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I N T R O D U C T I O N

Craig Harris

This issue of Leonardo Electronic Almanac exemplifies the depth of creative activity around the world, and the force of the human spirit in responding to contemporary challenges. I am pleased to be able to publish the text which forms the basis of the presentation that Roy Ascott will make next month on the Telecommunications panel at the Fourth International Symposium on Electronic Art in Minneapolis. His article, "From Appearance to Apparition: Communications and Consciousness in the Cybersphere", offers a perspective which addresses how "questions of consciousness and the construction of reality are at the center of any discussion of the status, role and potential of art in the emerging cyberculture".

Roger Malina offers five New York-based artists' abstracts of projects which incorporate virtual reality technology. These abstracts represent articles and work in progress which will be published in a future issue of the journal Leonardo. LEA readers are invited to contact the artists with their comments and perspectives.

Judy Malloy presents a collection of artist's Words on Works encompassing such themes as surveillance, the real versus the ideal "me", the dualistic nature of the spider's character in many

myths and legends, and the declaration of a new country which includes all territory within virtual realities.

Annie Lewis provides a profile of the newly created National Online Media Association, and has compiled a collection of event listings, including several which follow the virtual reality theme.

Bonnie Wright from the University of California at San Diego wrote a perspective on the Composer to Composer '93 event presented by the Telluride Institute in July. A variety of new and old technologies were combined to create an event which included live music performances, integrated dance and telecommunications.

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P E R S P E C T I V E S

< From Appearance to Apparition: Communications and
Consciousness in the Cybersphere >

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[Editor's Note: This article is published here by permission of the author. It was written initially for publication in November in Spanish for the first issue of "INTERMEDIA", Madrid, editor Orlando Carreno.]

"The mod does two things...it stops me collapsing the wave function; it disables the parts of the brain that normally do so. But the mod also allows me to manipulate the eigenstates - now that I no longer clumsily, randomly, destroy all but one of them."

"So what should we call it?"

"...neural linear decomposition of the state vector, followed by phase shifting and preferential reinforcement of eigenstates". She laughs. "You're right: we'd better think of something catchier, or the whole thing will end up being grossly misreported."

Greg Egan, Quarantine, 1992

Schroedinger's Cat has to be the most celebrated creature in the bestiary of science, and the paradox it proposes is perhaps the most complex in our understanding of consciousness and reality. It describes the problem of measurement at the quantum level of reality, the level of subatomic particles, atoms and molecules. This gruesome thought experiment involves a black box containing a cat and radioactive material positioned so as to trigger the cat's death if the particle decays. The process is quantum mechanical and so the decay can only be predicted in a probabilistic sense. The whole boxed system is described by a wavefunction which involves a combination of the two possible states that the cat can be in; according to quantum theory the cat is both dead and alive, until we observe or measured it, at which point the wavefunction collapses and the cat will be seen to be in either one state or the other. And just as the electron is neither a wave nor a

particle until a measurement is made on it, so the cat is neither dead nor alive until we get to take a look at it. We are dealing here with observer-created reality. To look is to have the system jump from a both/and situation to an either/or outcome, the quantum jump producing what is known as the eigenstate. But there is no agreement amongst physicists about precisely where, in the chain of events in this wavefunction collapse, the measurement result is ultimately registered.

Greg Egan places the point of collapse, the point at which reality is created, right in the brain. By proposing a technology which could be inserted in the brain to modify this eigenstate effect, to block it and thereby prevent the collapse of the wave function, his scenario gives a post-biological context to the idea that reality is constructed. Egan speaks the language of the coming decade. His 1990's science fiction addresses issues of the neuro-cognitive sciences with the prescience that William Gibson showed towards computer communication developments in the 1980s. And just as Gibson's *Neuromancer* correctly identified cyberspace as an important cultural construct of the late 20th century, so Egan's *Quarantine* identifies the issues likely to preoccupy us at the turn of the millennium. The question of consciousness, the technology of consciousness, the transcendence of consciousness will be the themes of 21st century life. Fundamental to this evolution is the development of a telematic art in the cybersphere, and fundamental to that art are the experiments, concepts, dreams and audacity of artists working today with telecommunications systems and services.

Questions of consciousness and the construction of reality are at the centre of any discussion of the status, role and potential of art in the emerging cyberculture. The fundamental question is this: Can an art which is concerned, as western art has always been, with appearance, with the look of things, with surface reality, have any relevance in our systems-based culture in which apparition, emergence, transformation are seminal? Can Representation co-exist with Constructivism? It is the overarching concern with appearance and with representation which has hitherto characterised western art and which has made it the servant of ideologies, of both church and state. It is its concern with appearance which has kept it in line with classical science, looking no further into things than their outward forms allow, making of the world a clockwork machine of parts whose movements are regulated by rigid determinism, and seeing Man as little more than a material object. It is the art of appearance which is purveyed in boutiques, galleries, museums and on the pages of chic art magazines. It is International Art. And it is dying. It is dying because it is no longer relevant to a culture which is progressively concerned with the complexity of relationships and subtlety of systems, with the invisible and immaterial, the evolutive and the evanescent, in short, with apparition. Questions of representation no longer interest us. We find no value in representation, just as we find no value in political ideologies. We do not wish to keep up appearances.

The telecommunications of cyberspace, on the other hand, offer the contemporary artist the means of interaction (both his own and that of the viewing subject) with dynamic systems, with creativity-in-process, with the emergent properties of an art of transformation, growth and change. It is for this reason also that the narratives and technology of Artificial Life are so important to us at this time. Cyberspace is the space of apparition, in which the

virtual and real not only co-exist, but co-evolve in a cultural complexity . Apparition implies action just as Appearance implies inertia, Apparition is about the coming-into-being of new identity, which is often at first unexpected, surprising, disturbing. If appearance is claimed as the face of reality, of things-as-they-are, apparition is the emergence of things-as-they-could-be. However, our insight into the ways in which reality is constructed in our consciousness, leaves us in no doubt that the processes of apparition are authentic and that appearance is a fraud. Representation in art was always essentially mendacious, illusory, and counterfeit. The mirror always lies.

More and more artists now take global networks, virtual reality, high speed computing for granted. These technologies are no longer seen as simply tools for art, they now constitute the very environment within which art is developing. Given this increasing familiarity, artistic questions now are not so much concerned with these dataworlds per se but with the interface between them, between us, between our own minds and that larger field of consciousness we call the world.

Whether or not Egan's fictive brain modifier gets to be developed, the fact is that our technologies of perception, cognition, and communication - the interface to the complex computer systems that both mediate our consciousness and construct our reality - are moving closer and closer to the body and into the brain. Just as the keyboard and mouse are being consigned to history, so too will the Head Mounted Display, the DataGlove, even the datasuit soon be consigned to the museum. Conceptually, they already are. We want the systems interface set within our brain. We want the boundaries between "natural" and "artificial" to be as redundant technologically as they are becoming conceptually and spiritually. This is to talk about the post-biological body as interface.

