Re-place:
The Embodiment
of Virtual Space

JEFFREY SHAW,
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AND RODERICK COOVER

Jeffrey Shaw is one of the pioneers of interactive cinema and haptic digital arts. He creates technological topographies in which the spectators construct meaning by engaging both physically and intellectually with the environment. The space of these works is literary, cinematic, and geographic, with a focus on *presence*—confronting the challenge of how to understand "being" in spaces that are technologically mediated and virtual.

In the following pages, Jeffrey Shaw and the artist and curator Sarah Kenderdine of Museum Victoria (Australia) describe a series of projects by Shaw and one, *PLACE-Hampi*, that Shaw and Kenderdine coauthored. These descriptions are grouped into three sections; after each, Shaw responds to questions posed by Roderick Coover.

Embodied Interfaces: *Legible City* and *Distributed Legible City*; *conFiguring the CAVE*; *Web of Life*

In *Legible City*, created with Dirk Groeneveld (1989–1991), the viewer bicycles through a virtual city constituted by an urban architecture of computer-generated three-dimensional letters that form words and sentences along the sides of the streets. The layout is based on the ground plans of Manhattan, Amsterdam, and Karlsruhe, and traveling in these cities of words becomes a literal journey on many levels. While peddling an exercise bike, the viewer can freely explore over fifteen square kilometers of content. This may be compared with conventional interfaces—keyboard, mouse, joystick—that trans-

pose minimal displacements of the body into media coordinates. The *Legible City* embodies single-user interactivity through a purely individual and personal control of all navigation parameters; this lone bicyclist moves about in a city deserted by its inhabitants, now inhabited only by visitors. *Distributed Legible City* (Shaw and Groeneveld 1998) introduces multiuser functionality whereby two or more bicyclists at remote locations can be simultaneously present in the virtual environment. They can meet each other (by accident or intentionally), see abstracted avatar representations of each other, and (when they come close to each other) communicate with each other via headphones and microphones. While *Distributed Legible City* presents the same urban textual landscape as the original *Legible City*, this database now takes on a new meaning. The texts are no longer the sole focus of the user's experience. Instead, they become the con/text (in terms of both scenery and content) for possible meetings and resulting conversations between the bicyclists. A rich new space of commingled spoken and readable texts is generated, and the artwork changes from a wholly kinesthetic visual experience to the visual ambience for a disembodied social exchange.

The interface design of *conFiguring the CAVE* (Hegedus et al. 1996) presents the viewer with a surrogate body that both iconically inhabits and physically animates its virtual worlds. This work utilizes an innovative virtual-reality environment with contiguous 3-D projections on three walls and the floor, fully immersing the viewer in its space of representation. The user interface is a nearly life-size wooden puppet that is formed like the prosaic artists' mannequin; it can be manipulated by viewers to dynamically modulate, in real time, various parameters in the image and sound generating software, and particular postures cause specific visual events to occur. Most significantly, the action of moving the puppet's hands to cover and then uncover its eyes trigger transitions from one pictorial domain to the next.

Web of Life (Gleich et al. 2002), a networked installation, allows users to interactively influence the performance of an audiovisual environment by imparting to it the unique patterns of their individual hand lines. The environment is formed by an immersive conjunction of projected three-dimensional computer graphics and video sequences, together with a fully spatialized acoustic experience and a specially conceived architectural surrounding. This artwork is configured as a distributed network of installations—one large-scale environment situated permanently at the ZKM Karlsruhe and four others designed to travel to various locations around the world during the period of the project. User interaction at any location com-

municates with and affects the audiovisual behavior of all the installations. The artwork's algorithmic emergent tapestry of audiovisual and thematic correspondences is activated and modulated by patterns derived from the palms of visitors' hands, which are scanned and entered into the system from the local and remote input terminals. The varied and always uniquely individual palm lines appear on the installation's screen, then merge into and activate a singular sequence of transformations on the screen and the musical score that accompanies the imagery. The visual network is programmed as a self-organizing system, utilizing biology-derived metaphors such as neuronal growth. The topic of networking logic is at the core of the *Web of Life* project. As in the Net, where we move from single-user cause-and-effect models to multiuser emergent-behavior models, *Web of Life* sets out to create a paradigmatic and aesthetically formed exposition that both describes and evokes the core experience of emergence, thereby inviting and revealing the inexhaustible vernacular of shared individuated connectivity via the crafting of strategies that can reembody the disembodied spaces of digital fragmentation.

