

PROCEEDINGS

MICHAEL B. ROETTO, EDITOR



ISEA96 PROCEEDINGS Seventh International symposium on electronic art

Editor: Michael B. Roetto <mike@box nl> Layout/Design: Michael Josias <unit@box nl> Printing: Tripiti, Rotterdam

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Introduction to the Proceedings ISEA96

In September 1996, ISEA96 brought together scientists, artists, writers and educators in a fruitful exchange over the state of Electronic Art.

Following succesful symposia in Groningen, Utrecht, Sydney, Minneapolis, Helsinki, and Montreal, the ISEA symposia have grown in both popularity and importance as electronic art gains acceptance as a mainstream mode of artistic expression. The ISEA symposia play a continuing role in this development. With the establishment of a new headquarters in Montréal, Canada, ISEA promises to play an even larger role in the development of electronic art.

In the invitation of speakers, and in the call for papers, the ISEA96 Program committee set as themes "Education as a Bridge between Art and Science" and "Networked Art". From the content of these proceedings, one can see that ISEA96 went far in exploring these ideas. In their realisation, ISEA96 presented a kaleidoscopic programme consisting of:

- Paper Presentations,
- Poster Sessions,
- Panel & Roundtable discussions,
- •Electronic Theater
- Print & Slide Exhibition
- •Evening of Concerts & Performances
- Special Events

Beyond this, the 500 participants of ISEA96 were truly diverse as well. Coming from 30 different countries they represented a wide range of disciplines; from computer animators, computer musicians, sculptors, and multimedia artists to philosophers, computer scientists, art critics and art educators, as well many multitalented individuals who fall into no clear category.

ISEA96 was but one part of an extraordinarily active month in Rotterdam. ISEA96 worked in cooperation with The Dutch Electronic Art Festival (DEAF96) as well as being part of the larger new media festival R96. All three groups worked together to create one of the largest New Media 'happenings' ever held in the Netherlands.

To those who participated, I hope you enjoyed being part of ISEA96 as much as we enjoyed organizing it. I would like to extend special thanks to our International Program Committee upon whom the content of ISEA96 so much depended.

Peter Beyls: (Belgium), Paul Brown (Australia), Mike Chanowski (Netherlands), Rene Coelho (Netherlands), Achamyeleh Debela (USA), Anton van Gemert (USA), Michael Girard (USA), Craig Harris (USA), Theo Hesper (Netherlands), Pierre Levy (France), Raymond Lauzzana (France), Thomas Linehan (USA), Roger Malina (USA), Alain Mongeau (Canada), Jos de Mul (Netherlands), Cynthia Beth Rubin (USA), Joel Ryan (Netherlands), Keisuke Oki (Japan), Christine Schopf (Austria), Roman Verostko (USA), John Vince (UK), Iannis Xenakis (France), Siegfried Zielinski (Germany)

And last, one must not forget Wim van der Plas, acting as our Program Chair, who brought ISEA96 into existence.

Michael B. Roetto Editor

Michel P. K.

CONTENTS

6 Introduction

7 Contents

>KEYNOTES

11 Jos de Mul Networked Identities

16 Stelarc On the Future of the Net, Phantom Bodies, Fractal Flesh and Collective Strategies

>LONG PAPERS

- 17 Sean Cubitt Online Sound And Virtual Architecture (Contribution To The Geography Of Cultural Translation)
- 21 Rich Gold PAIR The Xerox PARC Artist In Residence Program
- 24 Samia A. Halaby RHYTHMS, The Aesthetics Of Electronic Painting
- 28 Pieter Huybers and Gerrit van der Ende The Outlines Of The Polyhedric World
- 31 Mike King Concerning the Spiritual in Cyberspace
- 36 Ryszard W. Kluszczynski, PHD The Context is the Message: Interactive Art as a Medium of Communication
- 40 Barbara London and Grahame Weinbren Looking for the Interactive
- 46 Roberta Lord Holiness and Dread: Poetics in Electronic Art
- 49 Eduardo Rick Miranda Machine Learning and Sound Design: A Case Study
- 55 Jon Van Oast and Ed Stastny SITO: The Past, Present, and Future of Collaborative Art on the Internet
- 57 Edward A. Shanken Virtual Perspective and the Artistic Vision: A Genealogy Of Technology, Perception, and Power48

>SHORT PAPERS

- 67 Jørgen Callesen Into The Black Box. relations between artistic expression and formal descriptions in computer based fiction and art
- 69 Lily Díaz Cross-Cultural Analysis of the Art of Memory: Ars Memoria, Itoloca and Xiuhámatl
- 73 Carol Gigliotti Bridge To, Bridge From: The Arts, Technology, and Education
- 76 John Law Drawing on the Brain: An Art-Science Collaboration
- 77 David McDowell Scenography and Synesthetics New Media and Aesthetic Experience
- 79 Eric Singer, Athomas Goldberg, Ken Perlin, Clilly Castiglia, Sabrina Liao Improv. Interactive Improvisational Animation and Music
- 81 Color Plates: JAPAN@ISEA96
- 91 Brett Terry Sound/Action Paradigms in Multimedia
- 94 Toshiya Ueno Japanimation and Techno-Orientalism
- 96 Adrianne Wortzel Medieval Cartography and the Ideological Mapping of Cyberspace Part II, Section A: Are You Sure It's Really Round?

>POSTER SESSIONS

- 101 Michael Bielicky Exodus
- 101 Heidi Grundmann Radio The Ne(X)T Century
- 102 Lane Hall and Lisa Moline "What's So Hard About Hardcopy"
- 103 Matthew Jones Conventional Art as Web Exhibits a New Electronic Art Form
- 105 Michael LeBlanc and Andrea Wollensack The Mc Luhan Probes
- 107 Henry Lowengard Cybergomi: Here Today, Gone Tomorrow
- 108 Peter Lunenfeld A Hyperaesthetic Case Study: Jennifer Steinkamp
- 110 Jacquelyn A. Martino Without a Special Object of Worship, An Interactive Book Arts Computer Installation

- 112 Ian Pollock & Janet Silk Intimacy, Concept, Interaction: Artistic potential of Voice Mail and the Telephone
- 114 Sonya Rapoport and Marie-José Sat Brutal Myths: Collaborative Creation and Interaction
- 116 Niranjan Rajah Locating The Image In An Age Of Electronic Media
- 117 Martin Rieser Interactive Narrative- Educating the Authors
- 122 Patricia Search Hickory Dickory Dock The Clock Strikes One in Hyperspace!
- 126 Naoko Tosa & Ryohei Nakatsu For Interactive Future Movie: Body Communication Actor, "MIC" & Feeling Improvisation Actor, "MUSE"
- 129 James Faure Walker Cool Heaven Blues, and Squares
- 131 Markus Weisbeck & Niko Waesche Depersonified Personal Agents: A Challenge to Web Design and The Project "logo.gif"
- 133 Léon CM Wennekes 'Time' for a Better Understanding and More Fun

>INSTITUTIONAL PRESENTATIONS

- 137 José R. Alcala Museo Internacional de Electrografia · An up-to-date art centre The museum for the digital art of the XXI Century.
- 138 Vladimir Muzhwsky Space of Cultural Revolution Laboratory of New Technolgies: (A)mediality projects
- 139 Elizabeth O'Grady Building a house on sand?: Is the digital world solid enough to be a new foundation for artists?

>PANELS & ROUNDTABLES

145 PANEL: Artists Teaching Artists: Towards a New Paradigm

chair: Roy Ascott

145 PANEL Beyond the Digital Diaspora

Janice Cheddie & Roshini Kempadoo

148 PANEL Electronic Space & Public Space⁻ Museums, Galleries and Digital Media

chair: Mike Leggett

149 ROUNDTABLE: Aesthetic and Compositional Issues in Interactive Systems

Richard Povall, Convenor

151 ROUNDTABLE Breaking the Code. Art that does not stand on its own

Cynthia Beth Rubin, Convenor

152 PANEL: Kunstliche Kunst - Art and Aesthetics in Times of the Artificial

chair: Martin Sperka

155 PANEL World, Body, Time and Space

chair: Maria N. Stukoff

159 Index

KEYNOTES

josdemul@molyvos.net

Jos de Mul

(,nl)

NETWORKED IDENTITIES

"Every decoding is another encoding" Morris Zapp

The Seventh International Symposium on Electronic Art, like the six that preceded it, covers a very broad domain. During the next five days, in an impressive number of lectures. panels, poster sessions and round table discussions recent developments in computer graphics, computer animation, computer music, video art, interactive art, including CD ROM and Internet applications, artistic applications of robotics, computer aided literature and dance will be discussed. However, there will be a special focus on two subjects: Networked Art and Education as a means to bridge the gap between artists and scientists. Focusing on these two subjects is not really surprising. The interest in networked art reflects the enormous growth of computer-mediated communication during the last decade, whereas the renewed interest in the relationship between art and science reflects the fact that the present day computer technology changes the relationship between art and science as it developed during the era of modernity in a fundamental way.

In this lecture I will discus a topic that - according to me - is highly relevant for both networked art and the changing relationship between art and science. I will present some philosophical reflections on how information and communication technology affects both our personal and cultural identity. Information technology, I will argue, not only creates new objects of experience, but new subjects of experience as well. Information and communication technology turns out to be a laboratory for the construction of multiple human identities. For that reason it is more than just a new tool for artists and scientists. Taking refuge in an oxymoron we might call information technology for that reason an ontological technology. Information and communication technology not only creates new beings in the world, but also affects the conceptual framework we depend on in our understanding of these beings in a fundamental way.

As body and mind are closely linked, information technology affects both our mental and our bodily identity. In my lecture I will chiefly concentrate on the effects of ICT on our mental identity. Stelarc in his lecture will deal extensively with the bodily implications of information technology and networked arts. This without doubt will compensate for the one-sidedness of my thesis.

