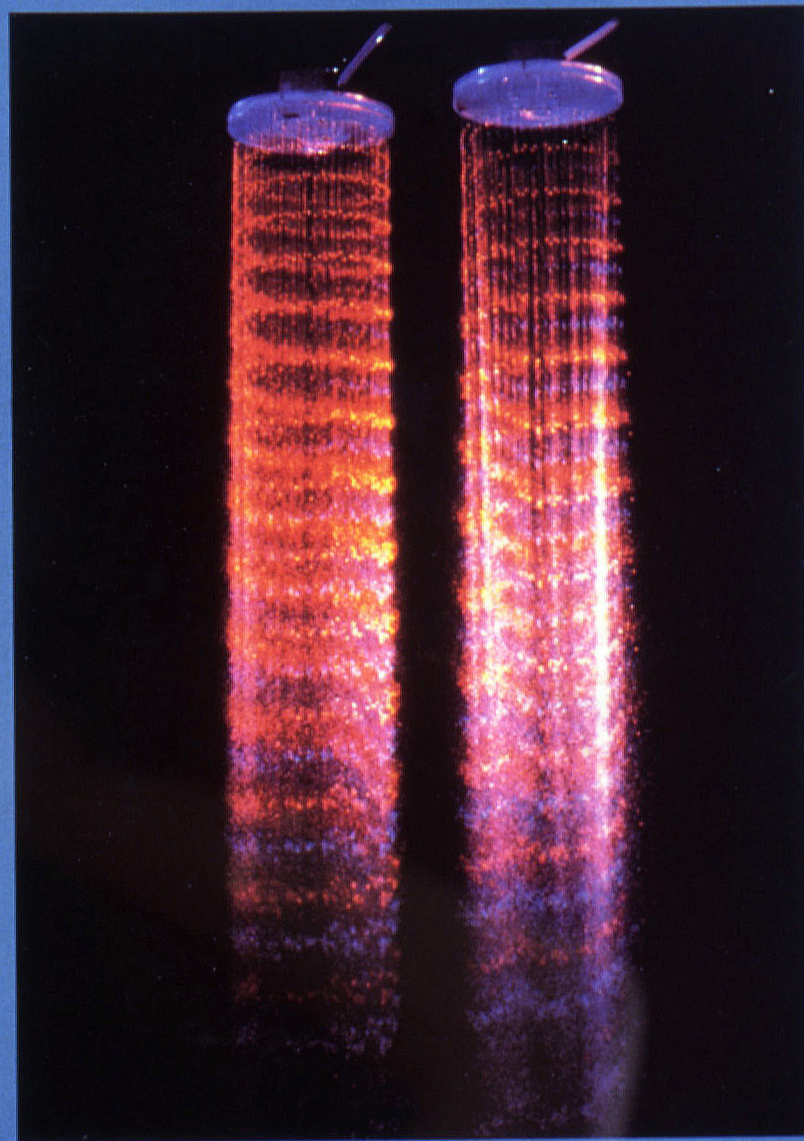


Interactivity in the Electronic Age

Anne Barclay Morgan

Pei-De Tsai, *Upward
Falling Fountain*,
1979. Mixed media.
Photo: Si-Chi Ko.



Viewer participation in art has assumed new meaning and direction with the advent of recent technologies and electronic media. The breakthroughs of the last decade—including the personal computer, videodisc, compact disc and the hard- and software for “virtual reality”—are now being explored by a number of artists who have overcome economic and technological obstacles to produce provocative works. With these new media, artists’ expectations of viewer interaction have extended beyond the activities of visual perception and cognition. The viewer has become empowered to activate a work, to engage in a physical dialogue and even to create a personalized version of the artwork.

As technophobia subsides due to the prevalence of technology in education and entertainment, electronically based interactive art is becoming increasingly more approachable and accessible. Given the growing demand for public involvement in the arts, such interactive works may serve to ease the art-public schism, making both art and technology more user-friendly. However, fundamental questions about the nature of technological art and its limitations, both conceptual and technical, remain unanswered. Can the dream of viewer participation be fulfilled by these media? Can this kind of work reach beyond simple entertainment into the realm of art? What forms of participation are best suited to electronic media? Can interactive art lead to more responsive, decisive individuals, or does it encourage a false sense of power and control? Who will program this interactive machinery and to what ends? How will artists get sufficient access to these costly new technologies?