Roderick Coover. I would like to begin with the question of what is the same and what is different about creating art with digital media—in particular how a cinematic activity is transformed, on the one hand, into a haptic experience and, on the other hand, into a readerly one of prewritten paths and passages. In *The Cinematic Imaginary after Film*, a book you coedited with Peter Weibel, you draw attention to works of artists like Friedrich Kiesler, who made media-mixing works in the 1920s, and Stan VanDerBeek, who developed the 1963 Movie Drome. Are there ways in which these works are still relevant today, or has something changed that renders them distant, historical reflections of their own age, an age that we are leaving or have already left?
Jeffrey Shaw. Early on I wrote:

> The activity of both art and science has always been the interpretation and recreation of reality. It is an exercise of the human imagination, creating concepts, forms and images that imbue our lives with meaning. Art continuously redefines itself in response to cultural transformations. Nowadays these transformations are very closely linked to the pace of technological developments, and therefore it is appropriate that art addresses itself to technology on the most fundamental level of its aesthetic and conceptual discourses. (Shaw 1999)

And recently, Terry Smith wrote:

> We are starting to see that in the years around 1989, shifts from modern to contemporary art occurred in every cultural milieu throughout the world, and did so distinctively in each. Just what happened is only now becoming clear, even to those who most directly participated in the events of those days. We can also see that, even as they were occurring in the conflict zones, these events inspired a critique of spectacle capitalism and globalization on the part of a number of artists working in the advanced economies. They developed practices—usually entailing research over time, widespread public involvement, and lengthy, didactic presentations—that critically trace and strikingly display the global movements of the new world disorder between the advanced economies and those connected in multiple ways with them. Working from similar perspectives, other artists were inspired to base their practice around exploring sustainable relationships with specific environments, both social and natural, within the framework of ecological values. Still others work with electronic communicative media, examining its conceptual, social, and material structures: in the context of struggles between free, constrained, and commercial access to this media and its massive colonization by the entertainment industry, artists' responses have developed from net.art towards immersive environments and explorations of avatar-*viuser* (visual information user) interactivity. (Smith 2009, 7–8)

Every gesture in art is a historical moment, a momentary embrace of, or revulsion against, the exigencies of current conditions. Works endure either because those conditions (in whatever permutation) also endure, or (as in Kiesler) because they prefigure the shape of *things to come* or because they themselves are the progenitors of condition change. A comprehensive reading of art history would say that it is a process of creative inquiry into the infinite complexity of the world via ever-changing strategies of representation and embodiment, and its works remain relevant as long as they continue to inform/inspire this inquiry. On a perceptual (and sensual) level this world presents itself as a totally immersive environment, and an artform that wants to represent and elucidate its psychogeography is driven toward the form of a *gesammtkunstwerk* whose inclusive strategies transform the viewer into a protagonist. Thus we have, for example, the trompe-l'oeil entireties of the Ba-
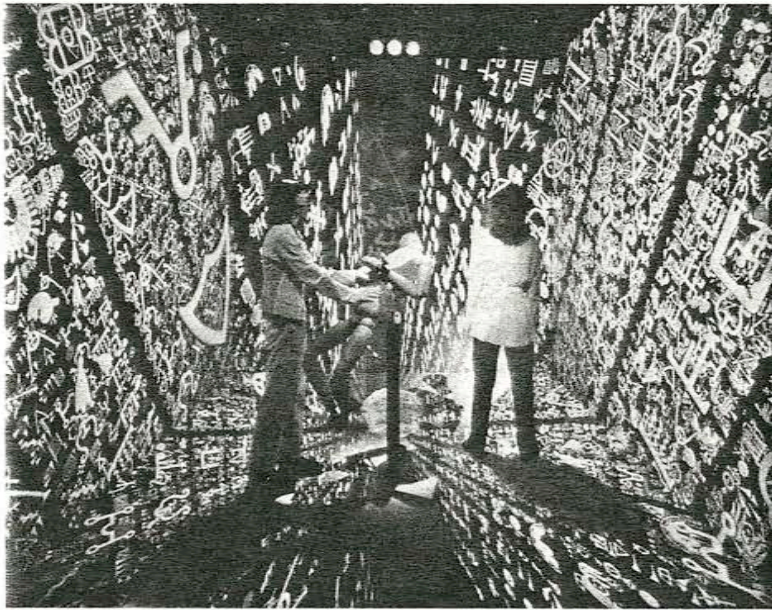
FIGURE 21. Interior view of the installation *conFiguring the CAVE* (Hegedus et al. 1996), showing the CAVE 3-D projection and wooden mannequin interface. Collection of the ICC Intercommunication Centre, Tokyo.

roque imaginary, the amalgamated reality of Panorama Mesdag's beachscape, the myriad permutations of Raymond Queneau's "Hundred Thousand Billion Poems," and the suffusing spectacle of Stan VanDerBeek's Movie Drome. Because of the world's wholehearted obscurity, literal representation borders on idolatry or kitsch, and other methods (esoteric and otherwise) are invented to "reveal" its multivarious nature. One such "technique" has been the mirror—literally, as in the traditional painted anamorphoses that describe a deformed (hidden) world whose shape is only detected through its reconfigured reflection, and immaterially (but in a similar spirit perhaps) as afforded by the optico-digital technologies of virtual, augmented, mixed, and hybrid reality. This new-media art of technologically informed "reflection" offers a productive field of investigative inquiry, testing blurred boundaries of perception and participation, often in paradoxical parenthesis, to expose our operations of being in the world and our means of imagining (in moments of aspiration and/or delusion) new ways of being.

