetic cinema, Sears merged aesthetic and technique. There are no effects when form and content are one.

Conceptual Gallery for Conceptual Art

The traditional triangle of studio-gallery-collector in which art historically has thrived is slowly being transformed. The psychological effect of television's totally immaterial nature may be largely responsible for the contemporary artist's awareness of concept over icon. For several years Gerry Schum has operated a unique "television gallery" *(Fernsehgalerie)* at a station in Dusseldorf, West Germany. "In art," he explains, "there is a general change from the possession of objects to the publication of projects or ideas. This of course demands a fundamental change in artistic commerce. One of the results of this change is the TV gallery, more or less a conceptual institution which comes into existence only in the moment of transmission. After the broadcast there is nothing left but a reel of film or videotape. There's no object that can be seen 'in reality' or be sold as an object."

Somewhat similar ideas inspired San Francisco art dealer James Newman to transform his Dilexi Gallery into the Dilexi Foundation in December, 1968, with the purpose of "allowing more freedom for the artist, reaching a general audience and making art an organic part of day-to-day life." Newman was among the few gallery owners to recognize television's potential as the most influential gallery in the history of art. He engaged in a joint project with KQED-TV to

establish a regular series of programs in the form of an "open gallery," not to sell objects but to move information—the experiential information of aesthetic design and concept.

Newman commissioned works by Robert Frank, Ken Dewey, Walter de Maria, Yvonne Rainer, Ann Halprin, Julian Beck and the Living Theatre, Robert Nelson, Frank Zappa, Edwin Schlossberg, Terry Riley, and Philip Makanna. The first pieces, televised in the spring and summer of 1969, were unanimously acclaimed. Chiefly responsible for this success was KQED producer-director John Coney, who coordinated, produced, and codirected many of the video projects, working closely with the artists.

Terry Riley: *Music With Balls*

Rarely has the multiplex structure of any film or videotape been so totally integrated as in the transcendental composition *Music With Balls* (see color plates), conceived by Terry Riley and commissioned by the Dilexi Foundation in 1968. It was the work of three men whose separate disciplines meshed in synaesthetic alloy: Terry Riley, composer; Arlo Acton, sculptor; John Coney, video mixer. *Music With Balls* is a dialectical synthesis of nonverbal energies that strikes deep into the inarticulate conscious. It inundates the beholder in megabits of experiential design information, aural, visual, and kinetic. To understand it we must understand its four elements: music, sculpture, cinema, and video.

Riley's music is strongly influenced by the work of LaMonte Young, with whom he is closely associated. Yet it can be said that Riley's music is unique in itself and represents, with the exception of Young, the most vital and refreshing American musical composition of the late twentieth century. While he is seriously involved with the "row" and "stasis" techniques that inform Young's work at a fundamental level, Riley is able to subsume a wide range of musical structure, combining the climax and directionality of Western music with the stasis of Eastern modalities. The result is cyclic precision and a buoyant mathematical randomness.

For *Music With Balls,* Riley pre-recorded four tracks of fourteen-cycle beats with a tenor saxophone and a Vox electric organ. Each beat was assigned a pitch, thus forming a tonal "row" that he played

back through oscillators. Various levels of tape delay were possible by starting and stopping one or more of the tracks randomly. In the studio Riley sat behind a bright red table, flanked by his tape equipment. Against the recorded, delayed, and oscillated time cycles he played rhythmic variations on his saxophone, effectively generating a static yet melodious macrostructure of cycles containing epicycles within epicycles. The music was alternately tense and relaxing, a shimmering trilling universe of aural bubbles penetrated randomly by syncopated wailing crescendi and diminuendi. The overall effect was magical, soothing, hypnotic.

Two stereo speakers were fitted into two of Arlo Acton's giant black spheres that were swung from the studio ceiling on long wires and revolved around the set in diminishing circles, pushed periodically by black-clad girls at either side. Thus the amplification of the cyclic music was itself heard in a physically cyclic fashion as it swirled about the empty space. A smaller chromed sphere was set in pendular motion, like a giant metronome, just above Riley's head. This had a calming, centering effect.

This auditory/tactile/kinetic environment was then processed through cinema and video on several levels, all corresponding to the cycle/epicycle mode. Tiny ball bearings suspended from threads were filmed in ultraslow motion with a high-speed camera to make them seem heavy. The resulting film of swinging spheres was made into twelve loops that were then superimposed over one another in all the various combinations and as many levels of multiple-exposure as possible on one master print that had been cut into a strip as long as the entire program, twenty-six minutes. This was fed through a film chain as one possible video source.

Two floor cameras shot Riley in wide-angle and close-up, and also focused alternately into a color monitor and a concave mirror. "The mirror gave the entire image a curvature which corresponded to the cyclic nature of the whole piece," Coney explained. "Also it broke the repetition of the circular orbits by making them elliptical. Shooting the color monitor was not done for feedback but simply to achieve an electronified or subaqueous visual patina. A rather blue cast. Also it accentuates the scan-lines which are appropriate to TV, and we used them as a design element. In addition it gave us the ability to

have the same picture running synchronously on two different scales. Seeing the image a bit larger on one camera than the other. That produced a very interesting cycle effect, particularly when we dissolved to another image."

The master tape of *Music With Balls is* a fabulously rich mantra of color, sound, and motion. Huge spheres sweep majestically across the screen trailing comets of shimmering ruby, emerald, and amber. Contrapuntal trajectories intersect, pierce, and collide. Keying, de-beaming, wipes, and dissolves result in phantasmagoric con-volutions of spatial dimensions as Riley is seen in several per-spectives at once, in several colors, alternately obscured and revealed on various planes with each pass of a pendulum. The composition builds from placid serenity to chaotic cacophany to bubbly melodiousness with a mad yet purposive grace. Acoustical space, physical space, and video space become one electronic experience unlike anything the cinema has ever known.

Philip Makanna: *The Empire of Things*

"I'm supposedly a sculptor," remarks Phil Makanna, "but there's something strange and maybe decaying about making things—*things*—peopling the overpeopled world with more junk, not really touching anyone. More than anything I feel the frustration, desperation, of wanting to be able to reach out and hold your heart." With the startling beauty of his synaesthetic composition *The Empire of Things (*see color plates), Makanna reached out through the videosphere and held the hearts of thousands.

A combination of sculptor, writer, filmmaker, and electronic engineer, Makanna was conducting a creative television course at the California College of Arts and Crafts in Oakland when he was commissioned by the Dilexi Foundation in 1968. At the college, Makanna focused on TV as a medium specifically for such "fine" artists as sculptors and painters. His approach followed two directions simultaneously: videotape as a self-contained aesthetic experience, and closed-circuit television as an environment for live events of a theatrical nature. These included a collaborative effort with the Mills College Electronic Tape Music center, involving live performers, eight television cameras, twenty monitors, and eight

audio recorders functioning simultaneously. In another project, three and four acts of *King Lear* were presented simultaneously in several modes: actors seen in rear-projected movies, actors in video projections, actors seen through several closed-circuit monitors, and "live" actors on a stage.

But it remained for the medium of broadcast television, and *The Empire of Things,* to reveal to Makanna a means of reaching out to the hearts of the public. "He has such a powerful conceptual mind," recalls John Coney, "that all I did was guide him into a general technical format, offered suggestions that he could use as a matrix, and explained the capabilities of the color-film chain in painting video color. We processed *The Empire of Things* entirely by de-beaming the guns of the film chain. We formed the film into loops and practiced over and over again until the balance between form and content was perfect. We had a couple of engineers—Larry Bentley and Wayne McDonald—who were very interested in that piece of equipment as an electronic painting palette."

While *Music With Balls* wholly nonverbal and concrete, *The Empire of Things* is that rare combination of words and images often sought but seldom achieved. Makanna miraculously manages to contrast the abstraction of words with the concreteness of images, clarity with ambiguity, alternating between evocation and exposition to produce an overwhelming emotional environment of evocative powers. The title of the piece is the title of a short story by H. L. Mountzoures that appeared in the *New Yorker* magazine. An offscreen narrator reads the entire story aloud while we see a collection of images shot by Makanna specifically for this purpose, combined with stock footage from old movies, newsreels, and TV commercials.

Mountzoures' story is itself a masterpiece of imagist prose, often indistinguishable from poetry and only occasionally linear in structure. A parable of war in surrealistic and extra-objective terms, it consists of alternating *haiku*esque impressions of things observed, events remembered, nightmares experienced, and realities confused in the first-person consciousness of the narrator. One is completely caught up in this strangely beautiful story as it unfolds with a masterly richness of language. At the same time, however, the images are generating their own, quite separate, world of impres-

sions. One is caught in a sensorium of contrasts, a dialogue between visual and aural absolutes from which arises a pervasive sense of abstraction. One is made keenly aware of nuances seldom expressed with such clarity in any art form. The synthesis of harmonic opposites is raised to perfection.

Word-and-image connections are tangential at best, and often starkly antithetical in conceptual content. The narrator might be speaking of old belongings in an attic trunk, for example, while we see a line of men on horseback at the rim of a steep cliff. As the horses plunge down the incline, video de-beaming turns the sky orange and sends mint-green flames streaking behind them. The scene becomes an Expressionist painting of green shadows and purple highlights quivering in a liquid mosaic of hues. This almost Daliesque image of rainbow horses melts into an Impressionist vision of sun-dappled woods. A horse and rider move slowly through trees whose colors suddenly detach and float in midair. Images merge until all that is left of the horseman is a cloud of electronic pigment moving nebulously through a spangled field of Seurat-like pointillist fragments. Elsewhere a man rides a bicycle that melts beneath him; he performs a strange dance ritual on a deserted beach as the sky seems to burst in spectral madness. Never have conceptual information and design information been so poetically fused as in *The Empire of Things.*

We haven't even begun to explore the potentials of the medium [Coney remarked]. Part of it lies beyond our reach because of stringent union regulations as to who can use the equipment and who can't. Part of it lies beyond the reach of the technicians who *are* authorized to use it. Videotronics will never come of age, will never be useful for creative purposes, until the knobs are put in the hands of the artist. We haven't even begun, for example, to work with really controlled color design. One built-in characteristic of television is the ability to manipulate spectral colors. There's a tremendous amount that can be done with muted and controlled colors that we haven't even started to do.

Television's biggest problem today is learning how to let go. Essentially that's what I'm trying to do; I want to let go of control without creating a disaster on the set. I want to open television to the extent that film is open. You see a multiplicity of voices and ideas in film on a number of levels of intent, interest, and seriousness. It doesn't always have to be "professional" to be true. And truth is what we're after.

WGBH-TV, Boston: "The Medium Is the Medium"

"The reason we're experimenting," explained Fred Barzyk, "is that a large portion of the public is really ahead of television. They can accept more images and ideas at once. They're watching underground films; they're commercial buffs who are fascinated by how many cuts there are in a Pepsi-Cola ad. These are the people who could easily be turned on to educational television if it had the proper ingredients." With young producer-directors like Barzyk taking an interest in television as an educational experience, the ingredients are certain to be there sooner or later.

It was at WGBH, for example, that the program "What's Happening Mr. Silver?" was originated. A regular experimental feature on pop culture, the program proved so successful that it was carried also by most other ETV stations except KQED in San Francisco, where it was found to be "technically innovative but slightly sick." In 1967 the program's host, David Silver, conducted his weekly show from a bed in the center of the studio floor, in which he reclined naked with an equally nude young lady.

> We wanted to experiment with every possible aspect of the medium [Barzyk explained] and intimate behavior in the form of nudity became one factor. We tried to create new problems in the broadcast system so that we could break down the system as it existed. We adopted some of John Cage's theories: many times we'd have as many as thirty video sources available at once; there would be twenty people in the control room—whenever anyone got bored they'd just switch to something else without rhyme or reason.
>
> "The Medium Is the Medium" came out of this show in one sense, because after two years of "What's Happening Mr. Silver" we had so totally bombarded the engineering staff with experimentation. We took the attitude that the engineers would have to change their normal functions. In most of the television industry a video man is a video man, an audio man is an audio man, a cameraman is a cameraman; they never step over each other's bounds. We created a situation in which each one of them was asked constantly what he could do for the station. We told them they were artists. We said each week, "We don't know what we're going to do, here's our raw material, let's see what we can do with it." So out of this the audio man had his sources running, the cameraman had his sources running, and so on.

Initially there is a great deal of resistance from the engineering staff, as might be expected when you change someone's job conditions. We deprived them of their security. I mean, you know what a "good picture" is: flesh tones, lighting, so on. But we deprived them of that. We said on our shows it doesn't really matter. One engineer turned off his machine. He didn't think it was right. A year later he came up to me with three new ideas that we might be able to use. So the pressure is reversed to bring creativity out instead of repressing it; we have the most production-oriented engineers in the whole country, I'd say. In effect we tell them the station is experimenting and we ask them not to be engineers.