Interactivity in contemporary art was introduced in the late 1950s with the Happenings of Allan Kaprow and others who encouraged audience participation. Similar goals motivated the performance events of the artists involved in Fluxus, an international group of artists who strove to eliminate the boundary between art and life. By the mid-’60s, the concept of the artist as communicator evolved. It was on this basis that Nam June Paik began his series of video pieces called “Participation TV” (1963–71), in which noises from the viewer’s space could create variations in the television image. Similarly, a number of artists employed closed-circuit video to create environments using the viewer’s image,

often distorted and delayed, as the pivotal element of the work. Examples include Bruce Nauman’s 1969 *Live/Taped Video Corridor*, in which two monitors were placed at the end of a long corridor, one depicting the empty space and the other an image of the viewer’s space that became increasingly smaller as the viewer approached the monitors. Nauman sought to elicit intense feelings of claustrophobia and surveillance.

Kir Galloway and Sherrie Rabinowitz were innovators in the use of satellite and videophone telecommunications with *Satellite Arts Project* (1977) and *Hole-in-Space* (1980), in which participants interacted on large video screens located in Los Angeles and New York via live satellite hookups. Their 1984 *Electronic Café* has become a permanent work with connections around the world, creating a “new virtual space” with the help of videophones. In addition to viewer interaction, the artists now intersperse poetics, graphics and performance.

The collaborative group Van Gogh TV/Radio, founded by Benjamin Heidesberger and Mike Hentz in Hamburg, Germany, also uses videophones. For its American premiere in January of this year, the group linked visitors at the Institute of Contemporary Art in Boston with those at the city’s Computer Museum via videophone. The artists manipulated the transmissions and interspersed computer graphics into the program. Produced under the motto “Live is art,” the Van Gogh projects may be the epitome of public interaction in an artwork.

Artists also began experimenting in the ’60s with interactive modes without using video elements. Pei-De Tsai, an artist and engineer, showed his first interactive work at the 1968 exhibition “Cybernetic Sculpture” at the Howard Wise Gallery in New York. Rather than adapt new technology to create social or conceptual art, Tsai’s visually rhythmic works respond primarily to sounds, like the viewer’s voice, causing his sculpture to shimmer with rapid flashes of stroboscopic light. Microphones pick up the sounds, which, in turn, cause switches to change the frequency of the strobe lights. For example, in his *Upward Falling Fountain* (1979) clapping hands cause computer-simulated columns of water to appear to reverse directions and rise.

In Tsai’s work viewer sound seems to engender motion, but for other artists viewer motion engenders sound. In 1969 German artist Peter Vogel, who has a background in physics, began experimenting with viewer participation in his paintings. He later reduced the paintings to electronic walls or freestanding sculptures composed of sensors,

Top: Lynn Herschman and Sara Roberts, *Deep Contact*, 1990. Videodisc installation, mixed media.

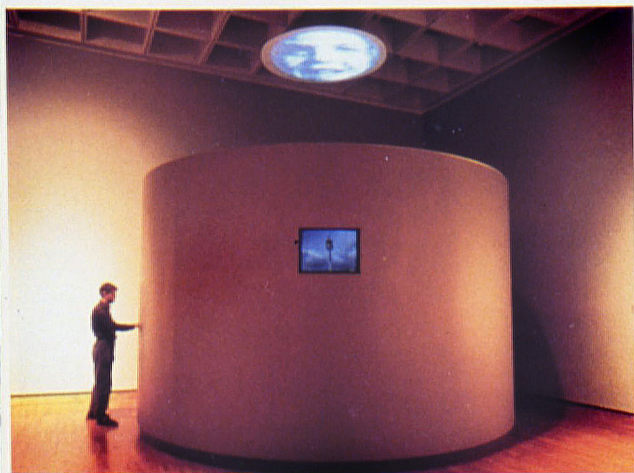
Bottom: David Rokeby, *Very Nervous System*, 1986–91. Mixed media. Photo: David Rokeby.



Below: Peter d'Agostino, *Transmissions: in the WELL*, 1990. 10 x 18 ft. Photo: Gary McKinnis, courtesy Philadelphia Museum of Art.

Opposite, top: Grahame Weinbrein and Roberta Friedman, *The Erl King*, 1987. Mixed media.

Opposite, bottom: Jim Campbell, *Hallucination*, 1988-90. Video installation. 4 x 2 x 7 ft. Photo: Jim Campbell, courtesy San Francisco Museum of Modern Art.



electronic photocells or microphones that register viewer sounds, movements or shadows and respond with noise, music, movement and light. In his 1989 installation *The Shadow Orchestra* the viewer's shadow activates photocells linked to various instruments, triggering sequences of music along with randomly occurring notes.