RC. One of the ways you draw attention to how we perceive and imagine worlds through digital media is through your exploration of "interface"—the point of exchange between humans and computers. How do you define the concept of interface in a context of works that are physical and haptic? The term coincides with an apparent shift in which "viewers" become "users." What does this mean for embodied works?

JS. An understanding of the new role of the user interface in the context of the manufacture of interactive artworks must firstly recognize its operational requisites. To quote Wikipedia:

> The user interface (or Human Machine Interface) is the aggregate of means by which people—the users—interact with the system—a particular machine, device, computer program or other complex tool. The user interface provides means of input, allowing the users to manipulate a system, and output, allowing the system to produce the effects of the users' manipulation.

But the "complex system" that constitutes an interactive artwork embodies aesthetic and conceptual formulations that articulate these input/output processes as artistically defined components of the total experience. The "creativity" that traditionally expressed itself in the invention of new modalities of representation here extends itself into the search for new modalities of communication between the human and the computer, such as vision or touch.

The major achievements in interactive art over the last thirty years show a profusion of idiosyncratic and often eccentric approaches in the design of their user interfaces, as each artist seeks to mold the uniqueness of each work's user experience. Fundamental to all of these experiments is the creative engagement of the user—his or her input is integral to the work's possible paths of self-revelation, and at the same time this input modifies those paths to create a unique moment that constitutes the ever-unfolding "liveness" of an interactive work. This constitutes a new relationship between the producer and the consumer of artifacts, one where the builder of the interactive system and its users participate in a situation of cocreative formulation, discovery, and experience. Another major significance of this development is the fact that such artworks are never conclusive—they are *always* in a state of continuous reformulation and refreshment at the hands of their users—and their cultural longevity will be measured by the extent to which they continue to offer inspiration for such user engagement.

RC. Simultaneous with evolving interface design is a reconceptualization of

the "frame" or film "shot". The analog frame directs viewer attention and fixes a set of relations in memory (one thinks here of Bergson and Deleuze); in digital environments, however, the elements that constitute an image are in flux and its dimensions may be boundless. Works like *Legible City*, *conFiguring the CAVE*, and *Web of Life* seem to make use of new interfaces to take aim at the notion of the frame—is that right?

JS. My expanded cinema installations of the 1960s (which I usually titled "Disillusionary Situations") marked the beginning of a long-term research effort to expose and "explode" established cinematic, proscenium, televisual, and painterly framing conventions and to create a fluid indeterminate arena of shared experience that would constitute a co-space of artistic expression and user (inter)action. My commitment to and enthusiasm for new media (inflatable structures in the 1960s and 1970s, computer-aided visualization systems since then) is based on the appreciation of how these media are able to offer unprecedented opportunities to articulate such an open space of artistic experience, and each of my works researches/articulates one or another nuance of this capability. Of course the liberation of the image from the frame is as fraught as is the struggle for existential liberation defined by mortality. Magritte perfectly pictured this paradox, while the Renaissance invention of perspective was a heroic achievement of pictorial liberation that the Mannerists quickly realized had to be disfigured to be more "true." Ultimately one can only talk about artistic freedom by acknowledging and subverting constraints, like the Oulipo writer George Perec's novel *A Void* (1994), where he manages to avoid that most basic prop of traditional syntax: the letter *e*. Works like *conFiguring the CAVE*, *Place—a user's manual*, and *Web of Life* go about transcending the traditional framing of artistic representation by creating expanded and virtual frames: the stereoscopy of *conFiguring the CAVE* offering an immersive set of nested spheres that extend into optical infinity, the modular architecture of *Place—a user's manual* simply multiplying itself forever in every direction, the networked intercommunicative space of the *Web of Life* allowing the work to be virtually connected and copresent at multiple locations worldwide. Simply put, I am fascinated by the space outside the frame, whose ubiquitous absence entails utter potentiality. That is why my recent work has been so engaged with strategies of panoramic visualization, where the viewers can let their attention wander into the periphery to discover something that might reframe everything.

RC. You draw several analogies to writing traditions—to the use of constraints by writers like Perec and to the conceptualization of the city as a text. What
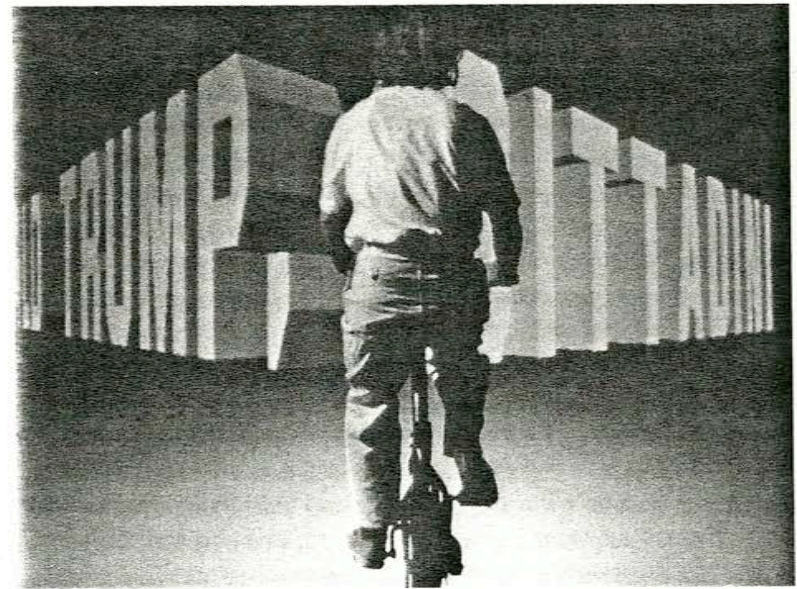