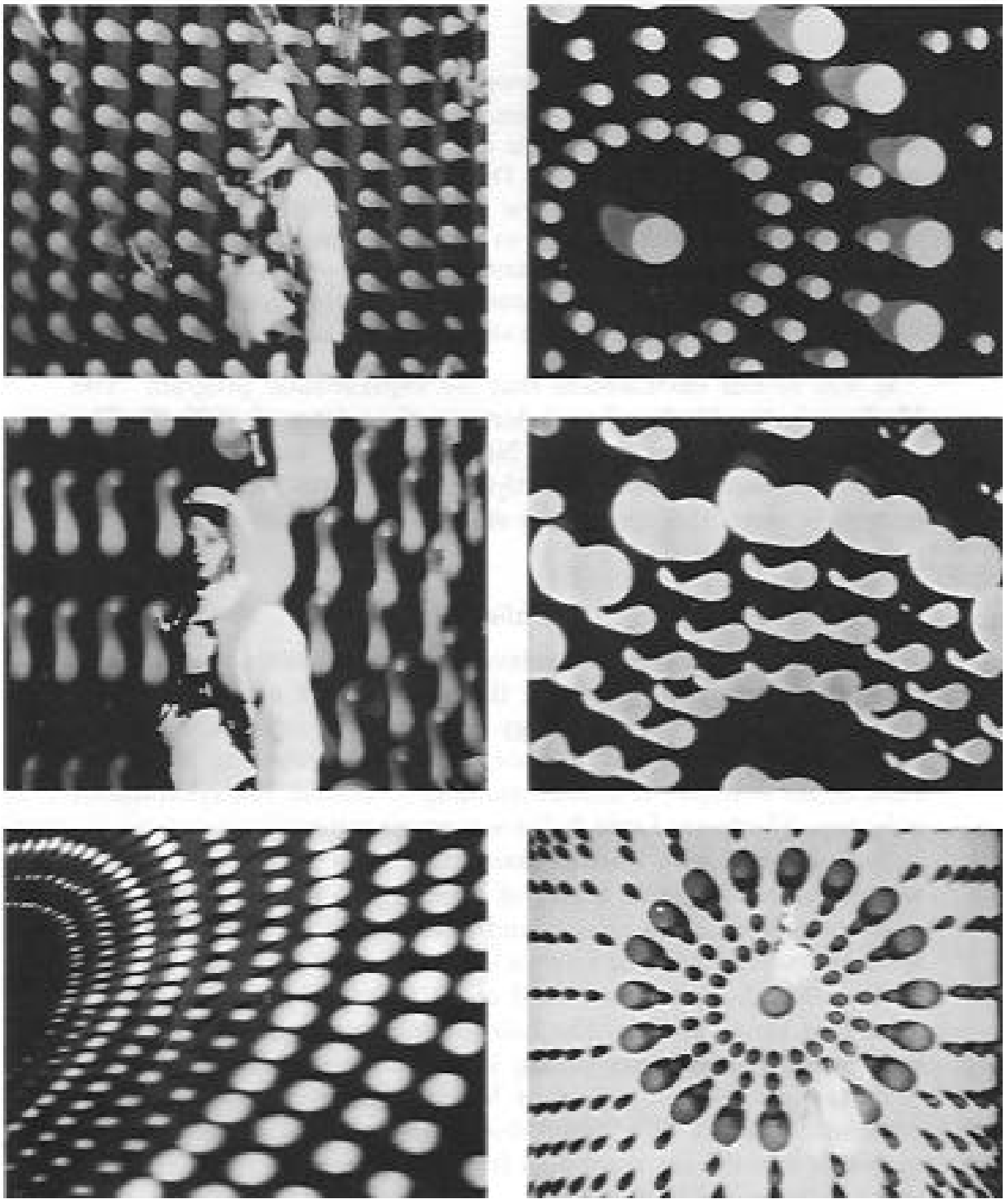
It was in this environment that the experimental program "The Medium Is the Medium" took form in the winter of 1968-69. The contributions of Allan Kaprow, Nam June Paik, and Aldo Tambellini are discussed elsewhere in this chapter; Otto Piene and James Seawright were also among the six artists who participated in the project.

Otto Piene: *Electronic Light Ballet*

Otto Piene's work with luminescence, pneumatics, and lighter-than-air environments is among the most elegant examples of aesthetic applications of technology. The artist's exquisitely delicate sense of proportion and balance, as demonstrated in his *Light Planets,* for example, is always stunning to behold. His synaesthetic videotape *Electronic Light Ballet* was no exception.

Typical of Piene's austere sensibility, only two image sources were used in this piece: a grid of colored dots that melted in rainbow colors across the screen; and a videotape of Piene's *Manned Helium Sculpture,* one of a series of experiments with lift and equilibrium that the artist conducted as a Fellow at M.I.T.'s Center for Advanced Visual Studies. The helium sculpture involved 800 feet of transparent polyethylene tubing in seven loops, inflated with approximately 4,000 cubic feet of helium, attached with ropes and parachute harness to a ninety-five-pound girl for a thirty-minute ascension into the air, controlled from the ground by ropes attached to the balloons and harness.

The ascension was staged at night in the parking lot of WGBH, which was illuminated by colored floodlights. Over this slow, buoyant, ethereal, surrealistic scene Piene superimposed a geometrical grid of regularly-spaced colored dots similar in effect to the multiple-bulb brilliance of his light sculptures. In exquisite counterpoint



Otto Piene: *Electronic Light Ballet.* 1969.
Hi-Band Color VTR. 15 ips. 5 min.
Lighter-than-air space contrasted with vivid videospace in Piene's usual elegant fashion.

to the balloon scene the dots flared brightly, became liquid, developed spermlike tails, and finally dripped oozing globlets of color across the screen. The technique was deceptively simple: de-beaming the separate guns of the color camera with a strong hot light source shining through multiply-perforated stencils. Both the stencils and the camera were moved, causing a sperm-shaped burn-in of intense colors. If a dot appeared originally as yellow and was moved, the de-beamed "tail" would remain yellow but the "head" of the comet-shaped light would suddenly turn red or green. The effect, as in all of Piene's work, was quietly elegant, revealing the potentials of the medium in the hands of a true artist.

James Seawright: *Capriccio for TV*

James Seawright, then technical supervisor of the Electronic Music Center of Columbia and Princeton Universities, was best known for kinetic/electronic sculptures. In fact, *Capriccio for* TV (see color plates) was Seawright's first experience with video as a creative medium. Whereas Piene's effort was a ballet of light and air, Seawright processed an actual ballet *pas de deux* through the videotronic medium to produce an inspired dance of form and color.

In contrast to the elaborate yet unimaginative convolutions of the CBS "Limbo" program, Seawright's piece was simple and effective. He televised two dancers—his wife Mimi Garrard and Virginia Laidlaw—against a score of electronic music by Bulent Arel. In the first two "movements" the dancers were shot in negative color and were superimposed over reversed images of themselves, producing a Rorschach-like mirror effect similar to bas-relief "flopping" in the cinema. In the concluding section Seawright televised the scene with three cameras that recorded only one of the three basic colors each onto three separate tapes. In addition, one camera was on tape delay so that a second dimension of abstraction was added. It was therefore possible to see two images of the same figure performing the same action at different stages in different colors, whereas the other figure was equally abstract in other colors. The image took on a ghostly quality, suggesting colored X rays or dream sequences in the mind's eye. Space, time, form, and color were brought into concert in an unforgettable video experience.

Nam June Paik: Cathode Karma

"Cybernetics, the art of pure relations, has its origins in karma. The Buddhists say karma is sangsara, relationship is metempsychosis. Cybernated art is important, but art for cybernated life is more important, and the latter need not be cybernated."

"My experimental television is not always interesting," admits Nam June Paik, "but not always uninteresting: like nature, which is beautiful not because it changes beautifully, but simply because it changes." Paik is the embodiment of East and West, design scientist of the electron gun, pioneer ecologist of the videosphere. He is to television what John Whitney is to the computer; he does with TV sets what David Tudor does with pianos. "Television has been attacking us all our lives," he says, "now we can attack it back."

This Korean-born genius has been attacking it back longer than anyone, and in his own inimitable fashion. The bloody head of an ox was hung over the door to his first video exhibit in Wuppertal, Germany, in 1963, as a shock device "to get the audience into a oneness of consciousness so they could perceive more"—as in Zen, the master would strike the pupil. Although he never really harmed anyone, Paik was for several years a cultural terrorist, a kind of *deus ex machina* of the Orient, who left in his wake a series of demolished pianos, clipped neckties, bizarre junkyard robots, and scandalized audiences from Holland to Iceland. John Cage once remarked that "Paik's work, performances, and daily doings never cease by turn to amaze, delight, shock, and sometimes terrify me."

In recent years Paik has abandoned his mixed-media environmental Happenings to concentrate exclusively on television as an aesthetic and communicative instrument. Independently, in collaboration with scientists, and in a special research and development program with the State University of New York, he has explored nearly every facet of the medium, paving the way for a new generation of video artists. His work has followed four simultaneous directions: synaesthetic videotapes; videotronic distortions of the received signal; closed-circuit teledynamic environments; and sculptural pieces, usually of a satirical nature.

There are approximately four million individual phosphor trace-points on the face of a 21-inch television screen at any given

moment. Paik's canvas is the electromagnetic field that controls the distribution of these trace-points in horizontal and vertical polar coordinates at 525 lines per second. By interfering, warping, and otherwise controlling the cathode's magnetic field, he controls the four million glowing traces. "It creates the possibility of electron-drawing," he says. "It's better than drawing on a CRT with a light pen because it's multicolored and provides interaction with the air program." (See color plates.)

Although he is continually developing new parameters of control and interaction with television, most of Paik's basic techniques were developed in the period 1963-64 in collaboration with Hideo Uchida, president of Uchida Radio Research Institute in Tokyo, and with Shuya Abe, an electronics engineer who, according to Paik, "knows that science is more beauty than logic." Paik has outlined three general areas of variability with these techniques. ("Indeterminism and variability are underdeveloped parameters in the optical arts," he says, "though they have been the central problem in music for the last two decades. Conversely, the parameter of sex has been underdeveloped in music as opposed to literature and the visual arts.")

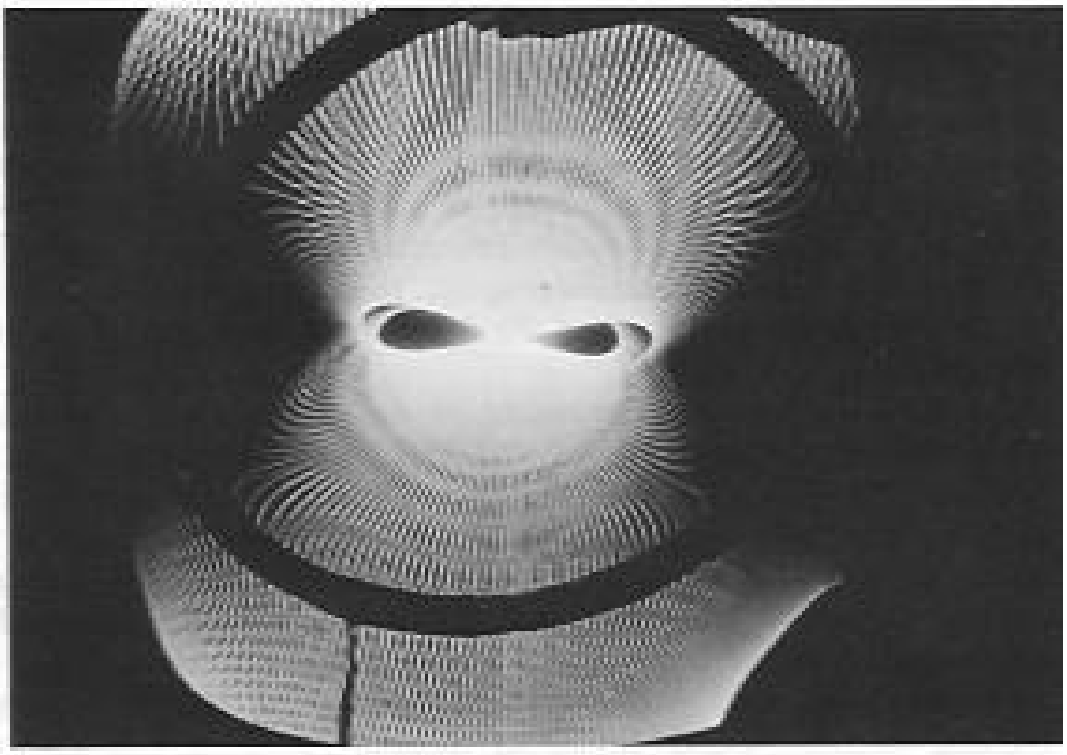
The first level of variability is the live transmission of the normal broadcast program, "which is the most variable optical and semantical event of our times... the beauty of distorted Nixon is different from the beauty of distorted football hero, or not always pretty but always stupid female announcer." Paik estimates that he can create at least five hundred different variations from one normal broadcast program.