Progressively, we artists want to be creative in cyberspace by controlling computer-mediated systems through biological input sensors and biocontrollers in our own nervous system responding directly to signals from the brain, eye and muscles. However, while the advent of neural interfacing will certainly have enormous consequences for the development of art in the Net, and as much as it fascinates our speculative nature, it is not the most fundamental question at present for artists in the cyberculture. More important to us now is the conceptual implications of the shift taking place in art from appearance to apparition, from object to process. Art, which was previously so concerned with a finite product, a composed and ordered outcome, an aesthetic finality, a resolution or conclusion, reflecting a ready-made reality, is now moving towards a fundamental concern with processes of emergence and of coming-into-being. This raises critical, theoretical, and aesthetic questions which we can no longer avoid. In an important sense the issue is political, it concerns as much the democratisation of meaning as the democratisation of communications, that is to say a shared participation in the creation and ownership of reality.

The revolution in art which prompts these questions lies in the radically new role of the artist. Instead of creating, expressing, or transmitting content, he is now involved in designing context: contexts within which the observer or viewer can construct experience and meaning. The skill in this, the insight, sensibility, feeling and intelligence required to design such contexts is no less than that demanded of the artist in classical, orthodox art. But the

outcome is radically different. Connectivity, interaction and emergence are now the watchwords of artistic culture. The observer of art is now in the centre of the creative process not at the periphery looking in. Art is no longer a window onto the world but a doorway through which the observer is invited to enter into a world of interaction and transformation. The importance of telematic networks, of the inherent connectivity of cyberspace, in all of this, cannot be overestimated. These ubiquitous networks are themselves undergoing significant augmentation with the capacity and speed now available in the so-called 'dark' fibre, as George Gilder explains:

"Fibre comes in threads, as thin as a human hair, as long as the British Isles, fed by lasers as small as a grain of salt and as bright as the sun. A single fibre thread can potentially hold all the telephone calls in the United States at a peak moment of Mother's Day. Fibre is not really a replacement for copper (wires) ...it's a replacement for air. Dark fibre, lit with different colours for different protocols, will deliver one thousand times our present total broadcasting capacity. The recently developed Erbium Doped Amplifier which will send an infinity of messages through glass on wings of light, is the communications engineer's Holy Grail - the dream communications system, capable of communicating over vast distances with huge information capacity."

So, dark fibre, boxed cats and biocontrollers are directly relevant to the development of art in the cyberculture, this domain of apparition in which natural intelligence and artificial life can interact creatively. Whatever the dominant media, whether electronic, optical, or genetic, the art of the cyberculture is generically interactive. This interactive art is characterised by a systems approach to creation, in which interactivity and connectivity are the essential features, such that the behaviour of the system (the artwork, network, product or building) is responsive in important ways to the behaviour of its user (the viewer or consumer). More than simply responsive, it constitutes a structural coupling between everyone and everything within the Net. This kind of work is inherently cybernetic and typically constitutes an open-ended system whose transformative potential enables the user to be actively involved in the evolution of its content, form or structure.

Science fiction such as Egan's is not alone in positing scenarios in which human consciousness is seen as the instrument for creating reality. Outstanding amongst philosophers from the point of view of cyberculture is Paul Watzlawick whose contributions to Radical Constructivism can be seen as directly relevant to the interactive art aesthetic. Radical Constructivism is as incompatible with traditional thinking as interactive art is with traditional art. As early as 1973 the cybernetician and biomathematician Heinz von Foerster gave his classic lecture "On Constructing a Reality" showing how the environment, as we perceive it, is our invention, describing the neurophysiological mechanisms of these perceptions and the ethical and aesthetic implications of these constructs.

What both the art and technologies of cyberculture are able to show is that there is a radical shift in our perceived relationship with reality, where the emphasis has moved from appearance to apparition, that is from the outward and visible look of things to the inward and emergent processes of becoming. In this culture, neither the precise state of art nor its cultural status can be fixed

or defined; it is in a constant state of transformation. This is not a state of transition between two known and fixed definitions or destinations, rather is it transformation itself as a defining characteristic, as intrinsic to the identity of interactive art as the composed and finite object was to its classical predecessor. Interactive art is art in a state of endless becoming. It is art-in-flux. This is so at present both in stand-alone systems, whether hypermedia or multi-media in format, as much as in the Internet with its global multiplicity of inputs and outputs.

A culture concerned with appearances bases itself on certainties, a definitive description of reality. Uniformity of dogma, uniformity of outlook and goals, cultural continuity and consensus, semiotic stability, these are its distinguishing features. Within this larger frame, aesthetic changes, when they occur, are merely cosmetic, the basic conformity to an approved model of reality remains. There have been paradigm shifts in art just as in science, but it could be argued that the canon of Western art has maintained a much longer consistency and continuity than science, since numerous scientific revolutions have come and gone while art's preoccupation with appearance, with the surface image, with ready-made reality, has held for millennia.

In contrast, a culture concerned with apparition bases itself on the construction of reality, through shared perceptions, dreams and desires, through communication, and on the hybridisation of media and the celebration of semiotic instability. The shift in art towards apparition and construction as its primary concerns is a paradigmatic shift. We now realise that an art dedicated to appearance, simply gives the lie to whatever is the case, since the retinal gaze can penetrate very little of the material state and almost nothing of the spiritual state of things. The surface of the world hides more than it discloses. Science in the 20th century has been based largely on what is invisible to human retinal vision since it has always attempted to comprehend the forces and fields, and relationships underlying "our" visual world. In the earlier art of the 20th century this also to some extent was true; Kandinsky, Duchamp and Pollock distinguish themselves, in their radically different ways, by their attempts to reveal the invisible, and construct their separate realities. Of these, it was Pollock whose intimations of connectivity brought to modern painting the great commanding images of a networked world, in the swirling, circulating, linking, confluences of line and colour. It was Pollock who first brought the tight-framed picture window of painting off the gallery wall and onto the surface of the earth, marking out an arena for action and interactivity, and thereby laying the groundwork for those holistic ways of viewing, imaging and constructing, an entirely new attitude towards art and aesthetics, of which we in our digital space are the principal heirs and benefactors.