FIGURE 22. Installation view of *The Legible City* (Shaw and Groeneveld 1989-1991), showing a bicyclist in front of the projection screen. Collection of the ZKM Karlsruhe. Photo: Jeffrey Shaw.

shapes this relationship between language and image in *Legible City* and in your works in general?

JS. A city is simultaneously a tangible arrangement of forms and an immaterial pattern of experiences. Its architecture is a linguistic morphology, its ground plan a psychogeographic network, and its streets a labyrinth of narrative pathways. In *Legible City* the viewer rides through a virtual city whose architecture is made up of letters and texts. The bicycle trip through these cities of words is consequently a journey of reading. Choosing the path one will take is a choice of certain texts and their spontaneous juxtapositions. The identity of these new cities thus becomes the conjunction of the meanings these words generate as one travels freely around in this virtual urban space.

The Manhattan version of the work (1989) follows distinct, fictional story lines created through monologues by ex-mayor Ed Koch, Frank Lloyd Wright, Donald Trump, a tour guide, a confidence trickster, an ambassador, and a taxi driver. Each story line has a specific lettering color. The bicyclist can choose one or another to follow the path of a particular narration. In the Amsterdam (1990) and Karlsruhe (1991) versions, all the letters are scaled to have the same

proportion and location as the actual buildings they replace, resulting in a transformed representation of the actual architectural appearance of these cities. The texts for these two places are largely derived from archival documents that describe somewhat mundane historical events that took place there.

When first conceptualizing *Legible City* in 1989, I was referencing a number of avant-garde tendencies that strongly interested me including Lettrism, concrete poetry, haptic poetry, and the Situationist notions of urban psychogeography and the *dérive*. I was also very struck by the seventeenth-century author Madeleine de Scudéry's *Carte de Tendre* (1654) when I came across it in the 1980 Centre Pompidou Paris exhibition catalogue *Cartes et Figures de la Terre*. This map of the fictional country where Scudéry's novel *Clélie* (1979) takes place, is a topographic allegory representing the stations of love as if they were real paths and places. Recently I found the relation I had envisaged between the *Carte de Tendre* and *Legible City* reiterated in Guy Debord's publication *Internationale Situationniste* 3 (1959, 14–15), where he puts the map of Tendre side by side with an aerial map of Amsterdam; he too was articulating the notion of a shared emotional topography between these two places. And in this context we must also think of the psychogeographic conjunction of the two Venices in Italo Calvino's *Invisible Cities* (1974).

With *Legible City* I was also responding to the iconographic nature of computer graphics (CG) in the late 1980s. In the nonscientific and commercial sector, this often manifested itself in the form of "flying logos," simply because CG technology at the time was limited in its capacity to display more complex objects. In other words, the early manifestations of CG occupied a space of concrete poetry by default, albeit in the banal guise of advertising. Most importantly, CG was able to give text a spectacular new three-dimensional tangibility—suddenly letters could fly and twist and join in space, an apotheosis of which is the opening title sequence to George Lucas's first *Star Wars* film.

Legible City, being a real-time interactive CG artwork, was similarly constrained by the technology available in the late 1980s—a finite number of flat, shaded polygons was the scope of current CG performance. But at the same time, this capability was perfectly suited to the aesthetic and conceptual formulation of *Legible City*—so one could say it is a work that is both technologically and artistically symptomatic of its time. This is an important aspect of the full appreciation of any technologically assisted artwork, because temporal technological conditions (both technical and cultural) strongly influence the artistic formulation—in the best cases, such conditions inspire and en-

hance the artistic production, but they can also cripple it (which is one cause of a simplistically negative attitude to media art in general).

The use of text (and hieroglyphs and symbols) has been a recurrent feature of my practice. Following *Legible City*, for example, I became interested in the possibility of users actually creating their own texts in the virtual world— a sort of graffiti capability. This led me to develop voice-activated texts in *Place—a user's manual* that each user could release. These textually construed virtual domains are quite distinct from other works of mine such as *The Narrative Landscape*, *Heavens Gate*, and *Web of Life*, which luxuriate in their layered density of images. Yet, I see both attitudes as being facets of the psychogeography of contemporary machine culture. On the one hand, there is an almost obscene proliferation of images and of the visual manipulation, combination, and transformation that is afforded by digitization. This offers reason enough for one to recoil and seek hope in an iconoclastic embrace of the word—language as a refuge of "truth" in a world being saturated (made speechless) by "untruthful" images—reason to feel an affinity with those artistic traditions that have belied the image and elevated the word to the greatest heights of visual expression. On the other hand, it is exactly that power of digitization that is freeing the image from its traditional analog constraints—enabling one to conjure a cultural imaginary with such virtuosity and vitality that it is difficult to resist its expressive possibilities, and this despite its almost simultaneous commercial depreciation. So in my work, I find myself oscillating between these two positions, and now and then attempting a merger. An interesting possibility for the latter emerges when one considers an image that is determined by its algorithmic description, that is, by language.