Perhaps the most complex and responsive interactive sound-based art to date is by Canadian artist David Rokeby. In his *Very Nervous System* (1986-91) installation a video camera registers movements, which are then processed by computer and translated via synthesizer into music. The viewer becomes both conductor and composer by means of his or her movements.

Although video is a pervasive presence in many interactive works, several artists use some form of electronic sensing device other than television. In the 1990 "P.U.L.S.E. 2" exhibition at the University Art Museum at Santa Barbara, California, only two of the interactive works incorporated video: Alan Rath's 1989 *Voyeur 2* and Steve Barry's 1989 *I.D.* In Liz Phillips's *Soundtable I and II* (1989-90), people approaching two tables containing a wet and a dry landscape activated shifting, unrepentant sounds. James Seawright, a veteran of interactive sculpture, was also represented. He has created numerous computer-age gardens in the last decade, including the electronic *Houseplants* (1984), which unfold like plants in response to the proximity of the viewer

and changes in the environment.

Videodisc technology has brought new possibilities to interactivity by allowing the viewer random access to segments of video or still images. Multiple videodiscs, compact discs or computer hard discs may be used in combination to make an elaborate interactive system. The personal computer can serve as the interface via a touch-screen or a mouse and keyboard.

The first interactive videodisc artwork was Lynn Hershman's 1983 *Lorna*, in which the viewer was able to choose what happened next in a branching narrative of a woman suffering from agoraphobia. Hershman has gone on to create other interactive works with feminist content, like her clever videodisc installation *Deep Contact* (1990), programmed and designed by artist Sara Roberts. A prime example of the provocative potential of interactive media, it is a seductively sexual depiction of an attractive woman, Marion, who has to be touched on the screen in order to advance into the artwork. Hershman's voyeuristic approach seems to cater to male fantasies: touching Marion's head leads to a choice of commentators discussing new reproductive technologies; touching her torso leads the viewer to a bar; and touching her legs allows one to follow her through a beautiful garden inhabited by a Zen master and a demon. In Sara Roberts's 1988 interactive videodisc installation *Early Programming* (also shown in 1989 as *Margo*) the viewer relives early childhood experiences. Taking on the role of the child, the viewer sees a typical location of a mother-child interaction on the screen and chooses a response from a given range of attitudes, which, in turn, affects Margo's mood and response. Margo is, in effect, a talking computer collection of some 1,500 maternal sayings covering a range of emotional states.

Another pioneer of interactive video installations is Peter d'Agostino, whose work often reflects a fascination with linguistic structures, as in the 1986 videodisc installation *Double You (and X, Y, Z)*. His work deals with the acquisition of language by using analogies of early language development. In his 1990 *Transmissions: in the WELL*, d'Agostino is concerned with the tragic fate of an Italian boy who drowned in a well, a true story that became a symbol of Italy's economic woes over 10 years ago. Organized around a larger cylinder symbolic of a well, a video depicts an interpretation of the story by Italian film producer Adriano Apra. Still images of the boy, his family and people around the well are projected within a circle on the ceiling. The cylinder also features a

peephole in which three events are seen on video, including an eye staring back at the viewer. Finally, a touch-screen monitor allows the viewer, depending on where and how the screen is touched, to access up to 35 chapters of his *Transmissions* database. Here d'Agostino explores universal myths of falling, of the underworld and of rebirth and resurrection.

Videodisc-based works can present a variety of options for viewer interaction. For example, Bill Seaman's interactive video installation, *The Watch Detail* (1990), allows the viewer a great deal of choice, combining language, images and music into "poetic architecture." The viewer can choose one of six categories to explore layers of literal and metaphorical images, sounds and text dealing with time and memory. He or she can then choose to edit together segments from the material on the videodisc and superimpose texts on any given still frame or motion sequence. These and other alternatives allow the viewer greater creative freedom than some videodiscs, albeit within the selection of images and texts defined by Seaman. Artist Ben Britton has devised a G.O.D. button (Graphic Overlay Device) in his interactive works, which when touched gives the viewer four choices of action. An example of interactive work that gives the viewer a minimal amount of control is Stuart Bender and Angelo Funicelli's *Seven Prophecies* (1990).