But until the effects of cyberculture were felt, until the radical implications for art of the new technologies had begun to be recognised and adopted, those artists whose practice, complicitly or unthinkingly, upheld the old orders of perception and knowledge, aided and abetted by the de facto controllers of representation and consciousness, the curators, critics, historians and dealers, resisted the radicalism of these pioneers. The great shame of American scholarship is that Pollock has never been properly appreciated or understood, nor, as Tim Hilton has noted

in reviewing the current, disastrous Royal Academy Exhibition American Art in the 20th. Century, has he ever been given a serious full scale retrospective, nor a fully sympathetic book. "America wishes him to be a dead movie-star rather than an artist." And yet Pollock first created the aesthetic possibility, in a sense the historical permission, for our own radical constructivism in the cybersphere to come into being. Because, at base, working with networks, is a matter of attitude before it is anything to do with machines. Telematic art is conceptually driven not technologically led. The fundamental concepts of art as action, interaction with the art-in-process, the artwork as arena, art as transformation, change, flux and flow, these are in origin Pollock's -with the acknowledged provenance of course of Navaho and the visual culture of Native America. If there is any link whatsoever between the art of cyberculture and the art of the pre-telematic era, it lies in the painting of Pollock. The link is one of sensibility not style, of attitude not form.

The collapse of the New York School, the market rise of resurgent German expressionism, the despairing flounderings of post-modernist solipsism, the dismal return to nineteenth century academicism, figuration and narrative, the whole miserable confusion, demoralisation and splintering of art at the fag end of this century is evidence of the major paradigm shift which we are undergoing. Nothing is spared in the process: galleries become redundant, museums have to be rethought and redesigned, academies have to be abandoned and reconstituted, the patronage, placement and perpetuity of art are all to be reconsidered.

In our present understanding of the world, nothing is sufficiently stable for us to wish to give a permanent form to its representation. Nor do we wish it to be. We are on that evolutionary spiral which has returned us to a more Taoist desire for flux and flow, for change and transformation. No eternal verities present themselves as worthy of consecration in manuscripts or monuments. We want now an art which constructs new realities, not one which represents a world preordained, finite and ready-made. We want now an art which is instrumental rather than illustrative, explicatory or expressive. Rather than to simply embellish the world and add to its ornamentation, the artist of the cyberculture wishes to engage in its renewal and reconstruction.

Above all we do not need any longer, hovering like vultures at the periphery of the old order of art, the cultural theorists, critics and academics who winge and wince at technology, who wag endlessly their disapproving and despairing fingers at the daring perceptions and dazzling innovations of science. Cultural theory was little more than ideological determinism dressed up in pretentious rhetoric, all show and no action, ideally suited in these latter years to preside over the demise of the old order of art, the art of appearance.

Art in the cybersphere is emerging out of the fusion of communications and computers, virtual space and real space, nature and artificial life, which constitutes a new universe of space and time. This new network environment is extending our sensorium and providing new metaphysical dimensions to human consciousness and culture . Along the way, new modalities of knowledge and the means of their distribution are being tested and extended. Cyberspace cannot remain innocent, it is a matrix of human values, it carries a psychic charge. In the cyberculture, to construct art is to construct reality, the networks of cyberspace

underpinning our desire to amplify human cooperation and interaction in the constructive process.

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A B S T R A C T S

< Artists' projects with virtual reality technology >
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The following abstracts describe articles currently being written for a section of the journal Leonardo, Guest Edited by New York artist Kiersta Fricke. The projects described involve the use of virtual reality technologies by artists.

We present these abstracts here prior to the complete articles being submitted in final form to the journal Leonardo by the authors. We hope that some readers of the Leonardo Electronic Almanac will be intrigued and contact the authors of the abstracts with their own comments and suggestions. Perhaps one of the possible functions of our new electronic journal the Leonardo Electronic Almanac can be to serve as an instrument of collaboration rather than primarily as an instrument of documentation and information.

Artists working at the cutting edge of science or technology work in separated places and rarely know of each others art and research activities. If they do hear about each other's projects it will be long after the art work is completed. There is often costly duplication of effort in developing tools and methodologies, and the lack of discourse among these artists reduces the opportunity for creative collaboration.

A recent report of the US National Research Council (see Wm Wulf, Science magazine, Vol 261, 13 Aug 1993 issue p854) calls for the instigation of "Collaboratories". These are described as "a center without walls, in which the nation's researchers can perform their research without regard to physical location - interacting with colleagues, accessing instrumentation, sharing data and computational resources, (and) accessing information in digital libraries". "The physical infrastructure of the collaboratory is the worldwide collection of networked computers..." "The bottleneck to the achievement of such a vision is not hardware."

Such a vision is one that artists could help shape and make a reality. For the first time in decades, if not centuries, artists are working at the leading edge of new technologies. This is true in visualisation software, in virtual reality technologies, in multi-media technologies, and in telecommunication technologies, among others. The entertainment industry, and the artists who work there, have become new drivers for the development of new media technologies and the enthusiasm for interactive media in the entertainment business is often initiated by artist. Many of the early experiments in interactive media and virtual reality can be credited to artists.

In a recent visit to the GMD (German National Center for Computer Science) in Bonn, I was introduced to the work resulting

from a number of collaborations between artists and researchers (contact Wolfgang Krueger and Monika Fleischmann fleischmann@viswiz.gmd.de, fax 49-2241-14-2040). These works represent some of the most innovative work in both contemporary art and contemporary computer science. Related work is going on at other institutions such as the new Academy for Media Arts in Koln, Germany, Xerox PARC, the MIT Media Lab, IRCAM, as well as numerous other institutions but such work is also going on as well in individual artist's studios such as those of the artists represented in Kiersta Fricke's forthcoming Leonardo Special Section. Yet most of these artists and researchers will never meet, except occasionally at conferences and shows such as SIGGRAPH, Ars Electronica, the ISEA symposia or the International Computer Music Conferences. The electronic networks provide an infrastructure for creative collaboration between these artists and researchers around the world. Perhaps the Leonardo Electronic Almanac can become one of the instruments to enable such collaborations. The journal Leonardo will remain an archive and documentation of completed artworks and research, as a resource for artists and researchers in the future. Leonardo Electronic Almanac, with the immediacy of electronic communication, could serve as a conduit for problems to be raised and as a resource to connect with people who already know how to solve them, or could help work on them. I hope that readers of Leonardo Electronic Almanac will email in reports of work in progress, which might allow their colleagues to contact them and, where appropriate, to enter into collaboration.

Readers interested in contacting the Leonardo Guest Editor Kiersta Fricke concerning the forthcoming Leonardo special section on artist's projects with virtual reality technology may send email c/o isast@garnet.berkeley.edu. Please address the email to Kiersta Fricke. The following abstracts are for articles which will appear in this section.

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The tools of artistic illusion seem ready for significant additions through the use of nonlinear computational media. However, these additions come at the expense of our most powerful tool, linear narrative. The fields of virtual reality and interactive media promise to add new tricks for creating illusions of presence, control and creation to the already well-known tricks for depth and movement. I will write about the possibilities these new tools of illusions have for providing a deeper suspension of disbelief. I will describe my ideas about the theory of achieving the illusions that is virtual reality and its fascinating (and expensive) implications. The main focus of my article will be work in finding accessible and practical ways of creating virtual worlds without sacrificing the human interest that has been so well provided for by linear narrative.