RC. Does this correspond to the perpetual tensions in digital-media works between reading and viewing and between unconstrained "browsing" and the framed, focused, or delineated trajectories of many of our expository and narrative traditions?

JS. That tension between unconstrained movement and narrative focus is actually one of the primary dramatic and aesthetic properties and qualities of interactive new media. It is the place where an artistic construct is modulated (deformed/reformed/informed) by the action of the user, and it is the place where the user takes personal possession of (and responsibility for) the work. To be wholly successful such an artwork will endeavor to give aesthetic and conceptual "shape" to this process of indeterminate unfolding by "crafting" the design of its operative algorithms in such a way that the work can maintain and extend its expository/revelatory coherence under all circum-

stances, and thus continue to express its integrity (value) as a singular artistic proposition. In this context it should be said that the social media currently in vogue—such as YouTube, MySpace, and Second Life—operate so exclusively as user-articulated frameworks that one should distinguish that phenomena from what I am describing here.

Cinematic Narrative and Immersion:
Points of View III; T_Visionarium, EVE

Points of View III (Shaw 1984) is an early interactive narrative installation in which each "user" makes a personal audiovisual journey through the work and in so doing generates a unique real-time performance for the rest of the public. This work is a theater of signs where both the stage and protagonists are represented by 3-D computer graphics and where the interactivity of a flight simulator lets the user shift his or her virtual point of view with respect to the visual setting. The representation of each of the figures on the stage is done with a character derived from Egyptian hieroglyphics, and the resulting constellation of signs is used to articulate a world model with a particular set of aesthetic and conceptual relationships. For its sound tracks, sixteen people were invited to write short narratives that reference all of the characters in the work. Using a single joystick to explore both the sound and image landscape, the viewer generates an extemporary transcriptive conjunction of spoken narratives that is openly linked to the shifting configurations of the hieroglyphic imagery.

T_Visionarium (Brown et al. 2008) utilizes AVIE (Shaw and Del Favero 2004), the world's first 360-degree stereoscopic projection theater. Its 120-square-meter circular screen surrounds the audience and provides the conditions for a completely immersive three-dimensional cinematic experience. For the T_Visionarium project, researchers at the iCinema Centre in Sydney captured twenty-eight hours of digital free-to-air Australian television over a period of one week. This footage was automatically segmented and converted into a large database containing over twenty thousand video clips. Each clip was then manually tagged with descriptors known as metadata, which defined its properties. The information encoded included the gender of the actors, the dominant emotions being expressed, the pace of the scene, and such actions as standing up or lying down. Having the video data segmented in this way deconstructs the original linear narrative into building blocks that the viewer can then associate and reassemble in an infinite number of ways. In the projection environment, three hundred video clips are simultaneously distributed around the huge circular screen. Using a special interface, the viewer can select, sort, rearrange, and link these video clips, creating new sequences that then play in the all-encompassing viewing space. Thus the viewer is provided with an engrossing density and intensity of ever-changing recombinant narrative formations.

The EVE (Shaw 1993) interactive cinema system in many ways is an apotheosis of this research trajectory. First developed at the ZKM Karlsruhe in 1993, this "expanded virtual environment" is a large inflatable dome, in the optical center of which a video projector is mounted on a motorized pan-and-tilt device that can move the projected image anywhere on the dome surface. A head-mounted device worn by one of the visitors tracks the position and angle of his or her head and controls the position of video projector such that the projected image follows the direction of the viewer's gaze. This allows the viewer to move the picture frame over the entire dome surface and interactively explore the virtual computer-generated or filmic spherical image that is presented there. In this way, EVE constitutes a space of representation that almost entirely surrounds the viewer; its head-tracking user interface embodies the notion of a fully immersive world of multivarious images and events that reveal themselves to the inquiring gaze of the viewer.

RC. One thing that is changing is how one works with "images." German cultural critic Florian Rotzer writes, "Today looking has come to mean calculating rather than depicting external appearance. . . . We build machines . . . not just to connect perception and process, but more importantly to internalize these and connect them with the millions of rhythms and cycles in our body." Practically speaking, what have been the significant limits to how images still function (and are made) in developing projects like these. Which changes in computer software and hardware have most changed your way of using (and thinking about) the computer in art production?

JS. Concerning Florian's positions on new media I have a more skeptical attitude: everything is different and yet everything is the same. I recognize (and embrace) the new qualities of our machine culture, and yet I question how deep-going this newness is existentially. In other words I feel myself more of an avant-gardist than a new-ager.