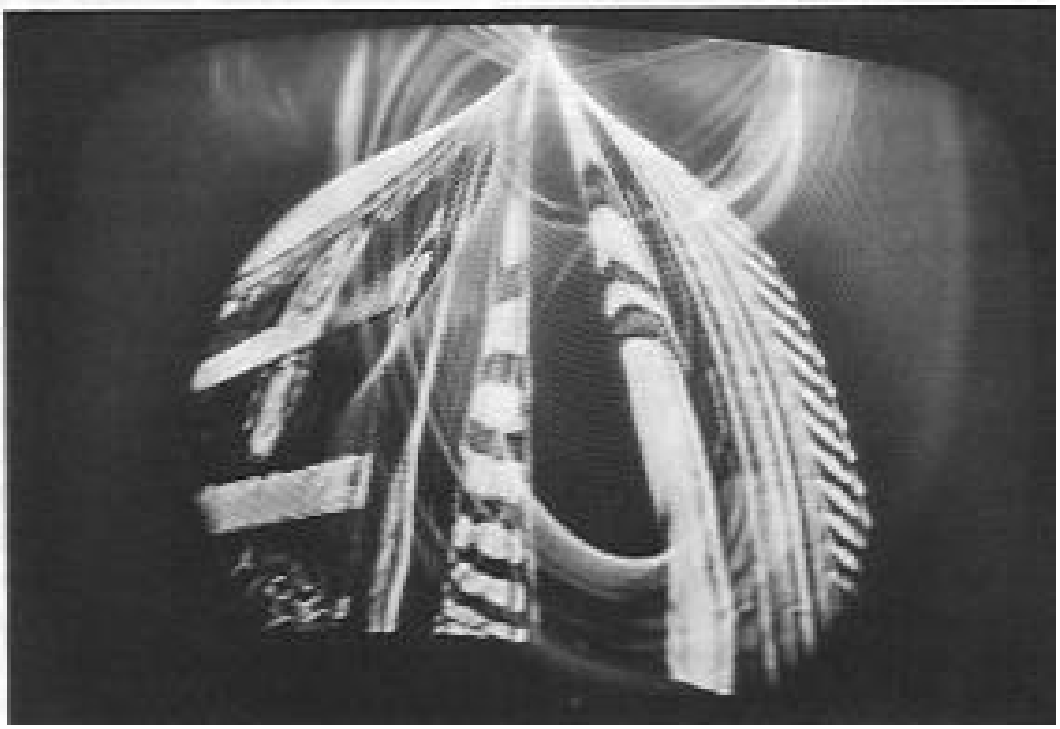
The second level of variability involves the unique characteristics of circuitry in each individual television receiver. Paik has resurrected several dozen discarded sets from junkyards and brought them back to wilder life than ever before in their previous circuits. "I am proud to say that thirteen sets suffer thirteen different varieties of distortion," Paik once announced, and then added: "1957 model RCA sets are the best." By altering the circuitry of his receivers with resistors, interceptors, oscillators, grids, etc., Paik creates "prepared tele-visions" that are equivalent in concept to David Tudor's prepared pianos.

The third level of variability is the manipulation of these prepared TVs with wave-form generators, amplifiers, and tape recorders to produce various random, semirandom, or completely controlled effects, examples of which are: (a) the picture is changeable in three ways using hand switches: upside-down, right-left, positive-negative; (b) the picture can become smaller or larger in vertical or horizontal dimensions separately, according to the amplitude of the tape recorder; (c) the horizontal and vertical electron-beam deflection of normal TV is changed into a spiral deflection using a yoke oscillator-amplifier, causing an average rectangular picture to become fanlike; (d) the picture can be "dissipated" by a strong demagnetizer whose location and rhythm contribute variety; (e) amplitude levels from radios or tape recorders can be made to intercept a relay signal at the grid of the output tube so that the picture is visible only when the amplitude changes; (f) asymmetrical sparks flash across the screen when a relay is intercepted at the AC 110-volt input and fed by a 25-watt amplifier without rectifier; (g) a 10-megohm resistor is placed at the vertical grid of the output tube and interacts with a sine wave to modulate the picture; (h) wave forms from a tape recorder are fed to the horizontal grid of the output tube, causing the horizontal lines to be warped according to the frequency and amplitude.

Once a set has been thus prepared, the simple flick of a switch results in breathtakingly beautiful imagery, from delicate Lissajous figures to spiraling phantasmagoric designs of surreal impact and dazzling brilliance. Tubular horizontal bands of color roll languidly toward the viewer like cresting waves; flaccid faces melt, twitch, and curl, ears replacing eyes; globs of iridescent colors flutter out of place. When videotape playback systems are used as image sources instead of broadcast programs, the extent of control is multiplied and the visual results are astounding.

However, technical descriptions tend to underplay the sheer intuitive genius of Paik's video art. His techniques are hardly exclusive and are far from sophisticated (engineers say he does everything he shouldn't), and his cluttered loft on New York's Canal Street is scientifically unorthodox to say the least. Yet out of this tangle of wires and boxes comes some of the most exquisite kinaesthetic imagery in all of electronic art. "My experimental color television has instructional resource value," he suggests. “Kinder-





Electromagnetic distortions of the video image by Nam June Paik. "Out of this tangle of wires and boxes comes some of the most exquisite kinaesthetic imagery in all of electronic art." Photos: Peter Moore.

garten and elementary school children should be exposed to electronic situations as early as possible. My experimental TV demonstrates various basic facts of physics and electronics empirically, such as amplitude modulation, radar, scanning, cathode rays, shadow mask tubes, oscillography, the ohm principle, overtone, magnetic character, etc. And it's a very pleasant way to learn these things."

Perhaps the most spectacular of Paik's videotape compositions was made early in 1969 for the PBL show "The Medium Is the Medium" at WGBH-TV in Boston, where later he became artist in residence. Paik brought a dozen of his prepared TVs into the studio; using three color cameras he mixed these images with two nude dancers, tape delays, and positive-negative image reversals. The nude slow-motion dancers in multiple levels of delayed action suddenly burst into dazzling silver sparks against emerald gaseous clouds; rainbow-hued Lissajous figures revolved placidly over a close-up of two lovers kissing in negative colors; images of Richard Nixon and other personalities in warped perspectives alternated with equally warped hippies. All this was set against a recording of the *Moonlight Sonata,* interrupted periodically by a laconic Paik who yawned, announced that life was boring, and instructed the viewer to close his eyes just as some fabulous visual miracle was about to burst across the screen.

Later in 1969, Paik produced an impressive teledynamic environment called *Participation TV.* The first version was shown in an exhibit called "Television as a Creative Medium" at the Howard Wise Gallery in New York City; it was then modified into *Participation TV No. 2* for the "Cybernetic Serendipity" exhibit in Washington, D.C. The principle of the piece involves three television cameras whose signals are displayed on one screen by the red, green, and blue cathode guns respectively; the tube shows three different images in three different colors at once. Color brightness is controlled by amplitudes from three tape recorders at reverse phase. Thus the viewer sees himself three times in three colors on the same screen, often appearing to float in air or to dissolve in shimmering water as multicolored feedback echoes shatter into infinity. This was repeated on three and four different TV sets arranged around the environment.

"Television has not yet left the breast": Nam June Paik with Charlotte Moorman in *TV Bra for Living Sculpture.* Howard Wise Gallery, New York, 1969. Images are modulated by musical tones played on the cello. Photo: Peter Moore.

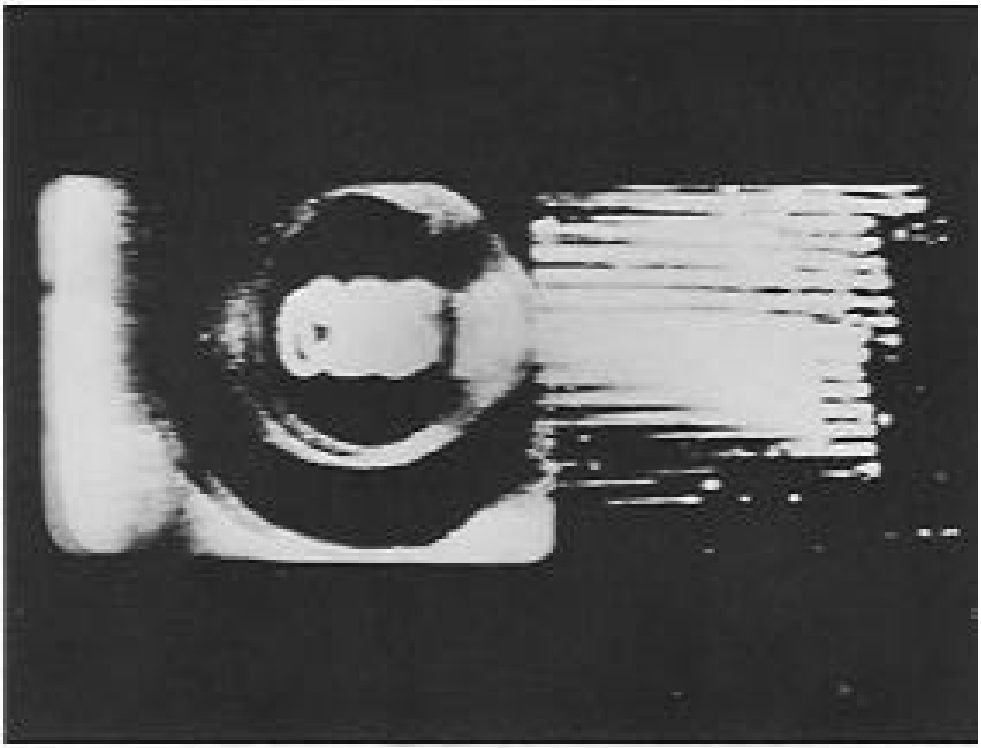
"The real issue implied in art and technology," he has said, "is not to make another scientific toy, but how to *humanize* the technology and the electronic medium… I suggest *Silent TV Station,* which transmits only beautiful 'mood art' in the sense of mood music. What I'm aiming at with my Lissajous figures and other distortions is a television equivalent of Vivaldi, or electronic Compoz. Lumia art will then become a permanent asset in the collections of millions of people. The *Silent TV Station* will simply be *there,* not intruding on other activities, and will be looked at exactly like a landscape or a beautiful bathing nude of Renoir. Normal TV bores you and makes you nervous; this soothes you. It's like a tranquilizer. Maybe you could call it video-soma."

Paik's exquisite sense of satirical irony comes through most effectively in his video sculpture pieces. In *TV Bra for Living Sculpture,* Paik covered cellist Charlotte Moorman's bare breasts with two tiny three-inch TV sets whose images were modulated by the notes played on her cello. "Another attempt to humanize technology," Paik explained. For an exhibit titled "The Machine at the End of the Machine Age" at the Museum of Modern Art, Paik contributed a chair with a built-in TV set in place of the seat: one was able to sit on the program of one's choice. For an exhibit at New York's Bonino Gallery he constructed a video crucifix of glaring and ominous proportions; and in the privacy of his studio loft there sits a box containing a TV set that peeps through the vaginal opening of a photographed vulva. "Art," he says, "is all activities, desires, phenomena, that one cannot explain."