Computermediated communication

The recent growth of the Internet is not without precedent. Human communication has expanded enormously in the past century. With the explosive development of mass media such as film, illustrated magazines, radio and television, not only has the number of communication media forms significantly increased, but we can also see an enormous growth in the range of such media throughout the world. The past decades have produced the rampant growth of the latest shoot on this plant: computer-mediated communication. Since 1970, the year in which four American universities were connected by the ARPA network, developed by the American Department of Defence, computer networks have experienced an exponential growth. Whereas the ARPA network connected four local university networks and with that, a few hundred people in all, Internet nowadays connects more than 10 000 local networks and over six million host computers, which allow millions of computers and even more users access to Internet. At the moment, more than forty million people - still mainly male and white people aged 20 to 30 and living in the North Atlantic area - use Internet regularly. If the number of users continues to grow at the same rate, the network will have more than one hundred million users throughout the world at the end of the century.

When we look at the development of computer-mediated communication, we can see that this new medium is integrating the current forms of mass communication means at a terrific pace. With the development of the World Wide Web, the most recent and fast-growing branch of this medium, Internet became a hypermedium, which unites the possibilities of the printed word, telephone, radio, film and television and will soon make these separate forms of media obsolete.

The significance of the digital revolution, however, is not restricted to the field of communication. Production and transport too, increasingly become digitalized in the post-industrial information society. It is expected, that in the future, an ever-increasing number of people will spend an ever-increasing proportion of their active lives and leisure time in virtual realms which will have become accessible through computer networks.

Virtual space is still largely restricted to the two-dimensional plane of the computer screen, but with the introduction of the Virtual Reality Modelling Language, an illusionistic central perspective has entered the digital do-main.

By linking more advanced Virtual Reality technologies to worldwide computer networks, the experience of being immersed in the new virtual realms will become even stronger. For some time, this virtual reality will probably still be seen as a substitute for, or mutilation of, the 'genuine' reality but, because it will colonise and increasingly augment and even exceed 'genuine' reality, it will be used more and more as an ontological standard by future generations. Moreover, if the exponential growth of the world population continues, we will have little choice, but will be forced to establish ourselves in the digital domain. [1]

Media and Identity

A question that arises is what the implications of this emigration to cyberspace will be with regard to our experience of the world and ourselves.

At least since Kant's transcendental critique of reason we know that experience is not a passive mirroring of reality, but a process that involves an active structuring by the human mind. Moreover, because of the work of the members of the so-called Toronto school (McLuhan, Havelock, Ong and De Kerckhove among other [2]- we have begun to realise that this structuring activity is affected by the media of thought. Media are no neutral ways of communicating information, but they influence the way in which we think and feel, the way we experience ourselves, and the way we act and treat others. For example, the influence of the discovery of writing on the cultural evolution of mankind cannot be overestimated in this context.

There are good reasons to suppose that the new electronic media also will have fundamental implications for human experience. Raymond Barglow in his recent book The Crisis of the Self in the Age of Information, (1994) expresses this view as follows: "Computers, like automobiles before them, echo back to us metaphorical representations of our own experience and agency. Human identity itself is entwined with techno-

logical circumstance: information technology, like previous forms of mastery of nature, serves to fashion not only objects outside ourselves but also human subjects^{*} [3]

As we are just beginning to enter cyberspace, it is not easy to grasp the full implications of computer-mediated communication for individual and collective identity. We may compare this to the reflection on the implications of the industrial revolution for human life and society. Only in retrospect we will be able to understand the fundamental impact of this perhaps most important revolution since the agricultural revolution in the Neolithic era and the industrial revolution in the nineteenth century .[4] It would be naive to believe that at this very moment we would be able to describe all of the implications of the digital revolution. Not only, because this revolution only recently have started, but also because we always tend to understand new media by means of the old.

However, despite these obstacles, we need not resort entirely to speculation alone. Although our emigration to cyberspace only recently has started, some of the consequences already become clear. My reflections mainly concern developments which are already taking place, here and now.

Moreover, the develop-ment of computer-mediated communication is not an isolated phenomenon, but forms part of the complex transformation from a modern to a postmodern culture Therefore, we can elaborate on the reflections which, in this context, have been devoted to the postmodern identity. Here we find a remarkable convergence: the new electronic media - as Mark Poster has recently argued, seems to put into practice the postmodern deconstruction of the traditional experience and concept of identity.[5]

Postmodern Identities

The concept of 'identity' - in Latin identitas, which has its root in idem: the same - traditionally has two related connotations, which should be distinguished conceptually. On the one hand, identity refers to that which remains constant in time. In this case identity means permanence amid change. When we mention the identity of a person or a culture, we often refer to that which remains constant in a person or a culture despite all changes in personal circumstances or in history. In his Essay on Human Understanding (1690) John Locke has argued that for that reason identity is closely connected with memory. "For, since consciousness always accompanies thinking, and it is that, which makes every one to be what he calls self, and thereby distinguishes himself from all other thinking things, in this alone consists personal identity, i.e. the sameness of rational being, and as far as consciousness can be extended backwards to any past action or thought, so far reaches the identity of that person". [6]The same goes for the identity of a culture. Cultural identity is closely connected with collective memory, that is: history as it is maintained in language, traditions and books.

The second connotation of the concept of 'identity' refers to a unity in diversity. In this case, the identity of a person or a culture refers to something that is common in a variety of characteristics or activities. For example, when a person at a certain moment has the two obvious different experiences of seeing and hearing a car passing, we are inclined to say that it is the same person that is having these experiences. And when we speak of the identity of ancient Greek culture, we suppose that the different aspects of this culture have something in common that enables us to recognise these aspects as belonging to the same culture.

When we combine these two connotations of the concept of identity with regard to the human individual, the result is a conception of the self being a coherent entity which is centred around a stable core. In modern philosophy, since Descartes, this core is normally conceived of as an autonomous and rational subject.

Although there have been criticisms of these two connotations of the concept of identity from the very beginning, especially in the twentieth century they have become the subject of radical criticism and deconstruction. For example the philosopher and developmental psychologist Plaget, prepared by the historization of the world view in the nineteenth century, queries the temporal identity of a person. In Piaget's genetic structuralist view, the human subject is no deter-mined and timeless identity, but the result of an ever-continuing construction.[7] In the development of the subject, there are qualitatively different stages - cognitive structures - which are responsible for the fact that our childhood memories are difficult to recall when we have grown up. Whereas Piaget still attributes a strong continuity to the development (in the sense that there is a persistent self that experiences the development), Foucault in his archaeological and genealogical writings emphasises dis-continuity in his analysis of the historical construction of the subject. According to Foucault, the modern subject is a contingent product of an entanglement of representations and social technologies. [8]

Around the turn of the century, the 'spatial unity' of the subject was radically attacked by Freud's theory of the unconscious. According to psychoanalysis, the self is no unity, but a battleground between conscious and unconscious thoughts and feelings. Like Plaget, Freud and later psychoanalysts such as Lacan argue that the subject is decentred in a radical way. Psychoanalysis undermined the image of the self as an autonomous and rational subject. The rational I is, as Freud expresses it, 'no longer master in his own house' [9]he is constantly under attack by sub- and unconscious thoughts and emotions.

Cognitive psychology attributed more recently to the fragmentation of the modern self. Partly with reference to Freud and Piaget, Minsky interprets the human mind as a Society of Mind a combination of a great number of simple agents which most of the time co-operate and carry out complex tasks, but also sometimes hinder each other. [10] And in Dennet's Consciousness explained we find a multiple-version model of the consciousness, according to which all variants of perceptions and mental activities in the brain are the result of parallel, multiple processes [11] In an article on Multi Personality Disorder Dennet states: "The possibility of developing multiple selves is inherent in every human being. Multiplicity is not only biologically and psychologically plausible, but in some cases it may be the best - even the only - available way of coping with a person's life experience." [12]

Besides this, in many contemporary theories it is emphasised that, to a significant extent, the self is also a social construction. Gergen states in his The Saturated Self: Dilemmas of Identity in Contemporary Society that our self is not detached from our social relationships and roles. This not only means that a person's status as an individual self depends on recognition, by others and oneself, of that status. [13] It also means that a person is a complex interplay of social relations: "We realise increasingly that who and what we are is not so much the result of our 'personal essence' (real feelings, deep beliefs' and the like), but of how we are constructed in various social groups. Previous possessions of the individual self autobiography, emotions, and morality - becomes possessions of relationships. We appear to stand alone, but we are manifestations of relatedness". [14] The self does not so much precede social interactions, but is more or less a result of them. And according to feminist thinkers, our sexual identity is not a natural fact but - at least partly - the result of a social construction, which is quite different in the cases of male and female subjects. [15] And the same is true for the identity of a com-



munity. This can not be explained as a natural entity - seen as race, populace or culture - but instead it is a complex, everchanging entity which has no constant core, but only acquires its identity in contact with other (equally fluid) communities (Often, as in former Yugoslavia, identities are constructed by means of ideological constructions and rather violent confrontations).

In summary, it may be stated that postmodern thinkers no longer see human identity as an unchanging unity, but as a changing, multiple entity, which is subject to the influence of libidinous, social and ideological forces. "A self", as Robert Stam's summarises, "is constituted by acquiring the ambient languages and discourses of its world. The self, in this sense, is a kind of hybrid sum of institutional and discursive practices bearing on family, class, gender, race, generation and locale. Ideological development is generated by an intensive and open struggle within us for hegemony amongst the various available verbal and ideological points of view, directions and values." [16]

Perhaps we should call it multi-plicity or multiple identities rather than identity. It is important to realise that the aforementioned trans-form-ation of the concept of identity has not just appeared out of the blue, but is closely related to the social transformation our society is experiencing. The postmodern theories of multiple identities do not pretend to be eternal truths, but reflect the explosive growth of social interaction, which is the result of the increase in human mobility and the introduc-tron of new means of communication.

The Postmodern Computer

Before entering in detail with regard to the influence computer-mediated communica-tion has on our identity, I would like to dwell on the ambivalent place the computer occupies in the transformation from the modern to the postmodern society Sherry Turkle remarks in Life on the Screen: Identity in the Age of Internet that the computer itself has gone through remarkable changes in the past decades. On its introduc-tion in the fifties, the computer seemed the perfect embodiment of the modern world view. The computer was seen as a transparent technology which enables us to reduce complex phenomena to a conveniently arranged and controllable whole of mathematics algorithms. This modernist idea of the computer can still be found in the MS-DOS operating system which domi-nated the first generation of personal computers in the eighties. It enables the user to master the computer at an elementary level down to the last detail. The relationship of the user with his computer is abstract here, formal and monological: The user instructs his computer by keying in commands which are characterised by a strict syntax and a wealth of exact parameters.