"Dan's Apartment," an interactive television show at the New York University's Interactive Telecommunications Program, was my first attempt at creating an illusion of presence. This project was an unusual experience for most viewers, but ultimately the place in which the user was given a presence was of limited interest.

Later, at Apple computer, I created tools for making "navigable

scenes" and "navigable objects," which are a sort of panoramic photograph on the computer. These tools made it a little easier to capture more storied spaces than my apartment. However, I was still working with frozen physical spaces which could only imply human action. In "Being There With the Melons," another interactive television show at New York University, I added a drama which took place only on the audio track, while the audience was free to look around the set of the play. This amounted to an enhanced viewpoint on a linear narrative.

In the present show at NYU, "The Electronic Neighborhood," we are trying to provide some sense of control and creation in addition to presence. The viewer can use a touch-tone television to navigate through a three-dimensional cartoon virtual world where everything is an icon "filled" with carious media: video, HyperCard stacks, pictures, sound, text, etc. The media has been created by the viewers who can send it in, and retrieve it, by fax, phone, modem or computer network. The process of creation and control in this project are still a bit tortuous. And so I will describe my past attempts and future hopes of using computational media to create new illusions worth having.

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Yo Lin (The Dark Spectre) - A Theatre Piece Incorporating Virtual Reality and New Computer Technologies

Virtual Reality, MultiMedia and Interactivity have become catch words to describe the avant garde of today's computer technology. But what exactly do these terms mean and how can they really, if at all, be applied effectively to the communication arts?

Our presentation of Yo Lin (The Dark Spectre) is an initial struggle with the aesthetics of virtual reality and the issues raised by daily interaction with the vast landscapes of electronically-generated and disseminated versions of reality found in television, radio, telephones, video games, and, increasingly, networked computer systems.

Yo Lin (The Dark Spectre) is a play combining live actors with computer-generated, video-projected virtual realities to explore exactly how the newest in computer technology can expand the drama of live theatre. It explores how live actors can interact spontaneously with life size, computer-generated environments, objects and characters. In short, Yo Lin (The Dark Spectre) shows how virtual reality technologies can even now, in their fledgling development, be used to expand the dimensional space of the stage and how one day these computer-based technologies will provide the artist with unimagined creative control -- control surpassing even that achieved by the film and television industries.

Yo Lin (The Dark Spectre) is an experiment. As artists, we believe that it is critical to engage in precisely such hands-on experimentation with these new technologies in order to understand them, present them, and determine their future applications. Yo Lin (The Dark Spectre) is an experiment to determine the aesthetic of these technologies in live theatre. The

article I will write for Leonardo will address these issues and describe the process of creating Yo Lin (The Dark Spectre).

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My article will be based on experiences from a collaborative project created at the Banff Centre for the Arts and Virtual Environments Seminar. My collaborator is Michael MacKenzie, a playwright and director living in Montreal.

The project has several incarnations - a VR headset piece; an interactive installation using computer-driven slide projectors, video projection, interactive sound and projected computer graphics on three-dimensional net scrims on screens; and a theatre piece which will use images and sound from the VR piece in a theatrical context with live actors.

My work usually involves installation or performance which utilize multiple technologies, but interactivity is not something I had worked with previously. I would like to speak about some of the preconceived notions I had about VR and the technologies which comprise it, how those changed as the project developed and why. This will address some of the issues around interactivity which arose as we got deeper into the project and began to get past some of the initial superficial responses to what constitutes a new approach to working with duration and narrative. To work with a non-linear system is like creating a branching multi-levelled web or net. In order to get past a simple or superficial response like a multiple choice model, you embark on complex mapping systems. These systems challenge traditional ideas about control and mastery, the linearity of language, and the engine or narrative which moves a viewer through time.

This model has broader social implications which I would like to examine. The developing technology of VR is a kind of cartoon myth which actually represents a broad range of developing technologies which will profoundly affect our lives. It affects the construction of public and private space, the development of models of identity and gender, the definition of labor, individual creativity and community. It will also shift power relations into a different hierarchical structure.

I would like to touch on all these issues in the context of my own experiences developing work which deals with a range of technologies from the cutting edge to the obsolete. I think the present period is a one of tremendous change and upheaval. The technical revolution, like the industrial revolution of the 19th century, will have profound effects on our cultural, economic and social structures. This period of transition offers more interesting opportunities for artists to participate in the reconstruction of social and culture forms.

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Virtual Reality and the Art of Memory

Since my writing traverses fiction and criticism - and their hybrid offspring - a central theme of the article I propose to write can be best summarized in a parable:

Ever mindful of our deficits, we have become preoccupied by the limitations of our wooden leg. It is heavy, splintery and primitive - more burden than appendage. To remedy this situation, we set about the design and manufacture of improvements. Our first attempts yield a satisfying fresh-colored veneer. But we are not appeased for long, and in our quest for a more perfect approximation, we contrive a regiment's worth of well-tuned limbs in ever lighter, more tensile and resilient materials, whose joints function with an almost transparent fluidity. We press on one more step and encounter a form so lifelike that for all intents and purposes it is an extension of our anatomy. At this stage we are able to envisage not only walking, but leaping; not merely waltzing, but jitterbugging - in short a panorama of glorious mobility beckons us. We have arrived at that longed-for moment where imagination and industry conjoin: we are free. Free but for the one unintended consequence that in order to render ourselves complete, we must choose to cut off one of our legs - and this because we already possess two perfectly good ones.

It seems that simulation is at the core of our creativity. Our interpretative faculties virtualize all available realities. How can it be otherwise, since truths are shared interpretations, distortions and elaborations of unencompassable, total actualities. No work of the arts or sciences could be realized without the systematization of this process; the most desiccated formulae have their origins in the spontaneous, internal play of the senses. The imagination is always programmed. It is always interactive. Let us be clear that when we talk about VR we are dealing with the electronically-mechanized, externally stimulated reproduction of something we do inherently. The questions are therefore cultural, not strictly technological.

In discussing the above, I will draw on an archaic VR form known as Artificial Memory - one by which Roman, Greek and Hermetic philosophers built and explored internal cityscapes: streets, palaces, towers and chambers. It is within this architecture - an architecture that could grow or shrink at will, blossom into infinite detail, or reduce to site model simplicity - that they stored and categorized the concepts, phrases and words that formed the sum of their understanding and scaffolded their rhetoric. And it is also within this simulated environment, this mirror world, that they located their compelling images of virtue and vice.