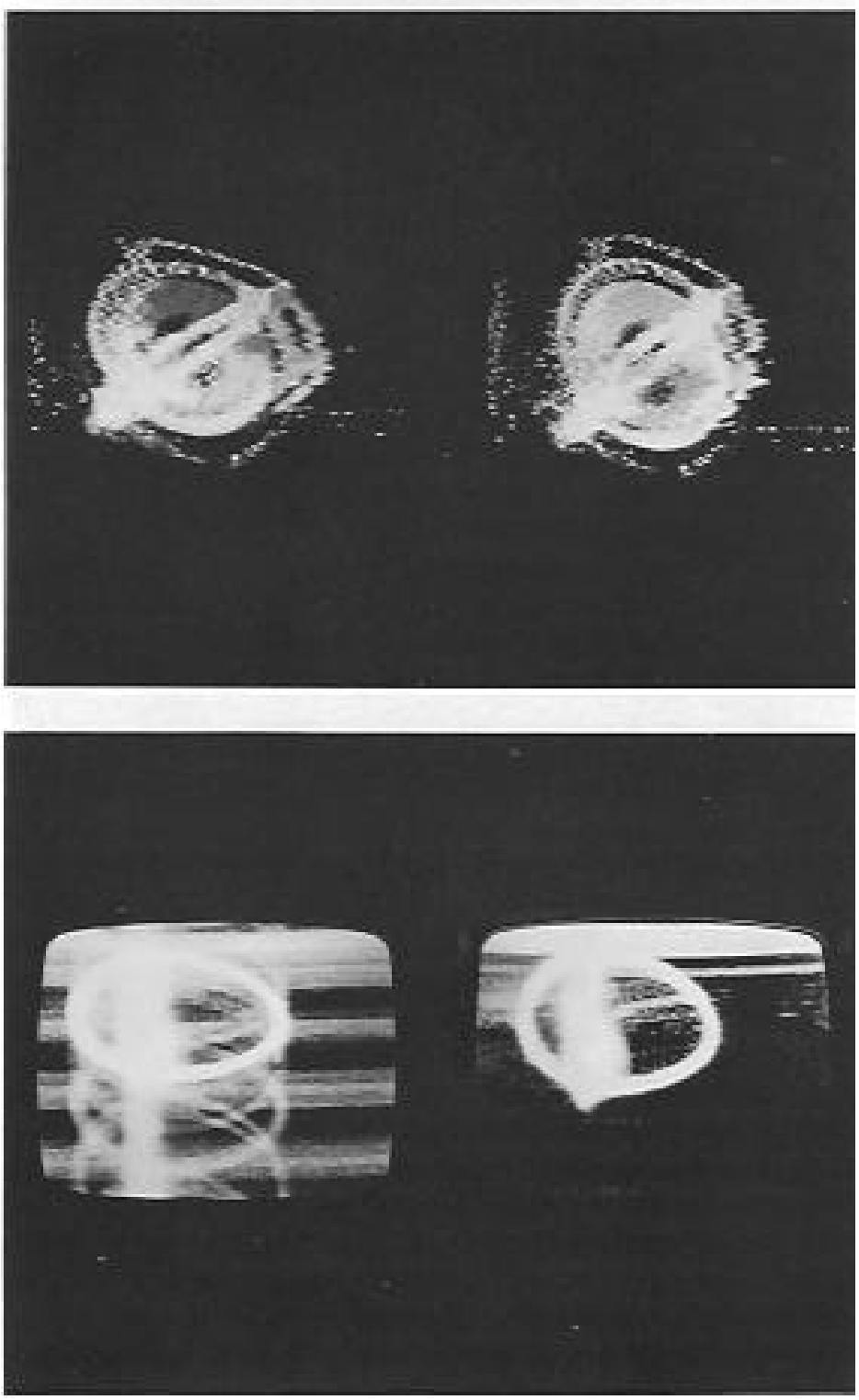
Aldo Tambellini: *Black TV*

"Our creative involvement with television must begin now so that the electronic energy of communication can give birth to new visions: we will face the realities which astronauts and scientists know to be part of life."

Intermedia artist and filmmaker Aldo Tambellini has worked creatively with television in many ways for several years. He has produced synaesthetic videotapes, videographic films, and closed-circuit teledynamic environments. All of his work, in whatever medium, is concerned with the theme of "black," both as idea and



Aldo Tambellini: *Black TV.* 1964-68.16mm. Black and white. 9½ min. Two years of TV news compressed into a staccato barrage of sight and sound.



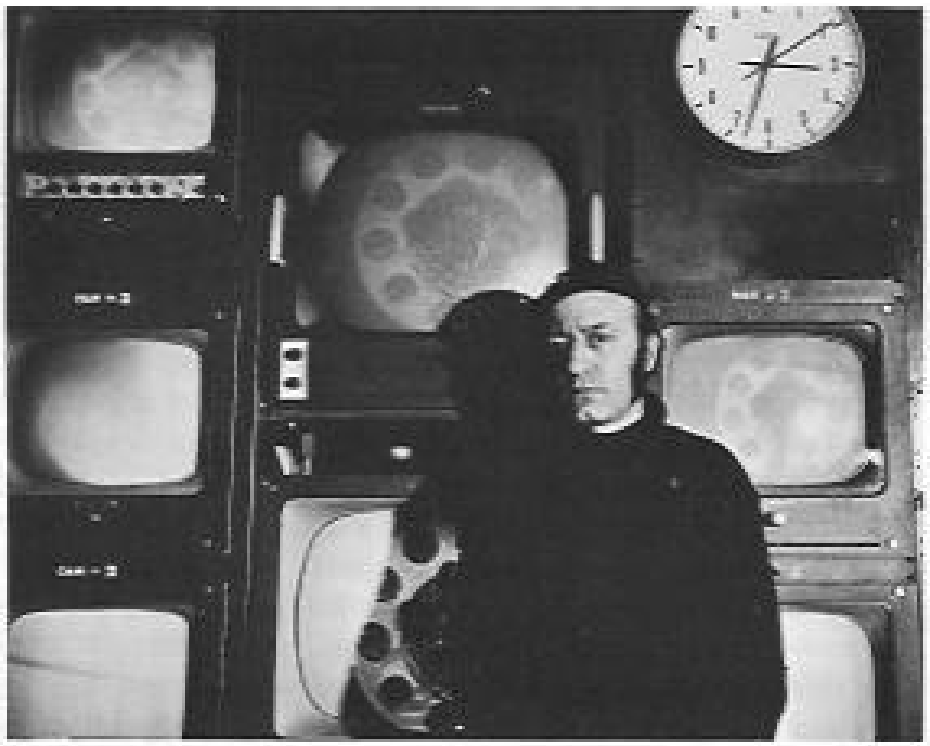
Aldo Tambellini: *Black Video Two*. 1968. VTR. Black and white. Both image and sound were generated electronically. Made in collaboration with engineer Ken Wise. Photos: Peter Moore.

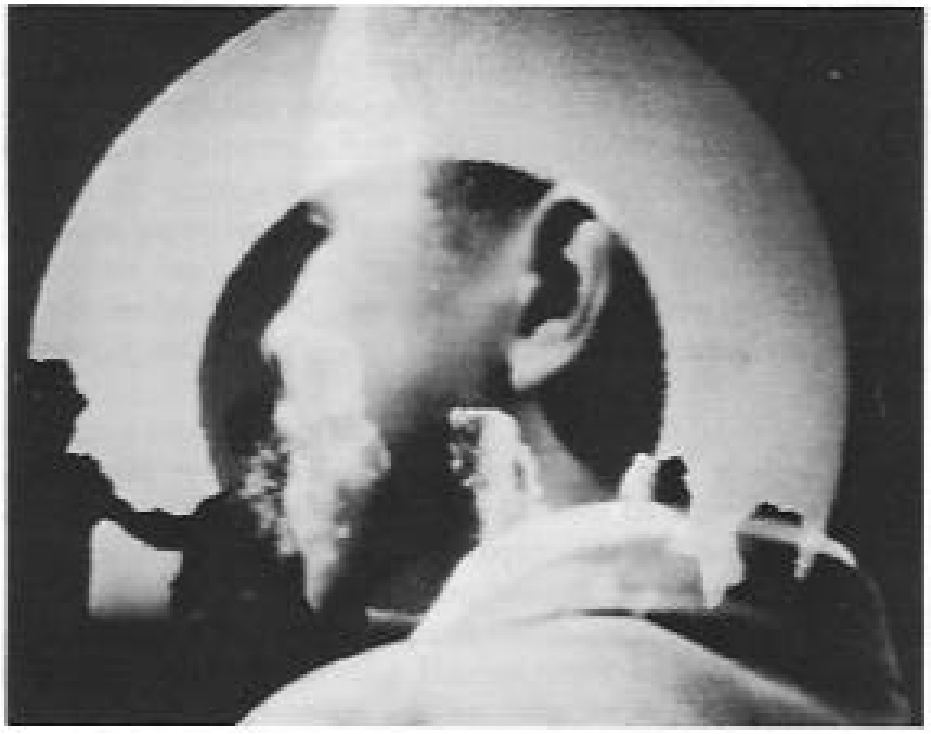
experience. For Tambellini, black is the womb and the cosmos, the color of skin and the color of the new consciousness. "Black is the beginning," he says. "It is birth, the oneness of all, the expansion of consciousness in all directions."

Tambellini began working with videotape in 1966-67 as part of his intermedia presentations. This work was subsequently expanded into live, closed-circuit, and broadcast video experiments. In the spring of 1969, Tambellini became the recipient of a grant from the New York State Council on the Arts in a project to develop relationships between artists and television engineers. He worked with technologists at five educational TV stations throughout New York, producing several experimental programs.

Also in 1969 he was one of six artists participating in the PBL program "The Medium Is the Medium" at WGBH-TV in Boston. The videotape produced for the project, called *Black,* involved one thousand slides, seven 16mm. film projections, thirty black children, and three live TV cameras that taped the interplay of sound and image. The black-and-white tape is extremely dense in kinetic and synaesthetic information, assaulting the senses in a subliminal barrage of sight and sound events. The slides and films were projected on and around the children in the studio, creating an overwhelming sense of the black man's life in contemporary America. Images from all three cameras were superimposed on one tape, resulting in a multidimensional presentation of an ethnological attitude. There was a strong sense of furious energy, both Tambellini's and the blacks', communicated through the space/time manipulations of the medium.

Black TV is the title of Tambellini's best-known videographic film, which is part of a large intermedia project about American television. Compiled from filmed television news programs and personal experimental videotapes, *Black TV* has been seen in many versions during the four-year period in which Tambellini constantly re-edited it. "Since my interest is in multimedia and mixed-media live events, and in experimental television, I think of film as a material to work with, part of the communications media rather than an end in itself. In the future we will be communicating through electronically transmitted images; *Black TV* is about the future, the contemporary American,





Aldo Tambellini in control room of WGBH-TV, Boston.
Below, a scene from *Black* (1969), an experimental videotape he produced at the station with 1,000 slides, seven 16mm. projectors, thirty black children, and three TV cameras.

the media, the injustice, the witnessing of events, and the expansion of the senses. The act of communication and the experience is the essential."

As Tambellini's remarks indicate, *Black TV* is about perception in the intermedia network. It generates a pervasive atmosphere of the process-level perception by which most of us experience the contemporary environment. Since it involves the use of multiple monitors and various levels of video distortion, there is a sense of the massive simultaneity inherent in the nature of electronic media communication. *Black TV* is one of the first aesthetic statements on the subject of the intermedia network as nature, possibly the only such statement in film form.

Black Video One and *Two* are representative of the techniques and approaches involved in Tambellini's videotape compositions. He calls them "video constructions" to emphasize that they are self-contained image- and sound-generating units, which do not take image material either from broadcast programs or closed-circuit cameras. Instead, special circuitry is devised to generate both image and sound electronically on two monitors. These completely synthetic videographics can be juxtaposed with other image material to create a sense of convergence between different worlds. As in most of Tambellini's work, archetypal white globes, spheres, or expanding coils are seen suspended in a black video void. Various forms of video noise are generated to accentuate the purely kinetic aspect of the tapes. Most of this work was first produced in 1967-68, and has been incorporated into Tambellini's intermedia presentations and films.

Black Video Two was exhibited at the Howard Wise Gallery in New York in 1967. Two years later, Wise commissioned Tambellini and two engineers from Bell Telephone Laboratories to produce a work for his exhibit "Television as a Creative Medium." Tambellini and the engineers, Tracy Kinsel and Hank Reinhold, came up with *Black Spiral,* a beautiful example of aesthetically manipulated video circuitry. The normal rectangular raster of the TV picture was transformed into a circular raster by modification of the circuitry from an *xy* coordinate system to a polar coordinate system. As a result, the broadcast picture appeared as a flowing spiral; any movement in the picture caused the spiral to swoop and explode in giant gaseous

curls of glowing phosphors. "Television is not an object," Tambellini said. "It's a live communication media. *Black Spiral* brings you live information. One day we will look at nature as the floating astronauts do in a spiral or circular form where no up or down or gravity exists." The sound was transformed by modulating normal audio signals from the television station with a random audio signal.