The Macintosh computer by Apple, which was introduced in 1984, radically abandoned the modernist aesthetics of the MS-DOS computer. With the Macintosh, the user is separated from the operating system by a graphic interface. He is forced to take things at interface value By using his mouse, the user double clicks icons in order to activate facilities. Here, the contact is concrete, concerning content and dialogue-like. The user simply deletes a file by 'dragging' it to an illustration of a waste-paper basket and enters into a dialogue with the computer by selecting the possibilities relevant to the con-text which the computer shows him. The MS-DOS computer permits his user to use only one application at a time, but the Macintosh user can 'zap' to and fro between the different windows which all give access to a specific application.

MS-Windows is a hybrid operating system because it unites both approaches. On the surface it is an imitation of the graphic interface of Macintosh, with the distinction that it still gives access to the underlying MS-DOS operating system. In this respect, Windows is a perfect metaphor for our present culture, which shows the same ambivalent mixture of modern and postmodern motives. [17]

This, however, does not mean that they are not essentially different Turkle interprets the transition from the modern to the postmodern approach of the computer as that from calculation to simulation. There is much more at stake here than the development of a new kind of interface: the change is symptomatic of the broad cultural change happening at the moment. We can also see this in the various ways in which the computer functions as a metaphor for the human mind. In the artificial intelligence research in the sixties and seventies, the human mind was described modernistically in terms of centred structures and explicit rules. Nowadays, postmodern theorists no longer pretend to be able to program intelligence, but they rather expect that intelli-gence, and possibly artificial life, will emerge from complex, not fully transparent and controllable interac-tions between subprograms.

"If these emergent simulations are 'opaque', that is, too complex to be completely analysed, this is not necessarily a problem After all, these theorists say, our brains are opaque to us, but this never prevented them from functioning very well as minds". [18]

The Postmodern Computer as a Metaphor for Postmodern Identity

The postmodern computer is a fruitful metaphor if we try to grasp the multiple self of contemporary individuals. The multiple self can be compared to a computer with different windows. Just as the different windows can be alternately active on a computer with graphic interface, the different selves can be active in the postmodern individual. There is no complete exclusivity here: like being able to 'run' programs in the background and the possibility of a continual exchange between the programmes, our selves are also part of a complex, combined action which is difficult to predict and control.

With regard to the social dimension of the postmodern 'multiplicity', one of those windows, that of the Webbrowser which gives entrance to the World Wide Web, forms an elucidating metaphor. Those who like to express their identity by way of a personal homepage, cannot only do this by the contents and form of this page, but, equally important, also by making connec-tions to other pages on the Web. This part of the identity is literally a multiplicity of associations and connections. The fact that modern notions such as originality and authenticity do not go well with postmodern identities can be seen in the easy way and the shamelessness in which other homepages, or parts thereof, are copied.

Multiple Personae and Virtual Communities

The computer, however, is more than a mirror in which we recognise our postmodern identity. It is also an 'ontological tool' with which we construct this multiple identity. Grafting a phrase from Michel Foucault onto the discourse of information technology we might say that the computer is 'a technology of the self which permit individuals to affect on their own bodies and souls, thoughts, conducts and ways of Being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality' [19]

In Life on the Screen, Sherry Turkle pays considerable attention to the experiences of users of the so-called Multi-User Domains (MUDs), virtual worlds which are created by the 'inhabitants' themselves. They are often Tolkien-like fantasy worlds, some-times based on famous science fiction stories. The virtual cities, shooting up like mushrooms, are also part of these MUDs. The population varies from a few dozen to sometimes over a million, such as, for instance, in the Japanese Habitat. At first, these virtual worlds existed exclusively in words but, here too, the visualisation has begun, as, for example, in Alphaworld. [20]

What makes these worlds so irresistible to many inhabitants is that they are construc-tions with no other limits than those of the human imagination. The same applies to our own appearance in those worlds. Those who feel the need, can act as though they belong to another sex, class or race, [21]The MUD enables the visitor to play social roles he is not familiar with in everyday life and to develop qualities which do not normally arise or - often for good reason - are suppressed. The digital personalities they assume certainly have their influence on the 'real' personality. A man who pretends to be a woman in a MUD not only has a more or less lifelike experience of what it means to be approached as a woman in a male dominated society, but he also ident-ifies himself with that role and experience, which sometimes has far-reaching consequences for his 'own' identity. Because most players have several identities in different MUDs, they seem to be the forerunners of a future homo zappens, who restlessly clicks himself a path through the many windows of his personality and of the virtual, post-geographical societies to which he - or at least part of him - belongs.

To many inhabitants, however, the MUDs are more than a transitional space in which they tinker with their own ident-ity before returning, enriched, to real life. This is caused by the fact that a considerable proportion of the inhabitants of the virtual worlds men-tioned, spend more time in these digital constructions than in the real world. To many who, for whatever reason, did not manage to build up a suitable life in RL (real life), life in cyberspace has become an everyday reality. To them, RL has been reduced to 'just one more window'. (Or should we say that Windows has become 'just one more reality'.) However, the dividing line between the real and virtual world evaporates not only for the escapists, who try to find in cyberspace the community which is lost in modern society, but also for those who like to keep one leg in RL. Howard Rheingold, a prominent inhabitant of the Californian virtual community The Well (Whole Earth 'Lectronic Link), expresses it as follows in Virtual Communities. Homesteading on the Electronic Frontier:

> "Not only do I inhabit my virtual communities; to the degree that I carry around their conversations in my head and begin to mix it up with them in real life, my virtual communities also inhabit my life.I've been colonised; my sense of family at the most fundamental level has been virtualized". [22]

Springtime for Schizophrenia?

MUDs are perhaps the forerunners of a the type of experience that will be dominant in our digital future. As far as identity is a construction - a human being does not start out as single or as multiple, "she starts out without any Head of Mind at all" [23] information and communication technology may act as a technology to create multiple personalities, a multiplicity of selves that will scatter in parallel around innumerable virtual communities. This is what Nicole Stenger seems to have in mind when she writes in an article entitled 'Mind is a Leaking Rainbow'- the Nietzschean tone of her statement is apparent:

*Of course don't expect to keep your old identity; one name, one country, one clock. For be it through medical reconstruc-



tion or through fantasy, multiplied versions of yourself are going to blossom up everywhere. Ideal, statistical, ironical. A springtime for schizophrenia!" [24]

The question remains whether this homo zappens will also experience multiple and parallel happiness. You do not need to be a notorious pessi-mist in order to develop an eye for this "spring-time for schizophrenia". Anyway, it seems realistic to suppose that the transform-ation from our pre-modern or modern identity to the described postmodern multiplicity - certainly for the first generations - will not be without difficulties. The more the number of selves increases, the more the chance of mutual conflicts and misunderstandings. On the one hand, this will make people revert, in a nostalgic and frantic way, to the pre-modern or modern identity ideal. The anti-pluralism of today's fundamentalist-religious movements - also in techno-logically highly developed societies like the United States - can be considered as a modest taste of what we can expect in our digital future. [25]On the other hand, on the other side of the spectrum, we can expect a further growth of dissociative disorders like schizophrenia and multiple personality disorder (MPD).

In the case of MPD - which probably in most cases is caused by trau-matic experiences, but which is probably also partly a construction of therapeutic intervention - the multiplication of the self is related to an often irreparable interference in the communication between those selves. [26] would venture to say that there is a link between the spectacular increase in MPD and the multiplication of the identity in postmodern culture forced by information technology. It is the task of the present homo zappens not to go to the described extremes and to learn how to live with numerous selves which continually communicate with each other and which constantly transform.

Exercises in Virtual Existence

In my opinion, there is an important task here for art. One of the merits of art is that it enables humanity to envisage new ways of existence. The development of the central perspective in Renaissance painting enabled pre-modern man to create a new worldly space and to orientate himself in this modern space. Likewise the art of novel-writing played an important part in the exploration of the mental, psychological space of the modern subject. It is left to contemporary and future art to explore and organise the vir-tual worlds which are revealed by the world-wide network of computers, and also to picture and experiment with the flexible, virtual identities which these worlds have in store. Seen in this light, MUDs are ideal laboratories for the contemporary artist. Here, at the interface of technology and human imagination, they are able to experiment with new practices and conceptions of individual an communal identities. In creating imaginative digital domains the artist of today offers us mental and bodily experiences which can help us to construct liveable multiple identities.

As history suggests, experiments with the new digital technology will also affect the identity of art itself. One of the challenges art is facing now is that it enters into a new relationship with sciences. In the modern world-view - which continues in this sense the platonic tradition -a sharp and evaluative distinction between science and art is made. Sciences aim at knowledge of the world as it is, whereas art - depending on the artist's imagination - only creates apparent worlds. In the digital domain, however, this distinction does not longer seem to be useful. Postmodern sciences like genetic engineering and artificial life no longer are mimetic activities, but are a kind of poiesis: they create simulacra, beings without a precedent object. The become what Claus Emmeche in his book Garden in the Machine: The Emerging Science of Artificial Life has called modal sciences: "Artificial life must be seen as a sign of the emergence of a new set of postmodern sciences, postmodern because they have renounced or strongly downgraded the challenge of providing us with a truthful image of one real world, and instead have taken on the mission of exploring the possibilities and impossibilities of virtual worlds. It is a case of modal sciences, passing freely between necessity and possibility. Science becomes the art of the possible because the interesting questions are no longer how the world is, but how it could be, and how we can most effectively create other universes - given this or that set of computational resources^{*} [27]

Whereas modal science becomes the art of the possible, digital art, by using exact methods, becomes a science of the virtual. The worlds created by digital artist are no longer apparent worlds, but worlds we are actually living in. In this respect the digital revolution resembles the revolution of the Renaissance in which art and science were not yet separated and instead were closely working together in the disclosure and habitation of the geographical space of the modern world. In the present digital Renaissance art and science together aim at the disclosure and habitation of a post-geographical Lebensraum

In yet another sense postmodern art resembles pre-modern or (maybe better: protomodern) art. Artistic creation in cyberspace again will become a collective activity - in this respect we can compare the place of MUDs in virtual space to that of mediaeval cathe-drals. Digital technology, in blurring the dividing line between reality and imagination, and consequently between science and art, gives the artists of today the worldcreating role of which avant-garde artists have been dreaming since the Romantics. In the future, we will inhabit innumerable art works. Whether we will feel at home there, will - at least partly - depend on the power of our technological imagination.