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My work attempts to push the boundaries of performance and technology. I am currently working on a piece entitled The Mutant Gene and Tainted Kool-Aid Sideshow. It incorporates live multiple-monitor/projected video, animation, sequenced and instrumental music as well as dramatic artifacts. Fusing technologies and characters both on and off screen, I attempt to explore the boundaries of environmental and psychological states. Beginning with the psycho dramatic confession of an

extraterrestrial, the piece journeys into a series of multi-colored, entropic landscapes. In short, it is a multi-sensory experience with an emphasis on atmosphere, environment, overload and perception, occurring both thematically within the piece and from the audience's perspective.

The fundamental tools used are a variety of digital and analog video and audio devices. I am interested in fusing "old" and "new" technologies. The video is, in part, created live during the show. It is the synthesis of abstract prerecorded imagery (generated on analog video synthesizers at the Experimental Television Center in Owego, NY) mixed and processed through on-stage computers and video switchers as well as mixed with animation and live camera inputs.

When dealing with the creation and synthesis of video and audio, there are properties inherent to analog technologies that cannot be replicated with digital ones and zeros. Likewise, digital media has properties that make it desirable. I am interested in incorporating "the best of both worlds."

The music, as well, consists of several elements: midi sequences (hot keys in progress) triggering multiple synthesizers, drum machines, samples and video segments; live vocals, percussion, midi sax and woodwinds; and cassettes containing prerecorded/found audio.

As stated earlier, my work attempts to push the boundaries of technology and performance. I am interested in the integration and relationship between the two. I view myself not as a "performer," but rather as a "generator" of the multiple technological elements occurring on-stage, as well as another visual/audio element. I am also interested in exploring the role of the audience with the merging of technology and performance, particularly in regards to immersion, expectation, definition, and finally participation.

While I have stated an overview of the work itself and the technologies used, I intend to explore these issues further in my article for Leonardo.

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W O R D S O N W O R K S

Judy Malloy

< Miradas en el Tiempo >
Marisa Gonzalez
Argensola 26, 1
28004 Madrid, Spain

"Miradas en el Tiempo" (Glaces in Time) [1] is a personal narration, a conversation between the real me and the ideal me, using multiple glances at the image of a single woman -- glances in time. In the collection of electrostatic images that comprise this work, the body speaks symbolically, in multiple emotional and mental ways.

Inspired by a photograph taken twenty years ago and brought to memory by the discovery of a similar image in the newspaper, the exhibition (based on variations of the figure of a black woman

dressed with necklaces and bracelets) is divided into four sequences -- desires, identity vertigo, territories and silences.

In "Miradas en el Tiempo" there are homogeneous parameters, governed by my background in music and the plastic arts. These parameters are rhythm, time, metamorphosis and sequence - the latent foundation of temporal conscious in all of my work.

[1] "Glances in Time" is a series of electrostatic images made with Canon Color Bubble jet A-1; Canon Color Laser 500 and the IPU-Canon CLC 10 Computer.

< Information Revolutions >

Richard Lowenberg
P.O. Box 1770
Telluride, CO 81435 USA

The artist is a spy, an agent of entropy, covertly intruding upon secret worlds, illicitly stealing the private moment. A techno-deviate, cultural provocateur, the trickster at large in the information society.

"Information Revolutions" is a long term work that attempts to address essential implications of the escalating information revolution. Presentations to date have focused on concepts of information theory and knowledge representation, military communications and surveillance, and potential cultural aspects of an information based society.

My current visual works are produced primarily with two military developed imaging technologies: image intensifiers (nightsopes) and FLIR's (forward looking infrared systems). High on the U.S. Department of State's export restricted list, these tools open up to the creative image maker the previously obscured world of night and darkness, and provide a richly informative view of our complex and wondrous electromagnetic environment.

The "nightscope" extends the range of photography beyond the limitations of film speed and lenses. Without a flash, unobtrusive, the photographer using an image intensifier may document the obscure and explore new realms of visibility. The photographic act is completely hidden in darkness.

FLIR imaging systems contain advanced infrared sensors and electronics that provide a high resolution thermal video display. Developed primarily for materials testing and surveillance, and heat-seeking missile guidance, FLIR's make uniquely visible that part of the infrared spectrum invisible to our eyes that we sense only as temperature variations. The FLIR provides a shifting window onto a rich thermodynamic worlds, unaffected by light or darkness.

Used as artists' media, these tools and their inherent processes expand our notions of the captured image, while provoking concern over the implications of illicit imaging, rights to privacy, and freedom of information; treacherous, yet fertile creative ground.

< Arachne Vanitas >

Franziska Megert
Schwarzenburger 17
CH-3007 Bern, Switzerland

"Arachne Vanitas" (1991) is a video installation composed of two towers --- each consisting of 3 monitors and 3 players. The work, recently shown at Montage 93 in Rochester New York, is the second part of a trilogy that deals with paradoxes, with the *simultaneousness of the other*. (first part: "Playing with Fire"; third part: "Philemon & Baukis")

Many myths and legends from different regions and times deal with a dualistic interpretation of the spider's character. This iconographic background is the fertile ground for associative trains of thought provoked by the Arachne myth. The spider can be an evil demon, responsible for the plague and associated with death. It is also invulnerable. At the same time, it is creator and guardian. It has healing power in some ethnic medicine, and in some regions it acts as a midwife. Spiders change into virgins and fairies, into demons and vampires. Arachne -- the idea of transformation of female creatures into spiders is very old. It is an Hellenic myth written down by Ovid in "Metamorphosis".

To make the work, I first shot a black spider walking several times over a white surface. I made a black and white "key-tape" by enlarging some spider shots and by mixing 8 "spider-walks" on the screen at more or less the same time. In the video studio, I had 3 recorders connected to 3 camera-sets placed in a vertical row to shoot one person in three sections. (head and chest; main part of the trunk; legs) The postproduction consisted of replacing the information in the spider key-tape with the tapes made of two women (one younger, one older) in the video studio. For one monitor tower, I replaced the white part of the spider key-tape with the image of the older woman, and I replaced the black information in the spider tape with the image of the younger woman. The second monitor-tower was similarly made, except the image of the young woman replaced the white part of the spider key-tape and the image of the older woman replaced the black part. The sound is a mix of several chirp-noises of crickets.

The "Arachne Vanitas" concentrates on that which is not, never will be, and has always existed. The body of an old woman and a young woman are interwoven by keyed-in spider shapes to one single ageless body that loses materiality by the immateriality of the video-image. The corporal transcends materiality and shifts to the metaphysical level, where the human being lives a paradoxical nature - longing for yet fearing the unknown: eternity and death. They are both the same and yet they exclude one another. The transitory seeks eternity, and the eternal yearns for transitoriness.

< Telepresent Surveillance >
Joel A. Slayton
895 Vermont Street, San Francisco,
CA 94107 USA
Email: joel@well.sf.ca.us; slayton@sjsuvm1.bitnet

Systems Software Design and Programming: Kelvin Chan

"Telepresent Surveillance", an interactive installation, presents an automated surveillance system that includes a self navigating inflatable designed to track and follow an individual entering and moving in a room. (or gallery) It also includes stereo imaging cameras and audio microphones that enable transmission of visual and acoustic information from the inflatable's current spatial orientation and a stereo viewer stand device for

telepresent display.