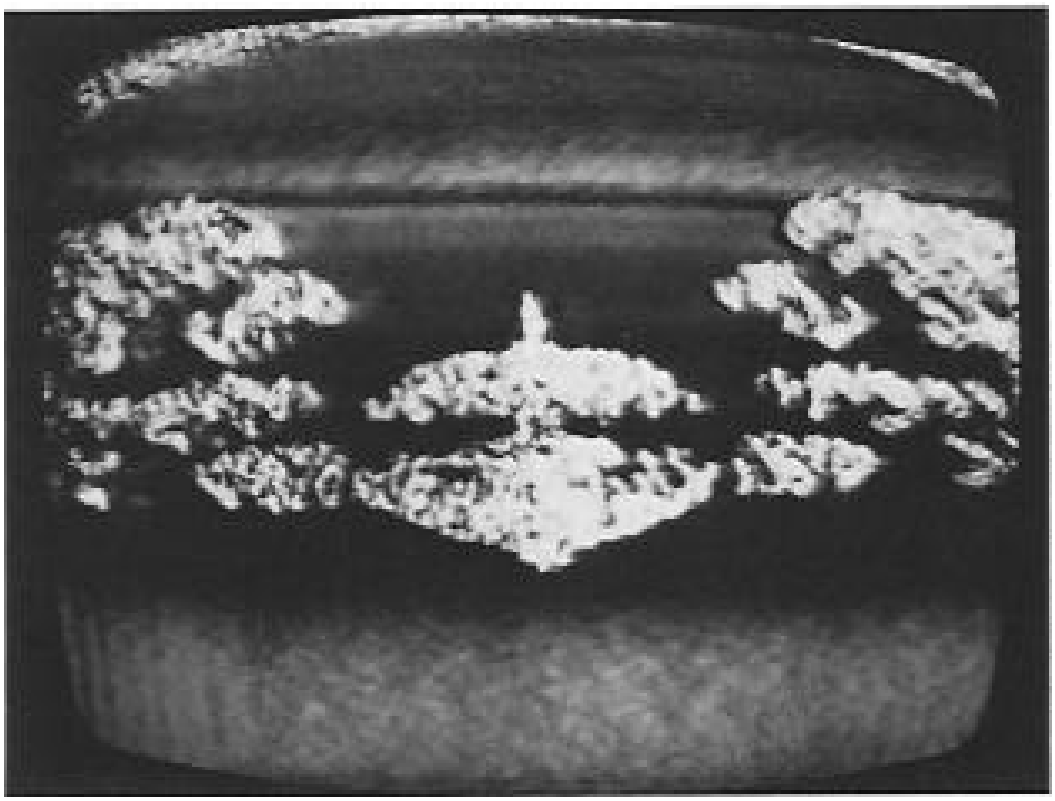
"The artist will have to get to this medium and begin to explore all possibilities," Tambellini urges. "After all, television is actually an image made of light which travels through time and space. I'm interested in getting to that particular point to actually show that light is a constantly moving and ever-changing form, that light is energy, and the same energy which moves through us is the energy which moves through the universe. It is the same energy we have discovered in the atom. When creative people begin to get involved with this idea of energy rather than making objects for someone, they will be exploring possibilities for everybody, art will be an exploration for all of mankind."

Eric Siegel: Video Color Synthesizer

"I see television as bringing psychology into the cybernetic twenty-first century. I see television as a psychic healing medium creating mass cosmic consciousness, awakening higher levels of the mind, bringing awareness of the soul."

In 1960, as a high school student of fifteen, Eric Siegel won second prize in the New York City Science Fair for a home-made, closed-circuit television system he constructed from second-hand tubes, a microscope lens, and junk parts. The following year he won another prize in the same competition for a home-made system called "Color Through Black-and-White TV." Although highly successful as a technician, he was virtually unknown as an artist until his spectacular "Video Color Synthesizer" was exhibited at New York's Howard Wise Gallery in May, 1969. It was clear the television generation had produced another genius.

The synaesthetic videotape *Psychedelevision in Color,* made by Siegel on his own home-made equipment, was at least as creative as works by more established artists represented in the exhibit, and according to some critics was the outstanding work of the entire



Eric Siegel: *Psychedelevision.* 1968-69. Synthesized VTR. "Great waves of curling clouds sweep under and over the viewer in turbulent fury."

show. "A work of genius," wrote video artist Peter Sorensen in a rave review devoted entirely to Siegel's tape. A reviewer for *Time* found *Psychedelevision ". . .* closer to Kubrick's *2001* than to Disney's *Fantasia...* a glowing visual abstraction."

Siegel's synthesizer is a device that converts the gray scale of a video signal (in this case from a portable videotape recorder playback unit) into changes in hue on the screen of a color TV set. The results are, according to Siegel, "electronic Rorschach patterns in the context of a metaphysical statement." The statement is the tape he prepared for processing through the synthesizer, and this tape itself was recorded through special equipment that the young artist, characteristically, calls his "magic box." This device, more aptly described as a "video effects generator," processes images from a portable TV camera during the actual taping: the images are transformed during the process of moving from the camera to the videotape recorder.

One segment of *Psychedelevision* involves variations on a portrait of Albert Einstein as recorded through the effects generator and tinted through the color synthesizer. Einstein's face is seen in infinitely-repeated multiples, then implodes, bursting into a shower of fiery sparks, reforms again from the fragments only to melt into Daliesque puddles.

Because of the peculiar nature of the color synthesizer, the colors of *Psychedelevision* are unlike most other video hues: now organic in appearance, now like shimmering metal or mercury, glowing with an unearthly light, trembling in fierce brilliance, like the colors on the inside of the retina. But in the best kinetic art it's form as well as color that determines the kinaesthetic effectiveness of the piece. Siegel's forms are virtually indescribable: great waves of curling clouds sweep under and over the viewer in turbulent fury, quite reminiscent of the Stargate Corridor in *2001.* Random fire bursts of phosphorescent crimson flash across this eerie landscape. Suddenly the forms become bilaterally symmetrical, with shapes and colors streaming wildly from the center of the screen.

"Psychedelevision is my attempt at video mind expansion," Siegel explained. "A new science must be created which can reach the inner core of human beings. One of the most important tools of this new science will be television. I've been thinking of a television system which would take impulses from a human being through electrodes in a positive feedback loop: the person would be able to watch his own neurological reactions to the video patterns and video information generators activated by himself. The American Dream no longer is evolving. It's in a state of decay. Television must be liberated."

Videographic Cinema

"We use video technology in filmmaking," explains Loren Sears, "exclusively for its graphic potentials. You can't really 'represent' or carry over satisfactorily into film the electronic viewing experience of watching television. You can carry the graphics over, but not the actual electronic experience." In the best videographic cinema, which we are about to discuss, the artist is at least able to approximate or suggest the luminescent atomic world of video imagery. As Sears indicates, however, the motivation is more toward the graphic characteristics exclusive to television, which simply cannot be duplicated by cinema alone.

"Metamorphosis is the main thing you can do with video that you can't do with film," says Scott Bartlett. "But video plus computers could do it even better." As it turns out, the optical effects of many Hollywood films have for several years been done on high-resolution videotape since that medium is less expensive to edit than film. But the fantastic capabilities inherent in videotape are not used; it is employed only as an imitation of cinema.

In the work discussed here, film and video technologies have been synthesized together, often through many generations of processing, to achieve graphic character unique in the world of film. Since one automatically thinks of any movie image as having been photographed by a camera, videographic films are quite startling on first encounter. Nothing in one's experience with movies can explain how such visions were captured on film—and indeed they were not: videographic cinema might succinctly be described as a film of videotaped film. "Color is the biggest problem," Bartlett admits. "It's very difficult to control. But more stable circuits are being developed all the time. The possible range of video color is as great as the range of color in any other medium. And because you're right there watching it happen you can deal with the psychological nuances of color and form."

Scott Bartlett: Tribal Television

"There's a pattern in my film work that could be the pattern of a hundred-thousand movies. It simply is repeat and purify, repeat and synthesize, abstract, abstract, abstract."

With his first film, *Metanomen,* made at San Francisco State College in 1966, Scott Bartlett went practically as far as possible within the structural limitations of black-and-white film and conventional cinema technology. Winner of the 1966 National Student Film Competition, *Metanomen* was a stunning kinaesthetic experience in which form and content merged in synaesthetic alloy. It became immediately obvious that with more elegant structural technologies Bartlett could raise this form/content metamorphosis to higher levels of graphic integrity. Like the best synaesthetic cinema Bartlett's films are not *about* an experience: they *are* the experience. Here we find kinetic empathy soaring to poetic heights.

Early in 1967, as Bartlett recalls, "television sort of found me. I had been superficially exposed to it, as my friend Tom DeWitt was in the TV department at school. That summer another friend, Michael MacNamee of Washington State University, said he could set up a TV studio situation for me at a station in Sacramento. I didn't know what would come of it, but *OFFON* came of it. And now *Moon* has come of that. Going into television doesn't mean I've abandoned cinema. It's a matter of expanding my technical vocabulary. I'm still doing *Metanomen* things, and I'm still doing *OFFON* things. But it's all adding up; I'm creating a new vocabulary."

Winner of many international awards, *OFFON (*see color plates) was the first videographic film whose existence was equally the result of cinema and video disciplines. Like all true videographic cinema, *OFFON is* not filmed TV, in the way that most movies are filmed theatre. Rather, it's a metamorphosis of technologies. "That's becoming a kind of aesthetic common denominator," says Bartlett. "Marrying techniques so the techniques don't show up separately from the whole. It's crossbreeding information. That's what a computer does, too. Having several aesthetics force each other into their separate molds and then sort of seeing what happens."

What happens in *OFFON is* extraordinary. The basic source of video information was in the form of twenty film loops that Bartlett and DeWitt had culled from more than two-hundred loops they had

made for a multiprojection light concert called *Timecycle,* described as a "two-hour moviemural." The iconographic character of the *Timecycle* imagery was clean and simple since it was intended for use in addition to other image projections. These loops were superimposed over one another to a depth of as many as eleven print generations for one strip of film, separating images from background, positives from negatives, adding colors to separate strips, and then recombining them optically.

Black-and-white loops were fed through a color film chain in the television control room, adding videotronic phosphor-texture to the cinematic graphics. Simultaneously, other loops and portions of Glen McKay's light show were rear-projected onto a screen on the studio floor, which was televised as a second video source. Both video sources were routed into one monitor: two images riding between two incoming channels, each pattern competing for exhibition on the monitor, generating a cross-circuited electronic feedback loop ". . . to the point where white information in competition with itself breaks down into colors: spectral breakdown." A second TV camera televised the monitor, feeding the signal to a videotape recorder. This master tape was again processed through the switching/mixing system. Instead of being recorded back onto film in the usual kinescope process, a special camera was set up in front of a monitor that filmed at the video rate of 30 fps instead of the movie rate of 24 fps.

"The entire process took three hours," said Bartlett. "The advantage I had was that all the material was on loops and I could just keep adjusting knobs and arranging appliances, cameras and such, until I had what I wanted, and then just film a burst of it." This videographic imagery was again processed through an ordinary cinematic optical printing system in Bartlett's studio. "The video colors were pale, but they were for that special texture that you can't get any other way. After I had that, I separated the film into AB rolls and dyed the strips with food color. One roll was dyed one color, another roll was dyed a different color. I built a trough and filled it full of dye and rolled the film from one reel through the trough and up along banks of heaters. I sat atop a ladder and very slowly rolled the film through this assemblage at a rate of about five or six inches a minute. Took me all night. A yoga dedication."

It was well worth the dedication. *OFFON* begins with a close-up of a huge blue-red eyeball that pulsates with the sound of a heartbeat. The eye is both human and video: suddenly it bursts into an electromagnetic field of vibrations and becomes a slowly-expanding force field, a tight ring of bright red in a pale blue universe. The red ring blossoms into a constellation of scattering sparks and suddenly we see the image of a mirror-doubled dancer throwing out multiple layers of arms like a human flower in bloom. "The multiplication of arms was done in cinematic optical printing," Bartlett explained. "But the multiplication of the multiplications was done in video: the halos around the arms were created by video feedback."

Pink and blue sea gulls wheel languidly around the disintegrating dancer, whose image slowly melts into an infinity of geometrical echoes. This evolves into a close-up of a girl's face that seems to be streaking off, disintegrating but somehow holding together. "That's a good example of hiding one technique inside another," said Bartlett, "by doing essentially the same thing with both systems and just compounding one action. Two pieces of film of the same shot were flipped over so that the left became the right. This was printed back onto the left, except out of register so that it staggered behind, apparently trying to catch up with the right. And the shot itself initially was a very slow zoom, rocking the camera back and forth while zooming in on the girl's face, who was herself rocking back and forth. When that was fed through the monitor it was refilmed by a zoom lens which was also rocking and swaying."