Endnotes

 Cf. J. de Mul, Imagination without strings: A virtual look in the future of the visual arts. In: Liubava Moreva and Igor Yevlampiev (eds.), Paradigms of Philosophizing, StPetersburg 1996, 246-252.

2. See for example W. Ong, Orality and Literacy The Technologizing of the Word, London/New York 1982 and D. de Kerckhove, The Skin of Culture: Investigating the New Electronic Reality, Toronto 1995

3. R.Barglow, The Crisis of the Self in the Age of Information: Computers, Dolphins and Dreams. London/New York 1994

4 A. Toffler, The Third Wave, New York.

5. Compare M Poster, 'Postmodern Virtualities' in M Featherstone and R Burrows (eds.) Cyberspace, Cyberbodies, Cyberpunk: Cultures of Technological Embodiment', London, 1995, pages 79-95.

6. J. Locke, An Essay Concerning Human Understanding, New York 1959, A7 11.

7. See J Piaget Insights and Illusions of Philosophy, London 1972, 57f.

8. Cf Foucault, The Order of Things. An Archaeology of the Human Sciences, New York 1970, Discipline and Punish: The Birth of the Prison, New York 1979 For a more detailed reconstruction and comparison of Praget's and Foucault's views on the construction of the subject, see J de Mul, Mul, 'Structuralistic and Hermeneutic Approaches to Development'. In: A W.

van Haaften, M. Korthals en T. Wren (eds.), Philosophy of Development, Dordrecht 1996, chapter 16.

9 S. Freud, The Standard Edition of the Complete Psychological Works of Sigmund Freud, London 1953-74, XVII, p.143

10. 'I'll call 'Society of Mind' this scheme in which each mind is made of many small processes. These we'll call agents. Each mental agent by itself can only do some simple things that needs no mind or thought at all. Yet when we join these agents in societies - in certain very special ways - this leads to true intelligence'. M Minsky, The Society of Mind, New York 1985.

11. D.C. Dennett, , Consciousness Explained, Boston 1991.

12 N Humphrey en D.C. Dennett, Speaking for ourselves. Raritan A. Quarterly Review IX, no. Summer 1989 (1989), pp. 68-98

13. Cf. R Barglow, The Crisis of the Self in the Age of Information Computers, Dolphins and Dreams London/New York, 1994, pages 104ff

14. K Gergen, The Saturated Self Dilemmas of Identity in Contemporary Society, New York 1991, \ensuremath{p}

15. See for example J Butler, Gender Trouble Feminism and the Subversion of Identity, New York 1990

16. R. Stam, Mikhail Bakhtin and Left Cultural Critique. In: E. Ann Kaplan (red.), Postmodernism and its Discontents, New York 1988, 120

17 Already the windows metaphor itself is hybrid. On the one hand it reminds us of the modern metaphor of knowledge as a transparent window suppressing the sensual nature of every medium of knowledge, language included (cf. M. Jay, M., Downcast Eyes. The Denigration of Vision in Twentreth-Century French Thought, Berkeley 1994, 503). On the other hand, because of its scaling powers the graphical interface directs our attention towards the very materiality of the sign and in doing so deconstructs the very transparency of the computer window. Cf. Richard Lanham's analysis of the oscillation of looking THROUGH and

Doking AT on the computer screen in R Lanham The Electronic Word Democracy, Technology, and the Arts, Chicago 1993, 42-44

18 S. Turkle, Life on the Screen Identity in the Age of Internet, New York 1995, 20 $\,$

19 M Foucault, Technologies of the Self, Amherst 1988, p. 18

20 "AlphaWorld is a virtual environment that you inhabit along with all other users who are logged in at the same time as you. You can communicate with other users, and you can see their avatars. But what makes AlphaWorld a special place is the ability to claim a piece of this virtual space and build your own creations there. The location and specifics of the objects that you place are sent to the central server, so almost immediately your buildings and creations will be visible to anyone else in AlphaWorld Building with objects is tactile, visual and intuitive. And as you can see from some of the marvellous construction already present in AlphaWorld, the only ultimate limit on what you can build in AlphaWorld is your own imagination. So go out there and build! AlphaWorld is just the first of a whole web of interconnected virtual spaces. This quote is taken from the help-files of AlphaWorld. AlphaWorld-software

can be downloaded from Internet http://www.worlds.net/alphaworld/

21 Cf A R Stone, The War of Desire and Technology at the Close of the Mechanical Age, Cambridge 1995, 25, 65-81

22 H Rheingold, The Virtual Community Homesteading on the Electronic Frontier, New York etc. 1993, p 10

23 N Humphrey en D C Dennett, (ibid).

24. N Stenger, 'Mind is a Leaking Rainbow' in. M Benedikt, Cyberspace First Steps Cambridge/London 1991, 49-58, 53.

25 We should not forget that the growth of the number of windows of experience (television channels, magazines, newsgroups, websites) and the transformation from mass media to information and communication technologies (that is from the one-to-many communication of television to the many-to-many communication of Internet) does not necessarily lead to a more pluralist experience. On the contrary it often leads to a narrowing of experience, because the developments mentioned enable us to have a nonstop experience of uniform information (provided by television evangelists, soap channels or MUDs)

26 In his book Shattered Selves Multiple Personality in an Postmodern World James Glass points at the remarkable similarities between the postmodern deconstruction of the self and MPD. However, though Glass 'is not unsympathetic to many of the postmodern arguments', he passionately criticises the affirmative tone of the postmodern theories: "Postmodern philosophers such as Baudrillard

and Lyotard use the experience of texts to ground their theories of multiplicity, from these texts they create an aesthetic that celebrates a certain limitlessness and contempt for conventional value, a release from prevailing norms and an embracing of what Lyotard refers to as the 'loss of meaning,' a 'nostalgia for the unattainable,' and 'a war on totality' (J -F Lyotard, [The Differend. Phrases in Dispute, Minneapolis] 1988,26, 81, 82). But for a real person the psychological reality of being multiple, of actually living it out, is an entirely different issue. When multiplicity appears in reality, as identities frozen in time and trait, when consciousness lives in a psychological nexus distinguished by separable identities each of which possesses idiosyncratic imperatives and languages, the self encounters multiplicity not as an expan-

keynotes 15

sive dynamic but as a dreadful commentary on the ends of power". J M Glass, Shattered Selves Multiple Personality in a Postmodern World, Itchaca/London 1993, xviii-xix)

27 C Emmeche, The Garden in the Machine The Emerging science of Artificial Life Princeton (Princeton University Press) 1991, 161

stelarc@peg.apc.org	-
Stelarc	(.au)
STELARC - ON THE FUTURE OF THE NET PHA BODIES, FRACTAL FLESH AND COLLECTIVES	ANTOM TRATEGIES

1. ALTERNATE POSSIBILITES

Just as the Internet provides extensive and interactive ways of displaying,linking and retrieving information and images, it may now allow new ways of uploading, interfacing and accessing the body itself. Browsing the Net, generating Phantoms and constructing Virtual communities in Cyberspace is one contestable future. And instead of seeing the Net/Web as a means of fulfilling outmoded metaphysical desires of disembodiement, it offers on the contrary, powerful and unexpected individual and collective strategies for amplifying body functions and extruding body awareness. The Internet does not hasten the disappearance of the body and the dissolution of the self-rather it generates new collective couplings and a telematic scaling of subjectivity.

2. ZONE OF ERASURE

Consider a body remapped and reconfigured- not in genetic memory, but rather in electronic circuitry. A body needing to function not with the affirmation of its historical and cultural recall, but in a zone of erasure- a body no longer merely an individual but a body that needs to act beyond its human metabolism, circadian rhythms and the local space it occupies. A body that generates its awareness not through its mobility, but through its connectivity. Human awareness is altered by Al and AL and feedback loops filtering intense and extra-sensory experiences of teleoperated robots that navigate unimaginable micro realms and alien landscapes.

3. NEITHER MEMORY NOR DESIRE

Bodies must now perform in techno-terrains and data-fields where intention and action collapse into accelerated responses. Bodies acting without expectation, producing movements without memory. Can a body act without emotion? Imagine a body that is directly wired into the Net- a body that stirs and is startled by the whispers and the promptings of other bodies in other places. A body that is informed by Internet interface agents- Web crawlers, software spiders knowbots and phantoms A body whose awareness is augmented by surrogate robots in situations and spaces where no body could go. These machines, with arrays of manipulators and hybrid locomotion would exponentially multiply the operational possibilities, scaling up the subtlety, speed and complexity of human action.

4. INTIMATE INTERFACES

As nano-tech and neuronal chips provide more internalized interfaces, connections to the Internet, software agents and surrogate robots become increasingly intimate and invisible. This would result in seamless connections and a symbiosis of spatially and electronically distributed systems- fashioning powerful performance and search engines. The body needs more adequate inputs and outputs for subtle and seamless connections. What becomes important is not the bodyÆs identity, but its connectivity- not its mobility and location, but

its interface. Intimacy through interface, intimacy without proximity. The shedding of skin.

5. SPLIT PHYSIOLOGY(VOLTAGE-IN / Voltage-out)

What of a body whose pathology is not having a split personality, but whose advantage is possessing a split physiology (from psycho-social to cyber-system). A body that can collaborate and perform tasks remotely initiated and locally completed- at the same time in the one physiology. Or a body whose left side is involuntary and whose right side intuitively improvises. Consider voltage-in to induce the automatic actions (from its Net- connected computer muscle-stimulation system) and voltage-out to respond to remote promptings and to actuate peripheral devices. The body becomes a site for more inputs and outputs. The body needs to be rewired to cope with its split physiology.