On the other hand, I affirm the prospect and necessity that art has to reinvent itself continuously, and that in our time this constitutes a new identity that in many respects fundamentally differentiates it from its past forms and purposes. Here are some of its "new" features:

- Its interactivity, enabling tangible cocreative input from the user.
- The notion of an open, "unfinished" artwork that always (and forever) reveals itself in different ways in response to different (and unrepeatable) user input.
- The notion of the artwork that is not a space of representation per se, but more a space of exploration and (self-)discovery. Interestingly, the digital capability to construct a user-navigable virtual space of almost infinite dimensions aligns well with this purpose. *Legible City* (Amsterdam) has a virtual area of over ten square kilometers, and each of the PLACE installations presents a modular space that repeats itself indefinitely in all directions.
- The creative action of the artist now largely having to take place in the immaterial domain of algorithmic design. Such an artwork is essentially a software construct, whose visible (and other sensory) properties are simply the manifestation of code operating in a computational environment. This shifts the creative practice of art very much away from being a manual craft into one of conceptual engineering.
- The social operation of the digital artwork becoming essentially performative. Even a single-user interactive art installation (as mine usually are) offers itself to the general public as a sharable performed experience. And in works like *Televirtual Chit Chat* (Shaw 1993b) and *Distributed Legible City*, the virtual space created by the artwork becomes itself a shared social environment for its visitors. The recent massive popularity of social-media sites on the Internet confirms this essential aspect of new media.

A radical feature of an artwork whose forms derive from its algorithmic architecture is the possibility of designing algorithms that are subject to change due to user or environmental input, or that change independently of any external input due to the ability of the computational system to modify itself—that is, as a consequence of software instructions that imbue the system with some form of "artificial intelligence." The idea of auto-creativity in a man-made machine is an age-old fascination (linked of course to the machine's potential to replicate itself)—as if the making of such a "device" would exemplify the peak of human creativity. Many contemporary artists are not at all embarrassed by this idea and see the digital realm as offering a unique opportunity to experiment with auto-creative processes as the next logical step in art's cultural trajectory.
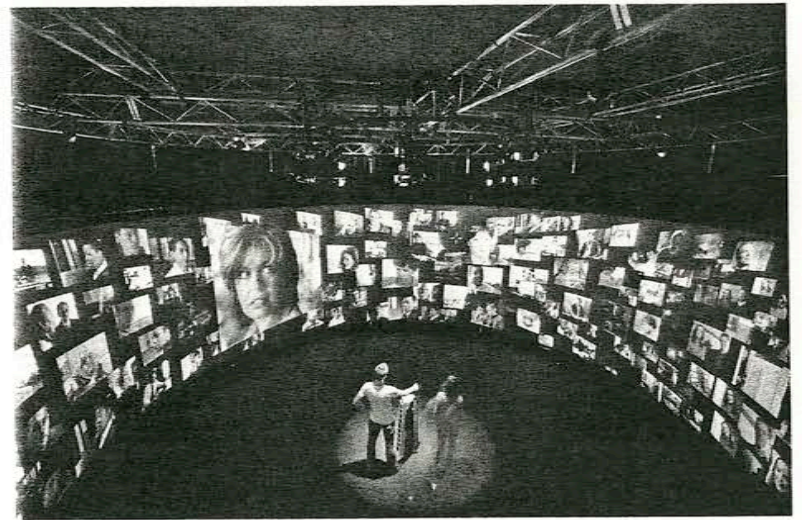

FIGURE 23. Overview of the installation *T_Visionarium* (Brown et al. 2008) at the Alhambra in Granada, Spain, Biennale of Seville 2008. Three hundred video clips are distributed in three dimensions over the AVIE cylindrical projection screen. Photo: Jeffrey Shaw.

RC. This seems to engender new kinds of creative relationships between artist and engineer. Could you give an example of how this played out in actuality? I imagine it can cause one to rethink the artist's role and the relationship of the artist to audience (when the audience is looking at a work that might be as much "made" by a machine as the artist-engineers who created the machine). JS. There are only a few new-media artists with the all-round capability to conceptualize, design, and build such typically complex works. More usually, they require a working relationship between artists and technicians with various skills such as programming and electromechanical engineering. This is not a historically new situation—many artists in the past ran studios where persons with various skills contributed to the work. And, multiple agency in the theater and cinema is almost axiomatic. What is new, perhaps, is the uniquely creative role that such engineers can have in the construction of a digital media artwork. In my own practice, there are numerous instances where programmers have become identified as coauthors because of this level of contribution. Furthermore, media artworks are (usually) not dependant on idiosyncratic individual artistic skills, as are needed, for example, in painting, so they can open themselves to a more cooperative process of creation where

the outcome is constituted by the conceptual, aesthetic, and critical interaction of individuals who have a closely shared enthusiasm and vision. In my own practice such cooperations have been a hallmark and are integral to the vitality of its (and each contributor's) development.