The inflatable is a helium filled, electronically controlled device that maneuvers, records and transmits information automatically. It is equipped with sensors for locating and tracking moving targets (people) and electric motors for spatial positioning and orientation. Maneuvering is independent, relying only on a ceiling grid for intermittent charging. When the inflatable gets tired, it returns to the ceiling, powers up and looks for a new target.

Information from miniature twin cameras mounted on the inflatable transmit directly to an optically corrected stereo viewing stand for display in three dimensions. The telepresent viewing stand also includes audio transmission.

The "Telepresent Surveillance" project presents a unique opportunity to witness an automated surveillance device as it tries to figure out the complex spatial positioning and behavior of individuals in a dedicated space. The concept explores the idea of "intelligent" visual probes that can be relied upon to provide unique vantage points autonomously.

< The Elgaland/Vargaland Project and "Paragraph 31 All Gates
Are Open" >

Stephen Travis Pope
1635 Scenic Avenue, #5
Berkeley, California 94709 USA
Email: stp@CNMAT.Berkeley.edu

The Elgaland/Vargaland Project:

I have been involved in a project undertaken by the Swedish artists Leif Elggren and C. M. (Michael) von Hausswolff, and have written a 23-minute computer music composition in connection with this project. The description below introduces the project and discusses my musical task.

Elgaland/Vargaland [1] is a new country that was proclaimed in March, 1993. The territory of E/V-land consists of: (a) all borders and no-man's-lands between all other states and their borders to international waters; (b) the hypnogogic state of near-sleep; (c) all territory within virtual realities, hallucinations and insane delusions; and (d) other territories yet to be defined.

Elggren and Hausswolff have declared themselves kings of E/V-land and have written all of the appropriate texts: a constitution, national anthem, national motto ("There is a bullet for every king"), quotes for their currency, etc. They organized a travelling exhibition, in which all of the regalia of E/V-land is displayed as well as maps, passports, letters to and from other governments making territorial claims (for real!), currency, postage stamps, and other artifacts.

I believe this exhibit makes the visitor reflect on what "nationality" means to us today -- an issue that is especially relevant in Europe with the debates over the European Community and tribal wars in the Balkans. In the letters sent to "foreign" governments, the E/V-land kings "respectfully suggest" that, in order to increase the territory of E/V-land, all other states continue to subdivide.

"Paragraph 31 All Gates Are Open":

As one part of the project, Michael and Leif wrote a poem for their national anthem and gave it to three composer friends to be

composed and realized in three different musical styles: contemporary dance music, classic/romantic orchestra music, and computer music. The piece "Paragraph 31 All Gates Are Open" is the computer music version of the national anthem of Elgaland/Vargaland.

The title is not related to the text at all, but comes from the country's constitution, where the entire text of paragraph 36 is indeed "All gates are open." I found this a good summary of what I consider to be the underlying idea of the whole effort.

The text provided by Kings Michael I and Leif I is called "Sol och Guld" (Sun and Gold), and ranges from the heroic ("Freedom and Virtue. Courage and Honor"), to spiritual ("We're not afraid of the Devil; we know what goes around comes around."), to downright silly ("Now go and eat your porridge, munch munch munch."). I very much like the mix, and have tried to capture it in the music of "Paragraph 31 All Gates Are Open."

I chose four phrases from the poem to use as the central themes of the four-movement piece:

- Droem och Vaka (Dreaming and waking...)
- Evigt Liv (Eternal life...)
- Och kaerleken (Also love...)
- En enda saang (All the same song.)

The musical textures explore the extremes of duration, density, and tempo using words and other speech sounds in contexts that range from very time-expanded "infinite reverberation" clusters to dense layers of radically accelerated words. The text of the poem is read understandably during the third movement, so the listener (should he/she understand Swedish) knows what the "message" is.

As in several of my recent pieces, all of the sounds used in "Paragraph 31 All Gates Are Open" are derived from the human voice. In this case, Michael and Leif gave me recordings of themselves reading "Sol och Guld" for use as source material. These sounds were processed using a variety of software tools, including phase and linear prediction-based vocoders and digital mixers. Most of the processing took place at the Swedish Institute for Computer Science (SICS), where I was working at the time on a virtual reality project. The final mix was done at the EMS studio in Stockholm.

The piece uses many direct textual elements of the Swedish poem "Sol och Guld," so that knowledge of the Swedish language allows the listener to understand many of the puns and jokes that are built-in. I have yet to test the piece on a non-Swedish-speaking audience, but am currently making a new mix that will hopefully be more "international" in that the textual and musical streams will be more complementary. (There are several sections where they're quite contradictory in the current version.)

1. Pronounced "Elyaland Varyaland" due to the soft "g" in Swedish (meaning Mooseland-Wolfland -- a pun on the names of the two artists) For more information, contact Kings Michael I and Leif I, Royal Chambers, c/o Rahm, Roslagsgatan 58, S-11354 Stockholm, Sweden

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| P R O F I L E S |

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Annie Lewis

< National Online Media Association (NOMA) >

NOMA

c/o Phill Liggett
Solutions, Inc.
89 Seymour Avenue,
West Hartford, CT 06119 USA
Tel: (203)233-3163
Email: liggett@delphi.com

A new trade association, the National Online Media Association (NOMA), was formed at ONE BBSCON '93 in Colorado Springs on August 27th, 1993. NOMA comprises BBS operators, Internet service providers, and other online media and services.

NOMA's mission is to act for the BBS and online service industry on matters of national importance by creating an industry presence in Washington, D.C. and other means; assist its members at the state and local levels; educate the public on the unique social, business and legal roles of BBS's and other online services; establish appropriate industry standards and guidelines; promote business development in the industry; and maintain and provide access to resources and industry information for use by the public and the industry.

An 11 person Organizing Committee was elected to develop a proposal for NOMA's charter, bylaws, membership requirements, structure, and form of leadership. The proposal is to be completed and distributed within the BBS and online services industry by November 30th, 1993.

Discussion areas are being set up immediately for those interested in participating in NOMA's early development. An Internet mailing list is available to all those interested at natbbs@echonyc.com (subscribe to natbbs-request@echonyc.com). A conference area is also being made available on the Delphi national information service.