6. FRACTAL FLESH- AUTHENTICITY IN MULTIPLICITY

Imagine a body that can extrude awareness and action into other bodies distributed over the Internet- displacing intentions into someone elsewhere. Clusters of remote agents could collaborate in the performance of a single body in a particular place or a lone agent could initiate motions in a multiplicity of bodies in many places. These Net-connected bodies would experience collectivity in their own individual way. A possessed and possessing body- neither all-yours nor all-theirs. With neither an awareness all-here nor all-there. Bodies hosting remote agents, calculating with collective minds and speaking with many tongues. Consider a body then whose authenticity is grounded not essentially in its individuality but rather in the multiplicity of remote agents that it hosts and performs and prompts. Constucting a more complex and operational entity.

7. PING BODY / TELEMATIC DREAMING

Consider a body directly wired to the Web. A body that moves not because of the promptings of other bodies in other places, but that quivers and oscillates to the ebb and flow of the Internet activity A body that manifests the statistical and collective data flow. A body whose musculature is actuated not merely by its internal nervous system but by the external stimulation of globally connected computer networks. Its subjectivity would be telematically enhanced to perceive and perform beyond it biology and the human-scale within which it now functions. Its Virtual Web vision augmenting its optical flicker-switching, superimposing and splitting your perception.

8. OPERATIONAL INTERNET- INTELLIGENT SYSTEM

Imagine the Internet structured so that it would continuously scan, select and switch- automatically interfacing clusters of on-line bodies (the size and expertise of the clusters selected for the operational or cerebral task to be attempted). Can a body function and cope with the multiplicity of agents- a fluid and flowing awareness that dims and intensifies as agents are connected and disconnected. Awareness and agency would be shifted and shared in an electronic space of distributed intelligence. The Internet becomes not merely a means of information transmission but a mode of transduction, affecting physical action between bodies. Electronic space becomes a realm of action rather than information. Are humans in the business of browsing and chatting to affirm their social, emotional and biological status quo? Or should we be plotting other trajectories with varying velocities in alternate spaces and structures? Perhaps being human is not about retaining our humanity....

LONG PAPERS

s.cubitt@livjm.ac.uk

Sean Cubitt

ONLINE SOUND & VIRTUAL ARCHITECTURE

(Contribution to the geography of cultural translation)

1.Communication is fundamental:

THESES

1.1

The unit of humanity is the community. Anything human is communal, whether it be a village, a society or the global complex in which we find ourselves today. We are born not only prematurely, but incompletely, our presumably genetic disposition to language and mentation (reason, emotion and so on) is a disposition to commune. Steven Pinker explains that 'Rather than selecting for a completely innate grammar, which would soon fall out of register with everyone else's, evolution may have given children an ability to learn the variable parts of language as a way of synchronizing their grammars with that of the community' (Pinker 1994: 243), offering as example, the babbling stage of acquiring speech, during which babies 'must be sorting sounds directly, somehow tuning their speech analysis module to deliver the phonemes used in their language' (ibid: 265). The peculiar bias of cognitive psychology towards individuals --- a concentration on the brain (even extended through the nervous system to the whole body) -- necessarily correlates with an ideology of individualism. But the same evidence can lead to an opposite conclusion: that the function of the language instinct is precisely to socialize the species.

1.2

Individuality is an effect of community. It is neither universal nor necessary, and it does not form the foundation of anything larger than itself. Rather, individuality is a product of specific historical circumstances, which I would align with the specifics of capital. What we experience as individualism, personal properties, are in fact just that: properties. You 'have' a self: you 'are' not one. The phenomenon we experience as selfhood is an epiphenomenon of community, and of the cascading consensual or conflictual combinations of communities. The parallel processor of the mind is not the brain but society.

1.3

Nobody speaks 'deep structure'. The a prioris which characterise Kantian and post-Kantian attempts to identify human universals, whether identified empirically or transcendentally, bottom-up or top-down, if they are indeed the case, explain no more than the possession of hands explains a Benin bronze. A specific case is Kant's introduction of the a priori division of space from time, which we have had to reassemble painstakingly through general relativity and guantum mechanics, and in human sciences through the circuitous reinvention of geography by Henri Lefebvre (cf Lefebvre 1974, 1958, 1968) and others. Chomsky's universal grammar (eg Chomsky 1957, 1965, 1966, 1972), Greimas' universal narratology (Greimas 1966, 1970, 1976), Habermas' universal discourse ethics (cf especially Habermas 1984, 1993) and the Grail of cognitive science, a universal science of perception, where they have survived critique and experiment, all come to the point at which they must admit that there can be no understanding of human behaviour which does not take into account the full complexity of the human environment. Chomskyan linguistics is

the most persuasive of these attempts, yet it has failed not only to produce a semantics, but even to formulate a workable text- or discourse-grammar beyond the scale of the sentence. To summon up 'context-dependency' is a cool way of dropping to your knees and beating the earth with your fists

1.4

(.uk)

Consciousness inheres in communities, just as semantics and textual syntax belong not to statements and sentences but to discourse. Consciousness, that process which means, is environmental from the point of view of the individual. It belongs in the world which we comes to inhabit, the human world of discourse and communion. This may be read as taking the Minsky–Dennett analogy between consciousness and distributed processing to its logical extent (Minsky 1985; Dennett 1991). It can also be understood as the beginnings of a critique of the Dawkins–Dennett theory of memes (Dawkins 1989; Dennett 1991) as inherently conservative. Consciousness only emerges in socialised humans, and is only observable in their communications, as social action and language.

1.5

The fundamental attribute of communication is mediation. The question of representation, as discussed by both semioticians and cognitive scientists, is misguided because it seeks a) a presence locatable in some single centre of consciousness, which neither science nor semiotics can identify, and b) representability as a defining quality of 'the world' otherwise defined as that which is not representation. Since logically there can be no equivalence between sign-stuff or mind-stuff and external, objective reality, the impasse of representational theories leads to the solipsistic nihilism of Baudrillard, and the grim obstinacy of a cognitive revolution imprisoned within the pale of its own premises. The reference of any community is to the lifeworld which it inhabits, and which its discourse describes, as a compass describes a circle. This is how what we think of as a shift in perspective occurs when someone throws into a discussion observations derived from another community, like asking cognitive humanists about gender, or an Israeli where Palestinians come from. What changes is not the perspective on the world, but the lifeworld that is being defined as the one shared in the conversation. This kind of clash is a vital factor in the evolution of communities.

16

Communication implies mediation, and mediation needs a medium. A community is an ecology, which keeps traditions alive (Gadamer's [1989] concept of language, which here seems very close to Dawkins on memes); serves for social coordination (Habermasian communicative rationality); socialises needs (Mead's [1934] social anthropology); and provides the possibility of new meanings arising. The medium nurturing such evolution is mediation itself: the material practices of signification. Mediation is the second vital factor in the evolution of communities. Each medium itself produces, by accidents and by the endless creativity of syntactic permutation, the grounds for new meanings. As such, discrete communities are unstable internally as well as externally. Without them, perhaps individuals would exist, as individual orang utans exist, apparently incapable of the speed of evolution which is specific to humans (at least among the primates).

1.8

The function of art is to participate in and foment this instability, to militate against such self-stabilising and anecological, unevolutive formations as the so-called 'free' market's monopoly tendencies, the planned futures of corporations and the model of individuality as self-equilibrating and self-perpetuating system. Art is a form of aberrant encoding that precipitates internal shifts within a communicative world, whose innovations ignite trails of knock-on effects, and whose accidental grammars can collide with and interfere in neighbouring discourses.

To resume:

Community is more fundamental than individuality. Mediation is more fundamental than representation. Consciousness is mediated and communal. Communities evolve consciousness through internal and external mediation.

Anyone interested in communication must insist that communication is more important to humanity than any other mode of interaction, and that other interactions derive from it. From communication we can derive exchange and economics; rituals, status and power; curiosity, technology, science and dominion; risk and conflict; ethical concern and sexualities; or any other form of analysis you like. It is absurd for anyone in communications to start anywhere else than in the most obvious, universal thing about human beings — we communicate.

In what follows, I will be testing a further principle based on these theses:

1.9

That communication most closely approaches the object world when it is most mediated. The transition from one lifeworld to another is perhaps the most heavily and consciously mediated of all discursive moments. At such extremes of mediation, mediation reveals that it can never be, as Godel showed of mathematics mathematically, both coherent and complete (cf Nagel and Newman 1959; Penrose 1995) It is at such moments that we can glimpse the existence of an object-world at the horizon of the clash of lifeworlds Mediation is not against realism: it is its necessary cause

2. Distance Engineering and Community In an utterly interdependent world, where it is no longer

possible to live alone, the dominant facts of culture are diaspora and hybridity: the scattering of peoples and their meetings in new spaces that they have had to invent or reinvent for themselves. In a curious historical irony, digital sound and recorded images have emerged in the century of diaspora as the mechanical models of scattering and sowing, plucking tones and light from one place, splitting them into their tiniest elements, and reassembling them elsewhere, translated into a new context. The problem facing communication arts in the era of digital networks is to engineer systems which are capable of evolution: systems which disable such characteristic tendencies of the contemporary capitalist mode of communication as centre-out broadcasting, long-range planning, economic monopoly and hyperindividuation And to do so in a world whose core experience is that of distance.

I take the term 'distance' to refer to the flexible, human lifeworld of space-time, especially as this has arisen in modernity through the process of imperialism.

The European and, more recently, North American and Pacific empires are qualitatively different from the empires that preceded them, firstly because of their global reach and secondly because of the rapidity of their communications. The communicative principle tends towards global interaction But the vicissitudes of history have so mangled the instinctual reach to others that only the perverse communications of domination and exploitation have guided its most visible planetary spread. Imperialism scattered peoples, by slavery, transportation, the movement of armies and bureaucracies, political, ethnic and religious persecution, and economic migration. The early empires did not produce such massive population movements, and therefore did not require the complex communications technologies of the 19th century. The Great Khanates of the 13th and 14th centuries, which required a month of hard relay riding to cross, or the British outposts in India at the time of Cromwell, when ship-borne messages took a year to travel from Westminster to Surat, ruled without speed.

The new empires of the 19th and 20th centuries did demand speed, and for two reasons: for reasons of state, and for reasons of exile. Though state and commerce built the telegraph nets, they could not close them to traffic between citizens. The millions who left Ireland during the Great Famine of the 1850s could do so knowing that cheap and regularised steamship-borne mails and, within a decade, transatlantic cable, would make it possible to remain in touch with the home culture.