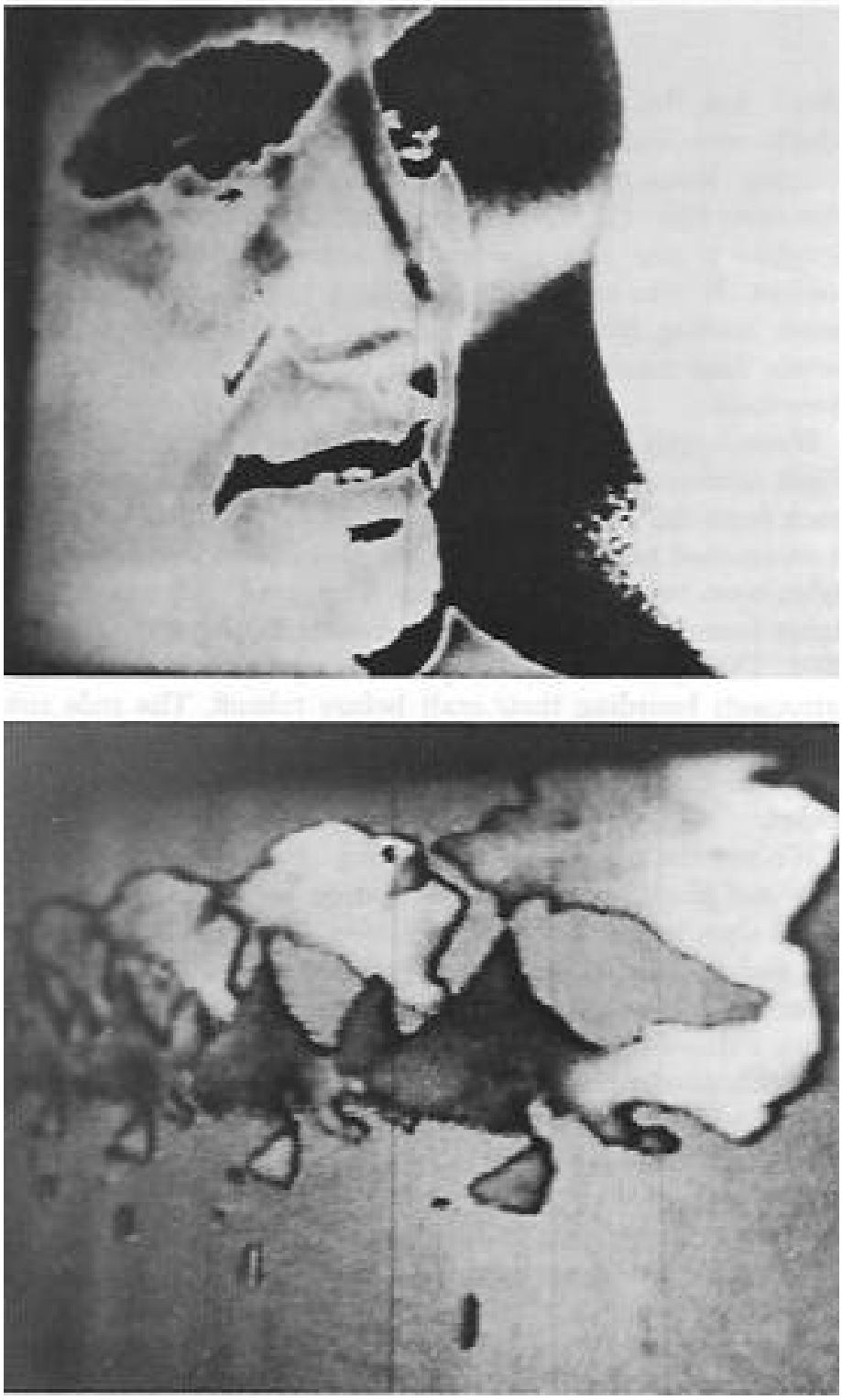
OFFON moves with dynamic thrust through a succession of images that never seem separate from one another, each evolving into videographic metamorphosis, exploding, glowing, disintegrating, cracking into infinity until it all ends with a final burst of kinetic energy. Later in 1968, Bartlett made a second videographic film, this time in black-and-white, called A *Trip to the Moon.* It involved a live panel discussion between Bartlett and friends on the subject of the new consciousness, cosmic unity, and metamorphosis. Films and slides of the moon and rockets were keyed into the scene randomly and certain interesting effects were achieved by associating audio and video feedback techniques. However, the film was too long (approximately half an hour) and not varied enough to support its length.

In the spring of 1969 Bartlett set about remaking *A Trip to the Moon,* but the film that resulted, simply titled *Moon,* became a wholly new work with only a few seconds of original footage remaining. *Moon* proved to be his most satisfying work, more impressive even than *OFFON,* because in addition to spectacular videographics it also was constructed around a substantial conceptual content. It was completed less than two months before the first moon landing, yet is more effective in its metaphysical evocative power than many of the films of the same thematic content made since then.

Moon begins in a black void as we hear a recording of the Apollo Eight astronauts reading from Genesis. Under this is a rather spacey track from the Steve Miller album, *Sailor.* Suddenly the black void is recognized as a night sky as we approach a distant airport whose lights seem to float in deep space. The image is flopped; the runway lights become a starry corridor similar to the slit-scan corridor of *2001*. This gives way to stop-frame, optically distorted footage of astronauts boarding their craft before takeoff. The pale colors and unearthly motions lend a kind of dreamlike *déjà-vu* quality to the scene as these hooded creatures lumber slowly toward the giant rocket.

We see the ocean and a dawning sky. As though from another time and place, we hear reverberating voices speaking of the Universal One, cosmic unity, the *I Ching.* A purple face appears in the sky and is fragmented into infinity. Waves of the ocean—obeying lunar gravity—crash in slow motion, and over this we see skip-frame video-distorted scenes of the lunar module simulator spinning and maneuvering in space.

Now we're inside a television control room with several monitors reflecting the faces of men whose words seem far away. The control center appears like some window onto a video space of another dimension. A roaring wind takes us soaring through towering clouds, an ethereal atmosphere similar to the opening sequence of *8½*. Aqueous fingers of de-beamed video phosphors stretch across the sky like phantom visitors from another galaxy. A spaceman whirls through the clouds, flashing and sparkling like an asteroid. The graphic tempo increases with flashes of light and a tremendous roar until the final crescendo. The last image we see is the ocean receding from a beach.



Scott Barlett: *Moon.* 1969. VTR/16mm. film. Color. 8 min.". . . A purple face appears in the sky and is fragmented into infinity..."

Moon is a beautiful, eerie, haunting film, a product of the New Surrealism, all the more wonderful for the fact that we do not actually see the moon: only the manifestation of its power here on earth: the ebb and flow of the waters that cover three-quarters of our planet. The film contains some of the most spectacular manipulations of video techniques Bartlett has yet achieved, sending fiery rainbows into a cloudy sky, transforming men and rockets into shattering crystals, creating a portrait of the cosmos in continual metamorphosis.

> The magic of the film [said Bartlett] is its totally undefined meaning, the purely visceral message. The message could be called a code that we're trying to learn about, a code for connections to new space and new consciousness, a code for making it to the moon metaphysically, paths for your mind to get out where you can reach anything. In some ways technique equals meaning: the stop-frame action means mechanically defined space and time and the feedback layers are like accordion time—all the times stacking up on top of one another.
>
> Commercial filmmakers use certain images or techniques as standard recognizable givens. Like the way a dissolve for them means the passage of time. But for us dissolve means "blend." Not so much one, not so much the other, but something in between the two, getting from one to another. It's valuable to hang somewhere between two different realities as a dramatic element. Dali does that. You see a face but then you realize the face is made up of a woman's ass and a cow and a flagpole or something. Your mind goes from one understood state to another understood state and you realize that you've voyaged in that process.

The understood state toward which Bartlett was headed in the latter part of 1969 was a "tribal television network" linking thirty or forty experimental video centers on the West Coast, some of them sponsored by rock groups such as the Jefferson Airplane and the Grateful Dead. "It will be a family of production centers cabled together and co-broadcasting with an FM radio station," Bartlett explained. "The FM radio would provide the mainstream programming and the disk jockey would be televised and would switch on visuals during records which would be electronically synthesized interpretations of the sounds. The production centers would make specials which would always supercede the main entertainment. The television station would be a voice: a natural

accelerating pace for more people sharing more knowledge. The tribal television would allow art and science to wed in a media marriage free from commercial concerns, free for pure experiment."

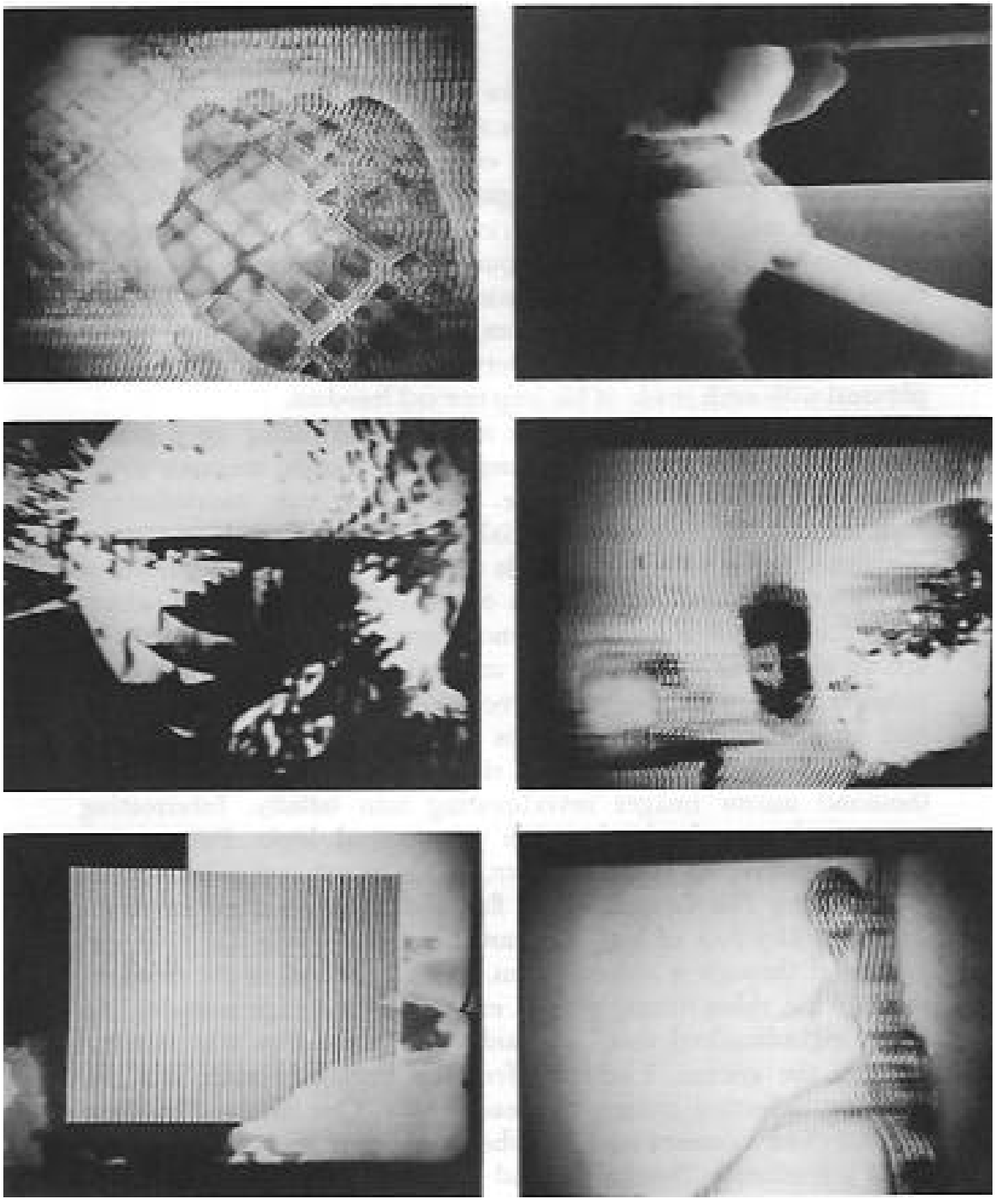
Tom DeWitt: *The Leap*

"I look at the medium through its manipulation of time and space. Man's ability to manipulate space is very limited. Actually a space change is almost inconceivable. The same with our control of time. We're contained in clock time. But the medium at least *seems* to control space within completely malleable time."

After his collaboration with Scott Bartlett in the making of *OFFON,* Tom DeWitt made his own extraordinary videographic film, *The Leap,* completed late in 1968. Although the two films were born at approximately the same time and place in San Francisco, they are dramatically different in almost every respect: evidence not only of two strongly individualistic personalities, but of the latitude for personal expression possible in the videotronic medium.