A project that fascinates me would be an exhibition titled "Artists Make Machines to Make Art"—focusing on machines that are creative facilitative devices rather than art objects per se. The camera obscura is, of course, a paradigmatic historical example, followed by the multivarious apparatuses built—often invented—by painters, sculptors, filmmakers, writers, musicians, and so on to enable them to undertake their specific creative objectives. Contemporary media-art practice is very much about artists building machines—especially interface devices and software engines—to engender specific forms of artistic expression and particular modes of user interaction. Such software architectures can be highly complex machines, with levels of autonomous behavior that extend the definition of the creative process whereby artists become the conceptual engineers of systems of aesthetic capability rather than of circumscribed objects.

Embodying Place: Place—a user's manual and Place-Hampi

In Place—a user's manual, a rotating platform with three video projectors allows the viewer to interactively rotate his window of view around a large, circular screen, and so to explore a virtual three-dimensional world constituted as a constellation of eleven photographic landscapes. These images, cylindrical panoramas recorded with a special camera in locations including Australia, Japan, the Canary Islands, Bali, France, and Germany, are simple landscapes of ground and sky that repeat themselves in all directions. The ground on which they are positioned is marked by a diagram of the kabbalists' sephirotic tree; the position of each panorama reflects a relationship between the landscape's scenery and the signification of that location on the diagram. The viewfinder on the interface camera offers an aerial view of the diagram and allows the viewer to see the exact position of the eleven panoramas. Moving texts are generated by the voice of the viewer and leave traces of their presence in this virtual world.

Place-Hampi builds on the interactive cinema paradigm launched in Place—a user's manual. Its central feature is a motorized platform that allows the viewer to rotate a projected image within a cylindrical screen nine meters in diameter and to navigate a three-dimensional environment of panora-
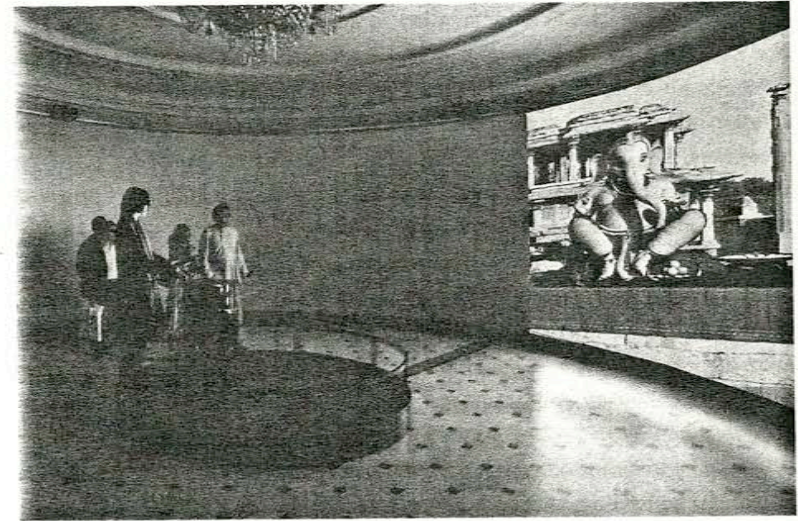

FIGURE 24. Interior view of PLACE-Hampi (2008) showing the motorized platform, cylindrical projection screen, stereoscopic panorama of Hemakuta Hill, Hampi, and composited animation of the elephant deity Ganesha. The installation was coauthored by Sarah Kenderdine and Jeffrey Shaw, with John Gollings and Paul Doornbusch. Photo: Jeffrey Shaw.

mas photographed at the UNESCO World Heritage site Vijayanagara Hampi, in southern India. These stereoscopic images are linked through narratives and enlivened by animations of Hindu gods and mythological events. These events reveal the folkloric imagination of contemporary pilgrims active at the temple complex. The single-user interface allows viewers to control their forward, backward, and rotational movements through the virtual scene as well as the rotation of the image. In walking around the viewing space, they also synesthetically engage their bodily movements with the stereoscopically perceived world, creating a heightened sense of presence.

RC. Physically, can you explain the technology of these works and how they compare to CAVEs or other immersive environments? What specific advantages do immersive environments provide, and this technical approach in particular?
JS. All of the Place installations embody the same visualization and interaction paradigm—one that I invented for Place—a user's manual in 1995 and that derives from the EVE installation first presented at the ZKM in 1993. In this paradigm, the user moves a projection window so as to explore a surround-

ing virtual scene. The *Place* installation has a nine-meter-diameter projection screen, with a motorized platform at it center from which a portion of that screen is projected upon. Rotation of the platform by the user controls the rotation of the projection window and the user's exploration of the panoramic scene. In this respect the *Place* installation has a greater affinity with a head-mounted display than with the CAVE. A head-mounted display also presents a restricted viewpoint, and the viewer has to turn and tilt his or her head to discover the complete scene, whereas a CAVE would simply project the scene in its entirety. Paradoxically, it is the human manipulation of a constrained projection window that offers a more kinesthetic experience than in a CAVE, simply because it demands a more concerted bodily effort on the part of the user, and furthermore, what appears on the screen is more closely linked to choices made by the viewer—that is, an active seeking out of information. Other perceptual and kinesthetic factors also come into play: the dynamic process by which a personal mental picture of the complete 360-degree scene is constructed in the viewer's mind as he or she explores its features; the user's experience of physical rotation on the platform that aligns his or her body with the virtual point of view, thereby making more tangible (even somewhat hallucinatory) the sense of tangible presence in that space; and the obligation of other viewers in the installation to walk around and follow the rotation of that platform and the projected image, thereby causing a psychophysical conjunction of real and virtual movement that amplifies every viewer's sense of the actuality of the scenes presented and the immediacy of their visit.