In the mass migrations of the late 19th century, the distance effect runs parallel to and in some senses despite the uses of communications technology for purposes of rule and economic manipulation. In the land-based cultures of European feudalism, departure on even such a relatively short journey as a crusade would mean years without contact with home. In its more methodical dislocation of people from places, capitalism produced the necessity for a network of globalised communications. But in the telegraphic net, interstices of the official service provided a ghost web of nodes, in the twenty per cent or so of traffic accounted for by private use, the first forerunner of a new mode of distance engineering.

In these modern empires, geography was experienced as time. Processes of mediation allowed for virtual presence, virtual community, but the differences in bandwidth between letters and telegrams, and later photographs and recordings, compared to that of social interaction, gave mediated messages a privileged status in the scattered community. The Irish in Australia, for example, both credited the home country with the more authentic culture, and eagerly awaited each newspaper or shellac disc; but at the same time, the Australian Irish began to evolve their own variants on the home culture, variants that would, within decades, evolve into complex feedback loops with it.

The purpose of information-based models of communication is to ensure the safe arrival of a message, as uncorrupted as possible, in the hands of the receiver. And it is axiomatic in information theory that the medium, the channel, is immaterial to the communicative process, completely subordinated to the message. Such is information in the imperial mode. But in the communicative feedback of the African, Italian, Irish, Chinese, Indian and other diasporas, the medium of communication is a living part of the message, its materiality evidence of connectedness. The arrival of news or art from home only began its circulation within exile communities, where stories, speeches and songs were translated from the distance media to the high-bandwidth ones of conversation, gossip, sing-songs and décor. This translation model undoubtedly adds noise and redundancy to corrupted messages. It fails to conserve the tradition, because it treats the message as raw material for life, not as its goal.

You cannot define the diasporas of globalised society by what they are not — as resistance, subversion or critique. That would be to define them only in terms of a global culture to which they have been subordinated (defining the vic-



tim in terms of the oppressor) And besides, there is little evidence of a globally coherent culture to resist (cf Pieterse 1995). Nor is it particularly fruitful to define diasporas by what they are — as roots, identities (cf Gilroy 1993) Diaspora is by definition a process — of hybridisation, of multiple influences from home and exile. Diasporan communities must be understood by what they do, and what they do is communicate.

Evan Eisenberg notes that, 'Whereas Bessie Smith had to go on the road with Ma Rainey in order to learn from her, Victoria Spivey and Billie Holiday and Mahalia Jackson could learn from Bessie Smith by staying put in Texas or Maryland or Louisiana and playing her records' (Eisenberg 1988: 116). What is noticeable about this tradition is how profoundly different are each of the vocal styles produced in the multiple confluences and mutual influences of popular musics in the African diaspora. Technique is acquired in order to evolve it. Contrast this model of diasporan communication as a translation from source to action with the fate of the European symphony in the age of sound recording. Refined and defined increasingly rigidly into a hierarchy of forms dependent on faithfulness to a written and preserved score (according to Michael Chanan 1995: especially 116-136), the orchestral repertoire ossifies. The associated cult of authenticity in tempi, instrumentation and interpretation curtails radically the emotional range of classical performances. Here the integrity of the message triumphs at the expense of the intensity of engagement and, what amounts to the same thing, the evolution of the culture.

The cult of tradition grows from belief in the integrity of the message. The messier messages of mediation have not that solidity and preciousness, they are porous, and indistinguishable from their media. Media and messages evolve together as communication. And from the point of view of an evolving communication, in diasporan translation, people are media. The evolution of communications is the evolution of the species.

3. Conditions of Sound

Music and information dominate the mode of hearing of the 20th century, and their dialectic has only recently begun to evolve a third mode of hearing, the soundscape. Music from Russolo to Cage strips itself of unessentials - melody, harmony, counterpoint --- to encompass all hearing, transferring the musician's mode of listening to the sounds of the world (cf Kahn 1990). Information structures movie soundtracks, the temporal and public functions of broadcasting, and much of telephony. In the audiovisual media, the dialectic of music and information has produced the multi-channel soundscape as a novel synthesis, the kind of soundscape in which music and dialogue are reduced to sound effects, and the sound approaches parity with the image, as it does in films like Se7en. But even this resolution is premised, like the personal stereo's headset, on a Cartesian aesthetics of hyperindividuation, Dolby and THX geared toward a sonic architecture at whose centre is the position mapped out for the isolated hearer

Though some contemporary installations challenge this closed dialectic (cf Cubitt 1996, available on request), what I have found so far on the net does not. Terminals are extremely expensive telephones and radios, and sound work is predominantly in music or information-led movie soundtrack style. Experimental radio work of the kind promoted by Kahn and Whitehead (1992), Augaitis and Lander (1994), Weiss (1995) and Strauss (1993), when it appears at all, is still searching for an understanding of the differences between network communication and broadcast (though see Soundsite at http://sysx apana.org au/soundsite/). Most of all, the end-user is constantly repositioned as the vanishing point of sound perspective, an impossible goal of pure consumption. What follows is an attempt to describe something that does not exist, a network sound aesthetic It seems appropriate to begin its description in silence

4. Lacuna

The sound which has just vanished is the building block of music, but what of the silence before the first note? We rely on short-term memory to position notes, and words, in relation to each other, and, especially in speech, silence is a palpable and meaningful element of dialogue. Or rather, it is several. A silence between phrases signals some kind of struggle to bring an idea into conversation. There is the silence between friends or lovers who do not need to fill it, the silence of refusal... But in music, silence has only two functions: as beginning, and as end. Cage's 4'33" is music, not silence, because it begins and ends, and what precedes and follows it is inaudible.

The chatter of the projector fills the silence of a 'silent' movie, especially without musicians or commentary, but the image itself is a flat field without sound, that Lumière cinematographe that Gorky saw as a world of shadows bereft of the substance of sound (in Leyda 1983). That silence is reconvened when one of our machines breaks down A hi-fi or video deck that loses a channel suddenly produces a cone of silence, marked now as where a sound should be. Depending on how much you have riding on it, this gap in the world can make you sweat. Once, we resoldered all the ancient, brittle connections on a giant Westrex theatre speaker at the Rio Cinema in Dalston just before a screening of The China Syndrome. At the climax, a nuclear reactor is about to blow, and the bass rumble from our ten foot woofer repeatedly bounced the soft connections apart. At the back of the auditorium, the Chief and I, in higher states of terror than he most involved of the audience, heard each static interruption as a vast wave of silence poised over the roaring soundtrack. Such silence has been a trope of science fiction since Orson Welles' reporter, his voice fading into a sea of static, repeats 'Is there anyone out there? Is there anyone?' Silencing a broadcast is like having your ears filled with earth: no wonder The War of the Worlds drove audiences to suicide.

At such moments, you feel yourself strain to hear, forcing your ears open, back, out, like an urbanite condemned to a night in a country cottage. Silence, in such a moment, is a pressing engagement with where you are. Suddenly, you are where a sound should be. The effort to hear is simultaneously the effort to define a place. That place, in turn, is a function of disconnection from the endless extension of space The arts of networked sound will need to address this dialectic of space and place.

A further and more troubling silence only becomes noticeable when it is over, not as memory, but as a gap in memory, the silence produced by intense concentration or intense vagueness, the state you describe when you suddenly prick up your ears and say 'Sorry, I wasn't listening'. Though we talk of it as an absence, it is a position of absolute place. Virilio has a different take, describing both picnoleptic moments of lost consciousness and the pathological auto-erasure of the hermit Howard Hughes in terms of 'ubiquitous absence', which he analyses as a bid for universal authority (Virilio 1991: 25). This is, I believe, only the case in the hyperindividuated world, and in sound terms in a mode of hearing in which the self is the centre of acoustic perspective, the infantile narcissist at the middle of the world. I want to argue for a different aesthetic, one in which the erasure of the self is the condition for the arrival of commu-

nity.

This vanishing point of sound is not attributable to our devices or cultures, but only to the withdrawal of attention from the world, even the world of your own sensorium, to a dimensionless point where, as there is no dimension, there is no time. If time be missing, there is only place. If such a silence can be defined as timeless, then sound must be defined in terms of time as well as height, depth and width. Obsessed with speed, we shut our ears to the spaces speed produces Hungry for perception, we spit out the silence of pure coordinates. The art of network sound can commence in the moment of abstraction. A degree zero of involuntary withdrawal, that erases the self and the familiar world that permeates it, this absence draws the shape of sound around it, a magnetic rose in the iron filings. Soundspace comes as no surprise: sound is a vibration. Acoustics is the science of spaces in time. What intrigues me is to imagine an art not of space, but of place, an art of the alteration of sound at the place of perception.

The silent abstraction into which all of us have fallen in our communings via Internet are usually described in terms of a diffusion of the self, but today I want to think of it as the kind of silence that might overcome a mariner, the soughing of the wind in whose rigging has become as homely as a heartbeat, and who listens not at all to the caulking as it creaks, floating in a vessel he can always call home, no matter the immensity of the ocean, and listening to the silence of the stars. Such silence has only an oblique relation to the silence of an interlocutor, or the dumb refusal of a server, and everything to do with this intensity of being, neither expecting not remembering, but here, in the terminal place.

In the Western tradition, sound is sourced in the environment, and the auditor has only to listen. (In the special case of hearing your own body, we benefit or suffer from the separation of body not only from mind, but from perception itself). Cage's unplayed piano is the musical source for an aleatory but environmental composition which we have only to hear. Like broadcasting, even this zero degree of music is centre-out, dominated by an origin beyond the perceiving body. The challenge is to define the rose in the steel-dust so, that the magnet appears at its heart. A network sound aesthetics will be centred in the hearer, not the producer or the technical medium of distribution. I use the metaphor of the lost moment to isolate the central quality of such a sound art: that it treats the hearer not as a goal, not as the defining point at which sound reassembles, but as a conduit, a hollow passage, a medium through which sound flows onwards, but retuned by its passage, translated.