"I turned to cinema as a vehicle for expressing my intuition," DeWitt explained. "I find myself only at the threshold and I can see no horizons. I try to use technology flexibly to realize dream images, but I would hardly call my work more than the first crude stage of image-manipulation through modern technology. I've been trying to learn enough about image technologies so that if I ever make a dramatic statement I'll know that it's being communicated through the essence of the medium. There was a time when I had my copy of Fortran and began to learn it—I saw computer art as a potentially limitless field—but I decided to explore what I could contribute through videographic cinema."

The leap of the film's title might be interpreted in several ways, all of them appropriate: a leap of consciousness from one reality to another; a leap in image technology from cinema to video; a leap to escape the suffocating boundaries of metropolitan life (in this respect *The Leap* is a continuation of the theme of DeWitt's first film, *Atmosfear*); and finally it might be seen as a leap to escape the purely videotronic world of the film's imagery. However one chooses to view it, *The Leap* unquestionably accomplished DeWitt's motivation: "I wasn't satisfied with the film until I felt that without any verbal



Tom DeWitt: *The Leap.* 1968. VTR/ 16mm. film. Color. 6 min. "A man seems to interact physically with videographic apparitions... androgynous symbols and arcane electronic voodoo..."

references it would take you on an emotional trip, reacting purely to the essence of cinema and television."

Whereas *OFFON* is composed entirely of iconographic, geometric concrete imagery—organic figures processed through the medium until only a fundamental primary structure is left—*The Leap* is impressive for its mixture of pure video space with representational filmic space. Thus an ordinary man seems to interact physically with videographic apparitions, moving in and out of different space/time realities, fluctuating between the physical and the metaphysical with each stride of his leap toward freedom.

We see a man jumping across rooftops and racing up a grassy hillside. He dodges through a jungle of billboards, ominous structures, and forests of barbed wire. This is the basic vocabulary: a man running through an industrial landscape in search of nature. But through the video system this simple footage was transformed into a breathtaking constellation of exploding perspectives, shimmering masses of color, androgynous symbols, and vast realms of arcane electronic voodoo. There are endless zooms into quivering video centers, rectangles within rectangles of vanishing imagery. In mid air the man's body becomes a videotronic ghost filled with vibrating silvery shock waves. A simple motion is shattered into a thousand mirror images reverberating into infinity. Intersecting space grids completely demolish perspectival logic. Positive becomes negative, up becomes down, inside is out and outside is in.

In making *The Leap,* DeWitt first shot approximately one-hundred and fifty feet of high contrast, black-and-white film that was processed through a video system. "By compounding the imagery through the video mixing panel I expanded the image material into about eight-hundred feet," he said. "While the film was running through the system, I added effects by keying, wiping, and debeaming, inserting images into each other. One of the film-chain monitors had a camera on it, so whenever I switched to that camera I got a feedback. That studio had only two monitors for four film projectors and two slide projectors, so some of the calls were blind, based on what I thought was back on the film chain. I could see the final mix on monitors, plus one of the two sources coming in from film chains, plus images coming in from a videotape recorder we started to use after the first session. So at about three layers deep it got pretty

Scott Bartlett filming Tom DeWitt at work in television control room. Photo: William Bishop.

complex. I was very happy because I was penetrating an area that was completely new to me; but if I were doing it over again I'd want more control. I'd want to see all the images feeding in; I'd want synchronization between the images, and I'd master roll the images before I put them in."

During fifteen hours of studio time DeWitt was assisted by an engineer who operated the videotape machines, an engineer operating the two film chains, and a man on the feedback camera. DeWitt made all aesthetic decisions at the master control panel. "One of the main things I like about video," he explains, "is the immediacy of seeing what you're doing, which is a tremendous balancing effect because you can make decisions on the spot which feed back into the work you're creating. It's much more spontaneous than working in film, where you're never really sure what the results will be until you get the film back. Plus the effects built into television which are very difficult to get in film, particularly keying and wipes."

The master tape was re-edited as a whole before a kinescope was made. The kinescope was edited through conventional film techniques, and color was added on DeWitt's home-made optical printer. This footage was edited once again, and finally an electronic sound track was made by Manny Meyer, who composed the track for *OFFON. "*I wanted to express an emotion," DeWitt said. "Certainly you're triggering something in the unconscious when you start playing with space/time alterations."

Jud Yalkut: *Paikpieces*

Recognized as one of the leading intermedia artists and film-makers in the United States, Jud Yalkut has collaborated with Nam June Paik since 1966 in a series of films that incorporate Paik's television pieces as basic image material. Yalkut's work differs from most videographic cinema because the original material is video-tape, not film. They might be considered filmed TV; yet in each case the video material is selected, edited, and prepared specifically for filming, and a great deal of cinematic post-stylization is done after the videographics have been recorded.

In addition to Paik's own slightly demonic sense of humor, the films are imbued with Yalkut's subtle kinaesthetic sensibility, an ultra-sensitive manipulation of formal elements in space and time. Paik’s

Jud Yalkut*: Paikpieces. (Left column) Beatles Electroniques.* 1967. VTR/ 16mm. film. Black and white. 3 min. *(Right column) Videotape Study No. 3.* 1968. VTR/16mm. film. Black and white. 5 min.

electro-madness combined with Yalkut's delicate kinetic consciousness result in a filmic experience balanced between video and cinema in a Third World reality.

The two films illustrated here—*Beatles Electroniques* and *Videotape Study No. 3*—are part of a forty-five-minute program of films by Yalkut and Paik, concerning various aspects of Paik's activities. The other films include *P*+*A*-*I*=(K), a three-part homage to the Korean artist, featuring his concert Happening performances with Charlotte Moorman, Kosugi, and Wolf Vostell; his robot *K-456* walking on Canal Street in New York; and his color television abstractions. Other films in the *Paikpieces* program are *Cinema Metaphysique,* a nontelevision film in which the screen is divided in various ways: the image appears on a thin band on the left side, or along the bottom edge, or split-screen and quarter-screen; and two other films of Paik's video distortions, *Electronic Yoga* and *Electronic Moon,* shown at various intermedia performances with Paik and Miss Moorman.

Beatles Electroniques was shot in black-and-white from live broadcasts of the Beatles while Paik electromagnetically improvised distortions on the receiver, and also from videotaped material produced during a series of experiments with filming off the monitor of a Sony videotape recorder. The film is three minutes long and is accompanied by an electronic sound track by composer Ken Werner, called *Four Loops,* derived from four electronically altered loops of Beatles sound material. The result is an eerie portrait of the Beatles not as pop stars but rather as entities that exist solely in the world of electronic media.

Videotape Study No. 3 was shot completely off the monitor of the videotape recorder from previously collected material. There are two sections: the first shows an LBJ press conference in which the tape was halted in various positions to freeze the face in devastating grimaces; the second section shows Mayor John Lindsay of New York during a press conference, asking someone to "please sit down," altered electronically and manually by stopping the tape and moving in slow motion, and by repeating actions. The sound track is a political speech composition by David Behrman. In his editing of these films, Yalkut has managed to create an enduring image of the metaphysical nature of video and its process of perception.

Ture Sjölander, Lars Weck, Sven Höglund: Video Monument in Sweden

In the fall of 1967, intermedia artists Ture Sjölander and Lars Weck collaborated with Bengt Modin, video engineer of the Swedish Broadcasting Corporation in Stockholm, to produce an experimental program called *Monument.* It was broadcast in January, 1968, and subsequently has been seen throughout Europe, Asia, and the United States. Apart from the technical aspect of the project, their intention was to develop a widened consciousness of the communicative process inherent in visual images. They selected as source material the "monuments" of world culture—images of famous persons and paintings.

The program was created in the form of a black-and-white videographic film, made with the telecine projector from other film clippings and slides. The films and slides first were recorded on videotape and then back onto film for further processing. Image distortions occurred in the telecine process of recording film on videotape. The basic principle involved was the modulation of the deflection voltage in a flying-spot telecine, using sine and square impulses from a wave-form generator. With the flying-spot method used by Swedish television, the photographic image is transformed into electrical signals when the film is projected toward a photocell with a scanned raster as the source of light. The deflection voltage regulates the movement of the point of light that scans the screen fifty times per second.

In the production of *Monument,* the frequency and amplitude of the flying-spot deflection was controlled by applying tones from the wave-form generators. Thus image distortions occurred during the actual process of transforming original image material into video signals, since the scan that produces the signals was electromagnetically altered. In principle this process is similar to methods used by Nam June Paik and others, except that the Swedish group applied the techniques at an early stage in the video process, before signal or videotape information existed.

After the videotape was completed from various film clips, a kinescope was made, which was edited by Sjölander and Weck into its final form. The result is an oddly beautiful collection of image

The King of Sweden as seen in videographic film *Monument* (1967), by Ture SjÖlander and Lars Weck.

Paul McCartney in *Monument.*

sequences unlike any other video art. We see the Beatles, Charlie Chaplin, Picasso, the *Mona Lisa,* the King of Sweden, and other famous figures distorted with a kind of insane electronic disease. Images undergo transformations at first subtle, like respiration, then increasingly violent until little remains of the original icon. In this process, the images pass through thousands of stages of semicohesion, making the viewer constantly aware of his orientation to the picture. The transformations occur slowly and with great speed, erasing perspectives, crossing psychological barriers. A figure might stretch like Silly Putty or become rippled in a liquid universe. Harsh bas-relief effects accentuate physical dimensions with great subtlety, so that one eye or one ear might appear slightly unnatural. And finally the image disintegrates into a constellation of shimmering video phosphors.

More than an experiment in image-making technologies, *Monument* became an experiment in communication. *Monument* became an image-generator: newspapers, magazines, posters,

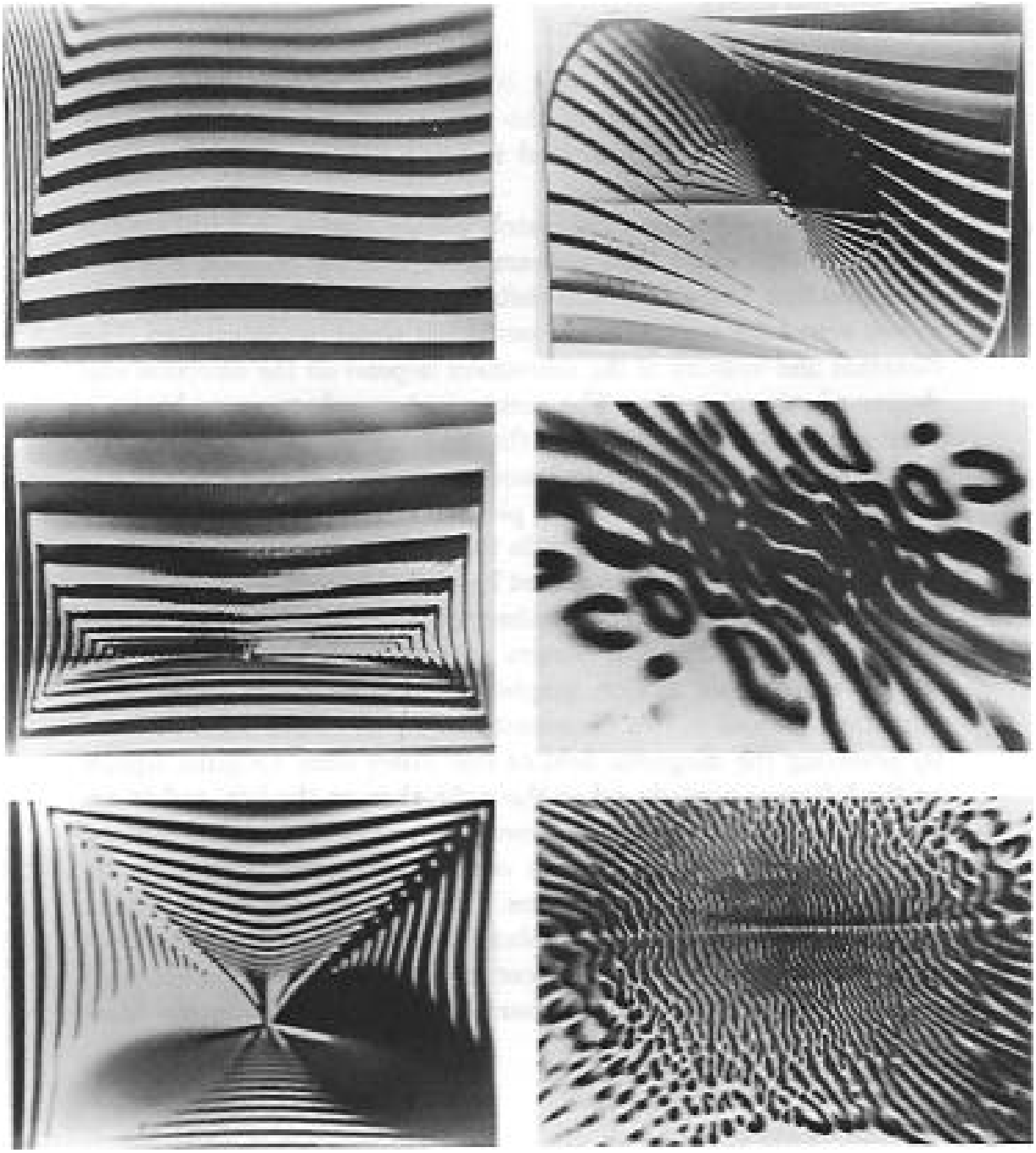
record albums, and even textile factories began using images from the videographic film. Sven Höglund, a well-known Swedish painter, entered the project after the film was completed. He made oil paintings based on the *Monument* images because he found them "parallel to my own creative intentions; I had for a long time been working on problems concerning transformations of forms. My painted versions of the images became another phase of the experiment in communication called *Monument.*

"Other phases were silk-screen prints, illustrated magazine articles, posters, giant advertisements. In each phase *Monument* experiments with pictures in their relation to spectators. The common denominator is the mass-media picture, especially the most commonly seen pictorial representation, the television picture. The pictures in the film are so well known to the public that they have been invested with symbolic meaning. People recognize them and are able to retain this identification throughout all the transformations and variations of the electronic image."