A primary theme in interactive media, apart from the modeling of human relationships, is the interplay of the subconscious and the conscious, of dream and hallucination. Jim Campbell confronts viewers with surreal, psychological circumstances through manipulated video. The viewers' images are slowly disintegrated or consumed by fire in his work *Hallucination*, originally shown in 1988. In its 1990 version at the San Francisco Museum of Modern Art, black-and-white images

of viewers are engulfed in flames, both visually and by the sound of fire, which gets louder as viewers move closer to the screen. Another hallucinatory element is a woman, not present in the room, who appears on the screen untouched by the fire. Her actions can affect the situation; by flipping a coin, for example, she can make the viewers disappear.

Grahame Weinbrein coined the term "interactive cinema" to define a new direction in narrative-based, interactive artworks. The random access of the videodisc makes a viewer-controlled sequence of images possible, thereby eliminating the linear structure of conventional storytelling. Using his background as a filmmaker, Weinbrein, together with Roberta Friedman, produced a very ambitious interactive narrative, *The Erl King*, in which the famous poem by Goethe is layered with a wide variety of images and music. Weinbrein's forthcoming *Sonata*, based on Tolstoy's short story "The Kreutzer Sonata," is even more ambitious. The story involves a man who, in a fit of jealousy, murdered his wife because she was practicing Beethoven's piece with her violinist friend behind closed doors.

Below: Nicole Natalie Stenger, *Angels*, 1990. 1-D computer-generated picture. Photo: Nicole Natalie Stenger.

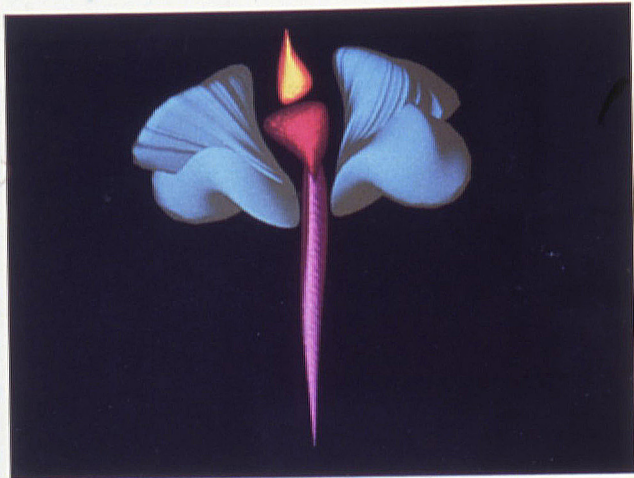
Opposite: Jeffrey Shaw, *The Legible City*, 1988. Bicycle and mixed media.

Viewers will move between the husband's and the wife's viewpoints, enabling them to experience the selectivity of human memory.

Another approach to layered narration will be seen in Gary Hill's forthcoming videodisk installation, *Which Tree*. As with other video or film artists, Hill is fascinated by language, yet rather than force the viewer to make decisions, he wants to simulate the complexities of auditory and visual thought processes—the wandering, phenomenological experience of thinking—by offering four possible directions for the narrative every two seconds, branching at a conjunction or a prepositional phrase. Noninteraction will result in repetitive patterns, eventually prompting the viewer to make a choice.

Jeffrey Shaw, born in Australia but currently living in Amsterdam, has been creating interactive works for a number of years. It was *The Legible City*, however, first shown in 1988, that brought him international recognition. Shaw created a virtual representation of a city where the architecture lining the streets is replaced by an architecture of three-dimensional letters forming words and sentences. The viewer, sitting on a stationary bicycle in front of a stationary screen, steers down different streets and pedals his or her way through virtual space. The image projected on the large video screen is generated in response to data from the bicycle. As the peddler makes choices in direction, a personal narrative is constructed. Using the plans of cities such as Amsterdam, Manhattan and Karlsruhe, Shaw cleverly incorporates historical texts or speeches of people living in that city. Shaw equates this city of words to a three-dimensional book that the viewer constructs. In his 1991 work, *The Virtual Museum*, presented at the Frankfurt Art Fair, a chair is placed on a rotating platform with a large video projection monitor, and the viewer, by rocking the chair in various directions, can determine the movement in space. The projected image—four exhibition rooms within a larger one—is a metaphor for the museum, with textual iconography relating to the traditional art genres in that museum.

The most recent development in technology-based art—called "artificial reality," "cyberspace" or "virtual reality"—is based on the viewer interacting via computer inside of an artificial environment. Myron Krueger, who has been developing technology-based interactive work for more than 20 years, coined the term "artificial reality" in 1973. In his continually evolving work *Videoplace*, composed of multiple works, viewers interact in purely visual terms. They create abstract geometric compositions in



the section titled *Body Geometry* or playful interactions with a graphic creature in *Critter*. In the more penetratingly psychological *Videodisk* two participants interact, with the one at the desk knowing how the system works and having a distinct "advantage" over the other.