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| R E V I E W S |
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< Composer to Composer '93 - Interactive Music, Media and Performance >

Bonnie Wright
Literature/Cultural Studies
University of California, San Diego
email:bwright@ucsd.edu

Composer to Composer '93 - Interactive Music, Media and Performance, presented by the Telluride Institute, was held from July 7 through 10th in Telluride, Colorado in the lovely old Telluride Elementary School Cafeteria which served as a lab and discussion studio for nine multi-disciplined composers. The large room, with polished hardwood floors and big windows overlooking the Rocky Mountains, was a fitting spot for high technology and music; the human composers and the gorgeous scenery were not dwarfed by the multitude of cables and wires,

computers and keyboards, laser disks and CD ROMs. The four days and nights were filled with formal and informal sessions where the colleagues shared their work and, perhaps more importantly, their ideas and philosophies regarding sophisticated technological tools, and problems in education, as well as the goals and value of their art.

Saturday night, Richard Lowenberg, video artist and the Program Director for The Telluride Institute, welcomed the audience to the only public performance of the conference and introduced Morton Subotnick, prominent composer of electronic music, who opened the program with a lecture demonstration of his CD ROM "All My Hummingbirds Have Alibis", which was released in January 1993.

David Rosenboom, a pioneer in American experimental music since the 1960's and Dean of the School of Music at the California Institute of the Arts, as well as a performer, conductor, composer and author, called on most of these roles to give a comprehensive demonstration of his computer software program, HMSL, (Hierarchical Music Specification Language). He explained to an audience uninitiated in techno-jargon just how his interdisciplinary work functions, combining computer science, music and psychology. He also discussed how HMSL attempts to listen to what is played with sensitive input devices, identifying important landmarks and then parsing the information into prioritized "chunks" for later use. In this way he demonstrated and clarified how the computer acts as an improvising tool -- responding intelligently to the content of what is being played. He also illustrated a variety of mapping procedures and analytical techniques used to extend the instrument.

During Rosenboom's performance, a telecommunication link was established with the Electronic Cafe in Santa Monica, CA. This technology which sends and receives visual and audio signals over telephone lines is not yet dazzling, but the next event returned to awe-inspiring techno-imagery. Video artists Steina and Woody Vasulka, composer/software designer Mark Coniglio, and choreographer/dancer Dawn Stoppiello demonstrated some of the possibilities and scope of their technology in a collaborative piece. Stoppiello wore a body suit with eight sensors, designed by Coniglio, which measured her limb movements and allowed her to have control over the lighting and music -- she became the conductor of the piece as she danced with a laser disk image of herself. The image on the screen was often ahead of her live performance, creating a surprising effect as it seemed to lead rather than follow the live performance. This effect is created by the computer sensing her direction as she goes into the movement.

Steina Vasulka, a concert violinist as well as a video artist, demonstrated both visual and performance virtuosity during an improvised interactive performance; each of the strings of her violin are assigned a computer channel which creates access to and controls the speed, direction, sound, and focus of the laser disk images. The images consist of a dancer, various landscapes, and a male actor whose image was digitally altered by Woody Vasulka by scan processing the image where vertical deflection pulls up the lines forming the picture causing visual distortions.

The evening's final event was performed by David Rosenboom and Richard Povall, multimedia composer of electronic music and art who teaches at Rensselaer Polytechnic Institute. The piece was

composed by Povall on MAX, an interactive computer program which allows for control over the progress of the piece. The audience was able to see his computer and was intrigued by how the changing patches, color boxes and time elements affected or were affected by the live duo, whose keyboards played preprogrammed sequences of text and sound as well as notes.

Composer and sound designer David Dunn and multimedia electronic artist Paul DeMarinis did not perform Saturday night, but Dunn was an active participant in discussions of his work on bioacoustics, music and language. He also demonstrated the work he has done with the Vasulka's on an interactive laser disk which contains an extensive history of electronic music. DeMarinis opened a show at the Telluride Institute Gallery which presented three installations from a larger show called "The Edison Effect". The pieces in this show use optics and computers to make new sounds by scanning ancient phonograph records with lasers.

The combination of old and new nature and technology enhanced the Telluride Institute's Composer to Composer program which plans to continue and will focus on telecommunications, media, human-machine interaction, and performance collaborations.

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E V E N T S

Annie Lewis

< 5TH Washington DC Virtual Reality Conference >
November 1-2, 1993

Steven L. Silver
Technology Training Corporation
3420 Kashiwa Street
Torrance, CA 90510
Tel: (310) 534-3922

The November 1993 Virtual Reality conference focuses on "The National Commitment to Develop VR" with an emphasis on government and military initiatives, new industrial applications, and advances in VR equipment. The conference chair is Dr. Michael Heim, author of The Metaphysics of Virtual Reality (Oxford University Press). The 18 speakers will highlight developments in the military, business, and industry. The conference addresses managers and researchers who are involved or wish to become involved in the application of VR systems. Besides 18 distinguished speakers, the conference also features a small number of exhibitors prepared to meet one-on-one with attendees.

< Los Angeles Virtual Reality Conference >
December 1-2, 1993

Mr. Donald Sprague
Technology Training Corporation
3420 Kashiwa Street, Torrance, CA 90510
Tel: (310) 534-4871.

The December 1993 Virtual Reality conference in Los Angeles focuses on VR in communications and entertainment. Chairing the conference is Dr. Michael Heim, cyberspace philosopher and

author of The Metaphysics of Virtual Reality. The 16 speakers will treat developments in the military, entertainment media, and industry. Besides 16 distinguished speakers, the conference also features a small number of exhibitors prepared to meet one-on-one with attendees.

< Beyond Speech Recognition: Virtual Reality Systems Fall '93 &
Teleoperation Fall '93 - New York City, NY >
18-21 October, 1993

SIG- Advanced Applications Inc.
1562 First Avenue, Suite 286
New York, NY 10028, USA
Tel: (212) 717-1318
Fax: (212) 861-0588/86

< Other Minds - San Francisco, CA USA >
November 4-7, 1993

Center for the Arts at Yerba Buena Gardens
701 Mission Street
San Francisco, CA 94103-3138 USA
Tel: (415) 978-2787

"Other Minds" is a unique opportunity to hear some of today's most important and exciting composers in a format that combines demonstrations of new work and work-in-progress, "talk show" type panel discussions with active audience participation, and concerts that will include a solo piano performance by Philip Glass, an appearance by Jai Uttal's world-jazz band, the Pagan Love Orchestra, concerts and demonstrations of the work of Conlon Nancarrow and Trimpin and a special tribute to John Cage. There will also be informal social events where attendees can meet the composers as well as others in the music industry.

Other performers scheduled to appear include Thomas Buckner, Robert Ashley, Barbara Monk Feldman, Jon Jang, Meredith Monk, Foday Musa Suso, Julia Wolfe, and Charles Amirkhanian.