5. From Broadcast to Translation: Virtual Acoustics

Desert Storm, even after these years, still reverberates in the public imagination. The Garden of A-----, the installation by Pervaiz Khan and Felix de Rooy from which the video loop just shown is extracted, is an archeology of that imagination. As meticulously as the discoverers of Tutankhamun's tomb, Khan and de Rooy brush away the millennial and daily piles of sand to uncover the centuries-old foundations of a meticulously executed act of cultural assassination. It's not that Hussein is a good bloke, but that the Ba'ath regime was first resolved into a single figure and then deliriously coloured with all the accumulated caricatures evolved since Napoleon's Egypt adventure. The people of Iraq, indeed of every Arab country and many, like Iran, that are not, could be subsumed into that one crazy picture of the vainglorious, magically powerful, ludicrously overblown, farcical despot. The desert war was and remains a war of oxymoron.

The installation is a labyrinth at the heart of a great pyramid of truisms, summoning genies from the database of clichés. A glowing touch-screen mandala, provoking arabesques from the Star of David, serves up a menu of categorical errors at a touch. A pyramid of screens accumulates patterns from the video loop, swept into apocalypse by a digital wind like the one that carried the 'smart' bombs, and ferried their triangular gunsight views to the televisions of the world. And here, in the very heart of the contradiction, where Western dream meets Eastern reality, you walk through an electronic desert projected on the floor.

Standing in this keystone of light as it shivers and roils, you hear sounds that have been with you all through the labyrinth, roaring, booming, chattering, flowing into one another. Move through this space now, hearing how the sound sources pool their resources, flood into one another's spaces. This is not cinema, where the image dominates the sound, forcing the aural world into its pursuit of the absolute truth — whodunit? Instead here are cycles and volumes, masses of sound and music, clouds and weighty hunks of vibration to permeate your body as you wander through.

These sounds, and this electronic drift, the storm of visions and vibrations wafted up into the air as thick as the blaze from the ignited oil wells - what otherness can we maintain in front of them? As Kuwait burned, so, in the snatches of old films, the minarets explode, and Babylon flares in its spectacular decimation across the screens. The Gulf War, it is almost jejune to announce, was a spectacle, a televisual action flick, a fictional depiction of actual strife. We crave that spectacle. Only the images from the bombed bunker, the photos from the napalmed convoy, urged a sudden calm in the turmoil of victory, and those images were never shown in the USA. Just as the Algerian footage and sounds, of a mother wailing for her incinerated child in the empty bunker, never made it onto British screens. That wailing, mixed into the exotic, the martial and the cinematic, is the pulse that anchors all the humour of The Garden of Athe synchronisation of you, in these rooms, with the spectacle of the blazing Orient. That voice, its agonised repetitions of a single cadence, drums in the mind's ear like your own mother, bereft, stripped back to the bone and nerve of suffering.

So spatial is this sound affect that it reinstates the sense of the cinematic as a journey, like the old Hale's Tours railway carriages in which audiences were rocked to the clickety clack of a steam engine while films projected landscapes rushing by on the windows. But this time, it is the audience that moves, and while the images revolve in structured patterns, redefines the multiple soundtrack sources. The mix is not in the tapes but in the movement through their overlapping, their centre not a stereophonic focal point but a fluid permeation of playback and body, the sound perceived not only through the ears but the soles of the feet, the bones and the chest cavity, resonances recalibrated constantly as you wander through. Sifted powders, forming and reforming in endlessly new combinations, sounds become undirected motion, a dérive towards an otherless future.

6. Some inferences

Broadcasting, stereophony and movie soundtracks sculpt a single, and a solitary position from which alone they are audible. Installation sound has the option of dispersing that integrity, atomising and scattering it, and in so doing shifting perception's centre of gravity from the disembodied mind to the physique as a whole, and through the material of the body as medium, to communicative community from which the hyperindividuation of interface design has thus far debarred network comms Short-circuiting the commodified form of information transfer in favour of a nomadic process of translation, prizing the remaking of materials into new hybrids over the conservation of integral tradition, network sound may be the gateway for electronic diaspora, the nomadism of global exile from which a true communications democracy can evolve

Information theory fails insofar as it commits its faith to the message. It is the lackey of a class system that separates senders and receivers. We are all receivers first, even if the legal fiction of intellectual property serves to staunch the flood of intercourse, just as feudal fealties did a thousand years ago. Intellect cannot be owned, neither by individuals nor by corporations. What a translator translates is not an original, but a hybrid hovering between source language and destination language. Here information is merely a local case among the universals of human communication -introspection, storytelling, poetry, gossip, humour and the others (cf Tooby and Cosmides 1992) - and one which is marked by its refusal of evolution. Conservation of the message, conservation of the individual (as sender/receiver role): diasporan translation models do not do away with these functional forms of quotidian administration; nor do they seek to subvert them. They replace them, operate a parallel communications world, in which the mutual interpenetrations of media and messages are both the goal and the modus operandi of mutual evolution. The first step will be for us, makers, to eradicate our selves by trusting in our media, from which, in the end, we are indistinguishable, and our audiences, who are ourselves. The critique of sound suggests that we have potentials normative corporate media have not dreamed of. The first step will be to smash the terminal.

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Rich Gold

rich.gold@parc.xerox.com

Manager, Creative Documents Initiative Xerox PARC 9/96

PAIR: THE XEROX PARC ARTIST IN RESIDENCE PROGRAM

1.BEGINNINGS:

1. PAIR (The Xerox PARC Artist In Residence Program) is an active procedure for bringing art and artists into Xerox PARC (The Xerox Palo Alto Research Center) which is a facility originally founded to study and design "The Architecture of Information" and "The Office of the Future"

2 PAIR is a project not for creating wonderful art or exciting science, though because we are dealing with highly motivated people these things happen, but for creating better artists and better scientists.

3. PAIR is a conscious attempt to boost and redirect the creative forces of PARC by providing alternative view points, theories, personalities and methodologies within the halls and long corridors of the community.

4. PAIR is an outstretched hand from PARC into the surrounding Bay Area (we almost exclusively focus on San Francisco artists) allowing PARC to become part of that community and to leverage off the creative forces that flow from the Golden Gate Bridge.

5. PAIR is a way for two groups who consider themselves "outsider" groups to the dominate culture (the artist's primary concern is for expressing themselves while the scientist's primary concern is to discover the truths of nature) to meet each other, artist to scientist, face to face.

6. PAIR is a way for two groups who are the ultimate "insider"

(.us)

groups of the dominate culture (the artist's primary patrons being the wealthy, the corporation and the government while the scientist's primary patrons being the corporation, the government and the university) to meet, scientist to artist, face to face

7. PAIR is a fun house mirror into which two groups, artists and scientists standing in their jeans and T-shirts, can simultaneously stare at each other and see the super-imposed energy, creativity, quirks, flaws, hypocrisy and promise morphed together in an overlaid image.

8 PAIR is a program based around the obvious, but often forgotten fact, that most artists and scientists are adults and can be treated that way.

II. STRUCTURE:

1. PAIR is a match-maker, a yenta, setting up marriages that can last a life time by knowing their clients, looking for sparks, realizing that all marriages are unique and understanding that all marriages have their own rhythms and songs.

2. PAIR, while being a match-maker, is not a marriage counselor, and instead believes in unmediated adult relationships that are as uncomplicated as possible by "helpful" third parties which would turn the union, sooner or later, into an unstable menage-a-tois.

3. PAIR is not about having artists becoming researchers or about scientists becoming artists, but rather about each profession's interests and goals being accepted and honored within the context of a heterogeneous intellectual ferment.

4. PAIR, and we worked hard on this, is founded on the idea that the legal contract between the artist and the scientist should be so straightforward that it can be signed or not with a clear conscience, so that for instance, the contract simply reads that "the artist owns the art and the scientist owns the science".

5. PAIR is also aware that to make the relationship between the artist and the scientist professional due compensation must be paid to the artist and so the contract includes a stipend, office space, equipment, all the copying anyone could ever want, and most importantly, access to three hundred very smart people.

6. PAIR is the provider of yet one more clause within the contract which states that the artist will be granted, if possible, a free, non-transferable, life-time license to any scientific discovery resulting directly from the pairing for use in their own work⁻ a kind of artistic-techno monopoly.

7. PAIR is in a state error having originally believed that pairings could achieve maximal potential within the duration of a year, when in practice, we have learned, that it takes at least three years to develop a common language, meaning of course, that the artists never leave.

8. PAIR is most fundamentally a project within a bureaucracy and the most interesting conflicts arise not between the personas of artist and scientist, but between the pseudo-class distinctions of corporate, technical worker and independent, aesthetic contractor

III. CONTEXT:

1 PAIR is deeply embedded within PARC, a native species to it, and it is not clear if it could be transported to other environs

with its present genetic make-up a make-up which is the result of a specific evolution within the PARC ecology.

2. PAIR is an organism that feeds off the very real "atoms to culture" landscape of PARC where one is as likely to eat lunch with a molecular physicist, as a computer scientist, anthropologist, philosopher, linguist, interface designer, mathematician or cryptographer.

3. PAIR is, by being part and parcel of PARC, part of a rare ecology (within the United States anyway) that values, in and of itself, intellectualism and creativity, and one good way to characterize the PAIR niche within the ecology would be a bee cross-pollinating the diverse flowers of this fertile field.

4. PAIR is lucky in that the director of PARC, John Seely Brown, along with PARC's Senior Staff, immediately embraced the program though they did wonder if any scientists would participate since the program was entirely voluntary (and they also wondered if the artists would do it for free).

5. PAIR is the result of many forces one of them being the External Advisory Panel which was composed of twelve Bay Area curators, editors, and art program directors from major museums to hole in the wall theaters, many of whom amazingly had never met each other before we brought them together by asking for help.

6. PAIR is forged by the first meeting of the External Advisory Panel where we got an earful and a half of complaints from how dare we drag artists into a corporation where we will suck them dry of ideas; to who will protect the artists from getting dirty without mediating corporate foundations, art organizations and curators; to how we should be careful not to use the word "quality" when discussing art

7. PAIR is forged by the second meeting of the External Advisory Panel where each advisor proposed one appropriate artist (and amazingly they all were appropriate) which got us started on the right foot with an unexpected bounty of wonderful candidates from almost every artistic discipline and who used a wide range of different technologies.