While Krueger's work constitutes an artificial interactive video space in two dimensions, the term "virtual reality" now denotes a burgeoning technology that employs goggles or a helmet to provide stereoscopic vision and stereophonic hearing and a data glove to allow the viewer to maneuver through space. Other feedback equipment, even an entire body suit wired to the computer, can also be used to interact with the space.

Although virtual reality technology has been used primarily for military and educational purposes, it is coming of age as a viable art medium. French artist Nicole Natalie Stenger is currently working on the first artwork incorporating the virtual reality technology of goggles and data glove. It will premiere early next year at the Museum of Sciences in Paris during "Machines à Communiquer," an exhibition that will also feature work by Myron Krueger and Jeffrey Shaw. Her virtual environment, *Les Rencontres Angeliques*, or *Angels*, based on her film of the same name, was inspired by Milton's *Paradise Lost*. The work will allow the viewer to explore a paradisiacal garden replete with angels, flowers, fruit and hidden

surprises. The environment will be "like an egg hunt at Easter, and [the participant] will not know all the clues," according to Stenger. Sound will be included in the three-dimensional environment. She describes it as "a dream, in which everything will be possible," and hopes the viewer will feel he or she has been somewhere very pleasurable.

The production of Stenger's first project is extraordinarily complex. The modeling was done at the Visual Arts Department at the Massachusetts Institute of Technology and funded by Prix Villa Medicis and a fellowship from the French Foreign Affairs Office. The virtual reality application is being done at the HITL (Human Interface Technology Laboratory) in Seattle and VPL Research with hardware from both VPL and Silicon Graphics and software from Wavefront Technologies. Stenger will be able to use newly developed, high-resolution goggles, resulting in quality-enhanced three-dimensional images. Since the field of virtual reality is still in its infancy, the tools for her piece are being developed as the project evolves.

The creation of new media labs such as the Center for Art and Media Technology in Karlsruhe, Germany—affiliated with the Media Lab at MIT—is making interactive technologies more accessible to artists. Many artworks are created with the combined skills of specialists, in collaboration with the artist, so that advanced technical skills are not necessarily a prerequisite for making interactive works.

Seldom found in art museums or galleries outside the context of media exhibitions, interactive artworks are more often found in places like the Exploration Museum in Tampa, Florida, the Exploratorium in San Francisco (where artists are regularly commissioned to make installations) or in science and natural history museums. Other venues for temporary exhibitions include international video festivals, the annual SIGGRAPH art show and festivals devoted to new technologies, including "Images du Futur" in Montreal and "Ars Electronica" in Linz, Austria. Major international exhibitions have also shown interactive art; the traveling exhibition organized by the Centre Pompidou, "Passages de l'Image," includes *The Erl King*. Since much of the work is viewed outside the context of the art world or in specialized festivals, the audience for



such work has been limited. This kind of art is likely to become an isolated branch of the art world—like photography, film and video—with separate, specialized exhibition spaces and journals. These media also suffer the constraints imposed by constantly changing technology. One thing is certain: this art is reaching segments of the public that usually do not see contemporary art.

The main focus of interactive, computer-based artwork has been the building of narratives that the viewer helps to create by his or her own choices. Often the work uses a videodisk, giving the viewer some freedom of choice in the sequence of events, but with a framework of dialogue—its context and message—controlled by the artist. From the sensorial sound interactions of Tsai to the vision of paradise in Nicole Stenger's virtual reality, the nature of the interaction creates the feeling of choice, but in fact the works are more contrived and more controlled than those in other media.

Most interactive artworks successfully transcend the area of pure entertainment, although gamelike features may entice the viewer into engaging with the piece. Artists have attempted to deal with issues of viewer choice in innovative ways by incorporating randomness, seeking to hide the obviousness of choices and avoiding a logical ordering of selections by imitating conscious and subconscious patterns of thought.

In stimulating participation, interactive art can, at its best, encourage viewer responsiveness and decision making. Whether the viewer is being controlled while being given a false sense of autonomy is a vexing question, particularly for virtual reality, since the experience is so powerful and engaging that the artist is posited as a god, the creator of a world with a tremendous influence over those who enter. Indeed, virtual reality may have the potential to reshape our psyche and society, perhaps even more than its technological parents, the television and computer. As it becomes more widespread, the ethical, political and metaphysical implications of virtual reality will need to be addressed.

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