< MultiMediale 3 - The Media Arts Festival of the Center for
the Arts in Karlsruhe >
November 6-13, 1993

Zentrum fur Kunst und Medientechnologie Karlsruhe (ZKM)
Postfach 6919
D-76049 Karlsruhe, Germany
Tel: +0721/9340-0
Fax: 0721/9340-19

< X CIM: X Colloquium on Musical Informatics in Milan, Italy >
December, 2-4, 1993

Comitato Organizzatore del X Colloquio di Informatica Musicale
c/o L.I.M. - Laboratorio di Informatica Musicale
Dipartimento di Scienze dell' Informazione
Universita' degli Studi di Milano
via Comelico, 39
I-20135 Milan, Italy
Tel: +39 2 55006.338 / .382 / .380 (answering machine)
Fax: +39 2 55006.373
Email: MacLim@hermes.mc.dsi.unimi.it

The Colloquium on Musical Informatics is an international biennial meeting of researchers in computer applications to music, organized by the Italian Association of Musical Informatics and by local partners. Previous editions (held in Pisa, Milano, Padua, Pisa, Ancona, Napoli, Roma, Cagliari, Genova) showed an increasing interest in this area, proved by the number and the quality of scientific contributions and the appearance of computer music systems providing tools for new aesthetic solutions. Special topics of this edition are: - standards in computer generated music; a tutorial and a panel sponsored by the IEEE Computer Society Task Force on Computer Generated Music will take place; - relationships between musical informatics and hypermedia systems.

Scientific sessions include the following topics:

- digital signal processing;
- neural nets;
- music theory, analysis and musicology;
- computer music workstations;

The discussion of research results will be organized as paper, poster and demo presentations, depending on the peculiar characteristics of the works. Music sessions include both human and mechanical executions. Proceedings will be available at the Colloquium.

Events at the Colloquium include the annual general meeting of the Associazione di Informatica Musicale Italiana, and Music/Multimedia Performances.

< Cyberculture Houston 93 >
December 10-12, 1993

Cyberculture Houston
P.O. Box 52973
Houston, TX 77052-2973 USA
Tel: (713) 227-8917
Email: cyber@fisher.psych.uh.edu

CyberCulture Houston 93 will be an annual exploration of computer art and of the social issues emerging in cyberspace. We hope to prove to the general public that creative behavior in the computer age is not limited to getting the best deal on the latest desk-top or avoiding Carpal-Tunnel Syndrome. At the same time, we hope to help this new medium gain greater acceptance and exposure in Houston's art community and the community at large.

Categories of works shown will include:

1. Graphic stills projected from slides and in hard-format. The latter format is preferred, as we have a limited number of slide projectors. This category includes not only "traditional" art, but also creative ray-tracing and fractal generation.
2. Computer Animation in VHS format. Preferably more artistic than commercial.
3. Tangible works made with or from computer bodies and/or electronic components.
4. Performance art dealing with human-computer interface.
5. Electronic Zines under 30-40K shown in hard-copy.

Also featured will be lectures and discussions on present and possible future issues related to this technology.

< Massive Underground Public Art Installation by Leni Schwendinger
to open in December 1993 >

In December, 1993, New York City artist Leni Schwendinger will unveil a mile-long subterranean light and sculpture installation, the site of which is a shuttle train tunnel at the new Denver International Airport. This is the largest public works project in the United States today. Schwendinger is one of 26 artists commissioned to create a site-specific art work through the airport's unprecedented "1% for Art" program.

"Deep Time/Deep Space: A Subterranean Journey" is inspired by Colorado's industrial and social history, and transforms the shuttle train tunnel with images drawn from related environs -- a mine shaft, a cave, deep space. From moving trains, riders will experience a shimmering animation of sculptural forms, from miner's pickaxes to hovering satellites. Schwendinger comments,,, "Deep Time/Deep Time" fulfills my lifelong dream to design a 'dark ride.' Unlike a theme park, real-life travellers will be invited to envision a landscape below the earth's surface alive with human labor and other-worldly dreams." The permanent installation is made of over 5,000 feet of conduit strips of reflective street sign sheeting, construction materials, steel cut-out shapes, and light. The sequence of lighting effects will be controlled by an industrial computer and sensor systems traditionally used to automate factory assembly lines.

< IS&T/SPIE Symposium on Electronic Imaging Science and
Technology - San Jose, California USA >
6-10 February, 1994

SPIE Headquarters
P.O. Box 10
Bellingham, WA 98227-0010, USA
Tel: (206) 676-3290
Fax: (206) 647-1445

< Conference on Unusual Delight - North Carolina State University >
October 29, 1994

David B. Greene, Coordinator
Arts Studies Program
North Carolina State University
Box 8101
Raleigh, NC 27695-8101 USA
Tel (919) 515-2467
Fax (919) 515-7856
Email: paul@social.chass.ncsu.edu

Call for Presentations
Topic for the presentations: Identify an idea, place, activity, event, or object which on the face of it does not seem delightful, but which, when approached in a certain way, becomes delightful. The purpose of the presentation is to enable the audience to take this approach and experience an unusual delight. We encourage the use of visual, acoustic, and other materials, especially unusual ones.

In addition to these presentations, the conference will consist of music-delighted videos, the opening of newly delighted physical spaces on the North Carolina State University campus, and

unusually delightful, penetrating and illuminating discussions among the symposiasts.

Deadline for proposals: February 10, 1994

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| P U B L I C A T I O N S |

Annie Lewis

< Special Editions to be published by CyberEdge Journal >

CyberEdge Journal
#1 Gate Six Road, Suite G
Sausalito, CA 94965 USA
Tel: (415) 331-3343
Fax: (415) 331-3643
Email: bdel@well.sf.ca.us

CyberEdge Journal is creating a collection of focused publications for people with special interests in Virtual Reality (VR). Called CyberEdge Journal Special Editions, the four quarterly publications will provide concentrated information on specific VR interest areas. The topics of the Special Editions are Medicine and Bio- Technology, Entertainment, Business and Finance, and Military and Aerospace.

CyberEdge Journal has been published bi-monthly since January 1991. Each issue includes news about business developments, new products, book reviews, conference proceedings and a calendar of VR events.

< Perforations 5 - Call For Submissions >

Public Domain, Inc.
P.O. Box 8899
Atlanta, Georgia USA 30306-0899
Tel: (404) 633-8022
Email: perf5@pd.org

Perforations 5: Bodies, Dreams & Technologies, will collect and assemble memories, stories and fantasies exploring the relationship between the human and the machine, and the impact of this relationship on the creation of present and near-future cultures.

We value noise, chaos, fluxus, anarchy, dada-streams, nonhierarchalization, improvisation, conflict, discontinuity, experimentation, invention and wild speculation. (We also tolerate more reasoned presentations as long as they avoid being too priggish.) We are looking for material--drawings, photography, text, hypertext, computer graphics, animation, audio and video-- that is explicitly experimental in the approach taken toward these themes.

Deadline for submissions: November 1, 1993
"Perforations 5" should go to press in the Winter/Spring of '94.

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| P U B L I S H I N G & |
| S U B S C R I P T I O N |
| I N F O R M A T I O N |
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