Lutz Becker: *Horizon*

The young German artist Lutz Becker began experimenting with video feedback techniques in 1965 at the age of twenty-four. In the period 1967-68 he produced three films of these experiments as a student in the film department of the Slade School of Fine Art, London, in collaboration with the BBC. *Experiment 5, Cosmos,* and *Horizon* are little more than documents of the cathode-ray tube experiments and thus are not particularly significant as examples of videographic cinema per se. They do, however, clearly demonstrate the degree of control and precision that is possible in this technique, and will serve to illuminate our conception of it.

In cooperation with BBC engineer A. B. Palmer, Becker began his experiments by focusing a TV camera on the blank white raster of its own monitor—the pictureless glowing rectangle produced by a constant strength of electrons. A point of light appearing momentarily on the monitor as a result of unavoidable "camera noise" will be picked up by the camera and reproduced again on the screen. If the monitor raster and camera raster are suitably registered, the reproduced point will coincide in position with the original and will be sustained as the cycle repeats. Depending on the total *gain* around



Lutz Becker: *Horizon.* 1968. Video feedback. 16mm. Color. 5 min. Tightly controlled phasing between a TV camera and its own output monitor.

the feedback loop—that is, the video signal's tendency to exceed the electrical limits of the equipment—the point brightness will either increase until limited in some way, or decrease to extinction.

If the two rasters are deliberately placed slightly out of register, the reproduced point then appears alongside the original, the next alongside that, and so on. The visible effect is that the point of light moves across the picture as the positional errors are integrated. The direction and velocity of the movement depend on the direction and degree of misregistration. The point can be made to move horizontally or vertically by shifting the registration between the two rasters in horizontal or vertical modes. Changes of raster amplitude (adjusting the strength of the picture signals) produce either a convergent or divergent motion in the picture. If one raster is tilted relative to the other, the movement becomes circular.

By combining these raster-misregistration feedback techniques with careful adjustment of camera controls Becker achieved a wide variety of concrete motion graphics, which he describes as "sustained oscillations in two dimensions." Further effects were realized by reversing the magnetic field of one raster scan. Original signals on the left were reproduced on the right, then on the left, and so on. The pattern thus achieved is symmetrical around a central vertical line. Further convolutions were obtained by combining scan reversals with raster misregistrations. These are some of the feedback possibilities employing only a blank scanned raster and attendant noise patterns. An entirely different range of effects can be obtained if a second and a third video source are introduced into the feedback loop.

Closed-Circuit Television and Teledynamic Environments

"Television can't be used as an art medium," claims Les Levine, "because it already *is* art. CBS, NBC, and ABC are among the greatest art producers in the world." The art of which he speaks is the art of communication. And, after all, art always has been communication in its most eloquent form. But until television, artists have been inventors first and communicators second. Artists have created things to be communicated: they have not created communication. But television is neither an object nor a "content." Tele-vision is the art of communication itself, irrespective of message. Television exists in its purest form between the sender and the receiver. A number of contemporary artists have realized that television, for the first time in history, provides the means by which one can control the movement of information throughout the environment.

In this respect television is not fundamentally an aesthetic medium, at least not as we've traditionally understood the term. It's an instrument whose unique ability is, as its name implies, to transport audio-visual information in real time through actual space, allowing face-to-face communication between humans or events physically separated by continents and even planets. The self-feeding, self-imaging, and environmental surveillance capabilities of closed-circuit television provide for some artists a means of engaging the phenomenon of communication and perception in a truly empirical fashion similar to scientific experimentation.

This approach to the medium may in fact constitute the only pure television art, since the teleportation of encoded electronic-signal information is central to its aesthetic. The actual transmission of information across space/time is not an issue when video equipment is used only for aesthetic manipulation of graphic images as in synaesthetic videotapes and videographic films. I use the term teledynamic environment to indicate that the artist works directly with the dynamics of the movement of information within physical and temporal parameters. The physical environment is determined by the

Les Levine with *Iris.* 1968*.* Three TV cameras and six monitors in an eight-by-five console. Collection of Mr. and Mrs. Robert Kardon, Philadelphia, Pennsylvania.

characteristics of the closed-circuit video system. The artist is concerned not so much with what is being communicated as with *how* it's communicated and the awareness of this process. Thus television becomes the world's first inherently objective art form.

Les Levine: *Iris*

"Machines that show the human organism itself as a working model," says Les Levine, "may eventually destroy the need for psychology as we know it today." Essentially an intermedia artist who works in plastics, alloys, and disposables, Levine was among the first conceptual artists on the New York scene focusing more on idea than icon. Naturally he turned to television, the most conceptual of all creative media. As a video artist Levine is best known for two closed-circuit teledynamic systems, *Iris (*1968) and *Contact: A Cybernetic Sculpture (*1969).

In both works the motivation is somewhat psychological: Levine is fascinated by the implications of self-awareness through the technologically-extended superego of the closed-circuit TV. "I don't tend to think of my work purely in psychological terms," he explains, "but one must assume some psychological effect of seeing oneself on TV all the time. Through my systems the viewer sees himself as an image, the way other people would see him were he on television. In seeing himself this way he becomes more aware of what he looks like. All of television, even broadcast television, is to some degree showing the human race to itself as a working model. It's a reflection of society, and it shows society what society looks like. It renders the social and psychological condition of the environment visible to that environment."

In *Iris,* three concealed cameras focus on an environment (one's living room, for example) in close-up, middle-distance, and wide-angle. These images are displayed on six black-and-white TV tubes mounted in an eight-foot console that also houses the cameras. Combinations and distortions of images interact from screen to screen in a kind of videotronic mix of the physical and metaphysical elements of the environment. Seeing three different views of oneself in combination with three others is a unique experience.

"Looking at *Iris*," he remarked, "many people are greatly surprised at the way they actually look. They see themselves the way they

usually see other people on television, and they have to make some kind of judgment about themselves in terms of themselves as a piece of information. That's what *Iris* does most of all, it turns the viewer into information. The viewer has to reconsider what he thought about himself before. He must think about himself in terms of information. You notice people in front of *Iris* begin to adjust their appearance. They adjust their hair, tie, spectacles. They become aware of aspects of themselves which do not conform to the image they previously had of themselves."

Contact: A Cybernetic Sculpture continues the principles of *Iris* on a somewhat expanded scale. It involves eighteen monitors and eight cameras mounted in a sleek eight-foot stainless steel console, nine monitors and four cameras on each side beneath plastic bubble shields. As in *Iris,* the cameras produce close-ups, mid-range and wide-angle views as images shift from screen to screen every few seconds. Each monitor screen is covered with a colored acrylic gel so that a given image may be seen in nine different colors as it swirls through the closed-circuit system.

"*Contact* is a system that synthesizes man with his technology," Levine states. "In this system, the people are the software. It relies totally on the image and sensibility of the viewer for its life. It is a responsive mechanism and its personality reflects the attitudes of its viewers. If they are angry, the piece looks angry. Contact is made not only between you and your image, but how you feel about your image, and how you feel about that image in relationship to the things around you. The circuit is open."

Levine is rather indifferent to the physical structure of the consoles that house his video systems. "I don't tend to consider my work in aesthetic terms," he says. "I don't make a work with any aesthetic principles in mind. If it happens to be a nice object to look at, that's fine. What a TV set looks like is only of value in terms of iconic imagery. However, what comes on the TV set is the real intelligence of the object, which has no intelligence until the software is injected into it. People don't look at the TV set, they look at the tube and the tube is always pretty much the same shape. But television is constantly re-wiping itself and printing over all the time, so that depending on what information is available at any given moment the image will be different. So there's really no image, no definite image.

Les Levine with *Contact*: *A Cybernetic Sculpture.* 1969. Photo: courtesy of Museum of Contemporary Art, Chicago, Illinois.

One could equate it, because of its flexibility, with looking at a person sitting in a chair: he looks as he always looks except that his behavior changes your image of him. Television has this quality: it always somehow looks the same, but it's always doing something different."

Frank Gillette, Ira Schneider: *Wipe Cycle*

Unlike Levine's work, the effect of *Wipe Cycle,* by the young New York artists Frank Gillette and Ira Schneider, was to integrate the viewer and his local environment into the larger macrosystem of information transmission. *Wipe Cycle* was first exhibited at the Howard Wise Gallery in New York in 1969. It consisted of nine monitors whose displays were controlled by synchronized cycle patterns of live and delayed feedback, broadcast television, and taped programming shot by Gillette and Schneider with portable

Frank Gillette and Ira Schneider: *Wipe Cycle*.
1969. TV camera, closed-circuit system,
nine monitors, tapes, broadcasting. Photo: courtesy
of Howard Wise Gallery, New York.

equipment. These were displayed through alternations of four programmed pulse signals every two, four, eight, and sixteen seconds. Separately, each of the cycles acted as a layer of video information, while all four levels in concert determined the overall composition of the work at any given moment.

"The most important function of *Wipe Cycle*," Schneider explained, "was to integrate the audience into the information. It was a live feedback system which enabled the viewer standing within its environment to see himself not only now in time and space, but also eight seconds ago and sixteen seconds ago. In addition he saw standard broadcast images alternating with his own delayed/live image. And also two collage-type programmed tapes, ranging from a

shot of the earth, to outer space, to cows grazing, and a 'skin flick' bathtub scene."

"It was an attempt," Gillette added, "to demonstrate that you're as much a piece of information as tomorrow morning's headlines— as a viewer you take a satellite relationship to the information. And the satellite which is you is incorporated into the thing which is being sent back to the satellite. In other words, rearranging one's experience of information reception."[8] Thus in *Wipe Cycle* several levels of time and space were synthesized into one audio-visual experience on many simultaneous frequencies of perception. What is, what has been, and what could be, were merged into one engrossing teledynamic continuum and the process of communication was brought into focus.

Allan Kaprow: *Hello*

The elements of randomness and chance, which Allan Kaprow has explored so successfully in his Happenings and environmental events, were brought into play in a television experiment conducted by Kaprow with the unique facilities of WGBH-TV in Boston for "The Medium Is the Medium." The station has direct closed-circuit inputs from a number of locations in the Boston-Cambridge area: a line to M.I.T., another to a hospital, another to an educational videotape library, and a fourth to Boston Airport. These were interconnected with five TV cameras and twenty-seven monitors that Kaprow utilized as a sort of sociological conduit, demonstrating the possibilities of creativity in the act of videotronic communication, including obstacles to communication.

Groups of people were dispatched to the various locations with instructions as to what they would say on camera, such as "Hello, I see you," when acknowledging their own image or that of a friend. Kaprow functioned as "director" in the studio control room, ordering channels opened and closed randomly. If someone at the airport were talking to someone at M.I.T., the picture might suddenly switch and one would be talking to doctors at the hospital. Thus not only the process of communication was involved, but the elements of choice and decision-making as well. Kaprow has suggested a global form of

[8] From an interview with Frank Gillette and Ira Schneider by Jud Yalkut in "Film," *East Village Other,* August 6, 1969.

Hello, interconnecting continents, languages, and cultures in one huge sociological mix. The information transmitted in *Hello,* he emphasized, was not a newscast or lecture but the most important message of all: "Oneself in connection with someone else."