One distinction between *Place-Hampi* and the earlier *Place* works is the later work's use of stereoscopic 3-D projection. Stereoscopy is a feature of most immersive display systems because of its ability to give a more tangible experience of the three-dimensional properties of situations and objects. Every monoscopic display from PDA to Omnimax forces the viewers to focus their eyes on the two-dimensional surface of the screen, thereby belying the third (depth) dimension of the image being presented. A stereoscopic display, on the other hand, allows viewers to focus their eyes both in front of and beyond the screen surface (to infinity in fact) so that the depth of the projection can be experienced as an immersive reality. In works like *Place-Hampi* and *Web of Life*, the projection screen becomes a transparent window that reveals a space of representation that effectively conjoins with the viewer's space of being (and action).

RC. In terms of how the works are made, *Place—a user's manual* and *Place-Hampi* employ video compositing and layering, with realtime CG characters and pre-animated ones reacting to the movements and actions of audience members via tracking systems. How has this changed the way in which narrative elements function? And, I imagine transparency of the technology must be a problem . . .

JS. *Place-Hampi* in its present form presents animated three-dimensional Hindu gods that have been composited into the three-dimensional panoramic photographs that were shot at Hampi. During the viewer's exploration of those scenes, these figures can be "discovered" at certain locations. But the animations themselves are pre-rendered and simply play over and over again in a seamless loop.

The next version of the *Hampi* project, which is currently in production, will be implemented in iCinema's AVIE environment. This is a 360-degree fully projected stereoscopic display. In AVIE each viewer's physical location and bodily gestures can be detected by infrared video cameras and used as input to influence the projected imagery. Our intention is to populate two of the *Hampi* panoramas with computer-generated autonomous narrative agents who will react in real time to the physical disposition of the viewers with respect to the scene. In one instance, a group of temple monkeys will be these reactive agents. In another scene, a group of virtual tourists will autonomously respond to the viewers' proximity, identifying them also as tourists, who they proceed to photograph. In each of these "experiments," the viewer experiences the shock of a virtual world that is dynamically aware of his or her presence and behavior, and continuously and autonomously modifies itself accordingly. This modicum of machine intelligence is enough to create a so-called co-space—a merging of the physical and the virtual, enabling simultaneous interactions between the real and virtual worlds. Irrespective of its obvious technological contrivances (and constraints), such a co-space promises to introduce a whole new dimension into the narratives of immersive virtuality—one where autonomous machine agents are socially copresent and coactive with human agents.

RC. Walking in your multimedia environments suggests the integration of time-based media like film and spatially represented arts like panorama. As with bicycling in *Legible City*, the walking articulates a changing relationship (similarities, differences) between humans and machines in relation to information processing and meaning. Is that right?

JS. Yes.

RC. Walking, then, seems to be one of the ways you construct conditions for exploring both the human experience of "presence" and what presence means

in a world of machines. . . . Perhaps this had practical implications in making works that explore presence or even impacted your understanding of what it might mean to construct (or articulate) presence in artwork?

JS. The success of the Nintendo Wii is largely due to the way it extends the range of physical interaction offered to its players. The effectiveness of such a device was prefigured by the earliest examples of media art, such as my *Legible City* and David Rockeby's *Very Nervous System* (1986; see Cooper 1995). But already in the nineteenth century, the attraction (and commercial success) of panoramic painting, as Errki Huhtamo has rightly pointed out, was that one could stroll around it as a flaneur—an attraction that was lost once seating was set up in the cinema, to be replaced by a more modern fascination, that of the voyeur (Huhtamo 2004).

A denominator in so much media art is the intention (once again) to reengage the body of the viewers, to affirm their bodily presence in the mediated space, and conjoin them in an extroceptive, proprioceptive, and kinesthetic relationship with the artwork. There are at least two drivers for this ambition: to revitalize the sociocultural operation of art in general because of its dysfunctional state, and to adhere this revitalization to a technological imaginary that has become the central ideology of our time. Samuel Beckett said, "To find a form that accommodates the mess, that is the task of the artist now" (Bair 1978, 21). Because the technological imaginary is a domain of digital immateriality, the existential success of this project necessitates its embodiment as a cultural prosthesis where we can critically register and enact our presence. When machines increasingly determine the spatial formations of this world (and the world of art) and can even inhabit it as autonomous agents, the core challenge on every level is to articulate and give meaning to these new modalities of "being" in this world. To address this challenge, the artworks we are making operate as laboratories of confrontation, interaction, and self-reflection around this issue, using technological and aesthetic constructs that delve deeply to elucidate its properties, problems, and potentialities.

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