8. PAIR is also the directed vector of PAIRCORE, the Internal Advisory Panel, which is composed of scientists from each of the diverse labs of PARC, many of whom surprisingly had never met each other but have now gone on in many cases to make their own "scientific" pairings

IV. JOININGS:

1. PAIR is based on the simple idea that we could use technology as a common language to get otherwise divergent disciplines to speak with each other, and that once the conversation began, everything else would follow.

2. PAIR is not based on the belief that each person must be both an artist and a scientist, though such people exist, but rather that there is a class of extraordinary activity that a scientist and artist can engage in, mutually beneficial, to both.

3. PAIR is not necessarily based on the model of scientist/artist interaction one finds in organizations like SIG-GRAPH where scientists construct complex artistic machines for artists to use, but it doesn't exclude such interactions either.

4. PAIR is not necessarily based on the model of scientist/artist interaction one finds in say Performance Art where artists scavenge scientific effluvia, from fractals to laser beams, to create technical collages, but it doesn't exclude it

either.

5. PAIR is a believer in the truth of the proverb. "Artists make art from the mud of the river bank that flows by their village" and since in the Bay Area that river is electrified and digital we had no trouble finding artists that were already using dialects familiar to scientists who were fishing in the same waters.

6 PAIR is fully aware that art has always used technology; that all art is technological; that even a painting is a precise road map of the history of Western chemistry; and so when we wrote our job description we ambiguously and loosely defined a category called "modern technology" and a category of artist who "used modern technology in a deep and fundamental way" and waved our hands a lot, to indicate the kind of artist we thought we were looking for.

7. PAIR is also fully aware that science is itself a creative act and that PAIR was specifically not about bringing creativity to the scientists, or for that matter formalism to artists: in some real sense, PAIR was about bringing remarkably similar professions together for a close look-see.

8. PAIR is awake at a time when fascinating new genres of communication are forming; when the aesthetics of these genres are pushing against the sciences and technologies of various emerging media: a cusp when small activities can create large folds of culture in a not too distant future.

V. TROUBLES:

1 PAIR, and what a little thing it is in the context of a polluted and starving world, is a small attempt at an intelligent activity when all intellectual activity is at risk.

2. PAIR is not unaware of the current crisis in art, where on one hand artists portray themselves as a moral force outside the power structure, while on the other hand their activities are primarily shaped by a small group of collectors working precisely for the ruling elite (and it really doesn't matter that to get by 99.5% of all artists take jobs pulling coffee at Starbucks or, lately, programming computers).

3. PAIR is not unaware of the current crisis in science, where on one hand scientists portray themselves as a moral force working for the good of humankind by understanding the nature of nature, while on the other hand almost all science is funded by a small group of corporations who are primarily interested in populating the world with yet more stuff.

4 PAIR is not unaware of the irony of bringing artists into corporate hallways (I should mention that artists meeting middle class workers and vise versa is perhaps the best unintended consequence of PAIR) in that there is a reasonable argument to be made that the "new and improved individualistic ethos" that drives capitalism is not just reflected in Western art, but is actually derived from it!

5. PAIR is a loose confederation of people not all of whom agree, but it is probably a widely held belief that to some degree modern corporations are deeply bound to science and hence corporations must seriously wonder if bringing artists into their research organizations will dull their scientific edge or sharpen it.

6. PAIR is as charmed by post-modern postulations that science is no more than a myth as it is by the belief that only good flows from test-tubes.

7. PAIR is as charmed by artists who claim that art is counter to the culture (what an odd culture that would be), as it is to claims that art leads the culture (and so one good use of artists would be to help companies think of new products, as if companies need help), to the idea that art is an unambiguous moral force for good

8. PAIR, in the end, is a small blob of humans on a planet in trouble hoping to make a difference by communicating across a shimmering boundary.

VI. PAIRINGS:

1. PAIR is artists John Winet and Margret Crane working late through the night with computer scientists creating one of the first interactive web sites, one that allows mental patients to communicate with each other, their doctors and their friends and then finding that the same technology could be useful in allowing corporate executives to communicate with each other in much the same way.

2 PAIR is Jon Muse and Jeanne Finley, documentary film makers, working with the PARC cultural anthropologists creating a film about how the anthropologists study artists while the anthropologists studied the filmmakers creating a documentary about anthropologists watching artists, and, well, round and round, while fundamentally altering the methodologies and understandings of both.

3 PAIR is the radical vocalist Pamala Z, who uses gestures to control banks of electronics that alter her voice, working with the video gesture recognition scientists of PARC who have never worked with a "professional" gesturer before and there by altering their understanding of what is possible, even as they created new content for Pamala's shows

4. PAIR is the interactive sound sculptor Paul DeMarinis who worked not only with the ubiquitous computing group creating the first ubi-comp sound sculpture, but with a collection of print scientists who created unique PostScript programs that allowed Paul to form giant printed spirals that encoded "The Theme From Vertigo" which could be played by human directed laser beams creating a dizzy music.

5. PAIR is net artist Steve Wilson who created. with the help of PARC interface scientists, one of the first alternative methods for surfing the web, in this case, the Road Not Taken, which showed the web sites you didn't click to, breaking open a flood of new browser possibilities and a kind of ennui as well.

6. PAIR is interactive novelist Judy Malloy who worked with Lamda MOO scientists to develop a new genre of literature: the first interactive detective novel in a multi-person MUD space, as well as writing a hypertext novel with a woman scientist at PARC that looked at gender across the artist/scientist boundaries.

7. PAIR is artist Perry Hoberman in long complex discussions with a group of scientists working on embedded and invisible data technologies trying to understand the aesthetic implications of images that encoded information as well as the technological pressures of artists wanting objects with metaphorical and linguistic layers.

8. PAIR is sound artist Tim Perkis working with media scientists at PARC to construct a real time sonic rain forest on the Internet which not only could anybody listen to, but one in which any listener could add a few noisy animals of their own.

VII. FUTURE:

1. PAIR is (was) an opening for PARC to look at the related field of Design (one can think of Design as the most succes-

sful applied social science ever to exist) for Design sees the world as Art does, in moral terms of aesthetics and human welfare

2. PAIR is an opening for PARC to study aesthetics as a field of research, for the aesthetics of a culture determine what people want to make if you happen to be making printers you might want to know what people want to print

3. PAIR is an opening for artists to observe scientists in a direct and humanistic manner and not through the lens of popular literature since the artistic representations of scientists are not neutral events.

4. PAIR is way to fund artists in a direct manner and not at the long end of long fingers where the funders and the fundees never meet.

5. PAIR is a strange but effective way for PARC to connect with other parts of Xerox and with other companies around the world because an artistic bridge seems like an unthreatening bridge that even enemies may want to cross.

6 PAIR is an opening into the research of artistic expression, which, if the question is. "How to create rewarding and meaningful lives?", might not be a bad place to start.

7. PAIR is an opening into using some of the methodologies of art in scientific research, which being a creative activity itself, is always on the lookout for new techniques to be borrowed from other professions (well, to some degree).

8. PAIR is an opening for Xerox the Document Company to work with some honest-to-god documents.

VIII. SPECULATIONS:

1. PAIR is a pause before genetic engineering renders all of computer science to a small blip on the screen of what important happened in the 20th Century and redefines not just what people like, but people themselves.

PAIR is perhaps a harbinger of a new corporate agenda, unspecified at the moment, but more dependent on the control of position and arrangement than the control of molecules and space.

3. PAIR is an early attempt to construct an art for and about the middle class, a class who have been essentially abandoned by the fine arts to the whims and wills of Hollywood.

4. PAIR is a tantalizing breeze of the possibility of an aesthetic life wafting ashore these industrialized beaches.

5. PAIR is the mere suggestion that there might be a new emphasis on the creation of technologies that are not designed to replace humans, but the creation of technologies that require humans.

6 PAIR is a not so subtle reminder that neither art nor science are neutral but can cause great destruction and/or great enlightenment, unexpectedly, anywhere.

7. PAIR is a reminder that the vast density of human made objects on the surface of the earth were in fact designed by humans and that we might want to think about the kind of future we actually want to live in before we design some more.

8. PAIR is a suggestion that creating new stuff is not the problem, but that different methods create different things, and that finding an appropriate method maybe our only hope for a charmed time on this planet.

Samia A. Halaby, Independent artist (.us)

samia@interport.net

RHYTHMS, The Aesthetics Of Electronic Painting

SUMMARY:

This paper focuses on kinetic abstraction as a painting expression appropriate to computing. It begins by describing the futuristic ambitions of early twentieth-century painters to create movement. The way in which the forms of computing fulfills those ambitions is substantiated by comparing the two kinds of art. The third section presents some of the artists who program paintings.

Painters who consider computing find two directions of work possible. On the one hand they can use it to support and automate work in other media. On the other, they can use computing as a medium for new work.

Painters study a new medium because they intuit that it can hold new content better than old media. Once understood, materials are applied to create visual forms that themselves hold the meaning of a painting. The essential search, then, is into painting itself. By using computers, painters might push the art of painting into new realms, and in so doing, they would cause computing to mature as a visual medium.

When painters examine computing as a medium they find a striking resemblance to abstraction. It echoes the writings of artists from the first decades of the twentieth century. It has potential for visual motion noisy enough to fulfill their most futuristic dreams. In this paper, the realization of s such a form is called kinetic abstraction.

Before the development of abstract form, many musicians/inventors hoped to create visual music. They felt that music had a hidden visual reality that they might externalize. Late in the nineteenth century, Alexander Wallace Rimington built a piano like machine which he called the "Colour-Organ." It was electric and its fourteen-octave keyboard was connected to lens and filters and ark lamps. It projected only colored light and did not produce sound but was accompanied by a piano in performance. It was so remarkable that as many as one thousand people attended a private demonstration in London in 1895.

In 1922, after the development of abstract form, in the early decades of the century, Thomas Wilfred performed on his own color-organ called the Clavilux. It had taken ten years to perfect at an exorbitant expense. What was extraordinary about the Clavilux was that it projected moving colored shapes and was intended as a visual show, independent of music, even though it was often accompanied by musical performance. Wilfred composed special pieces for his organ. One reviewer described such a performance as 'an Arabian night of color, gorgeous, raging, rioting color... lances of light darted across the screen to penetrate shields of scarlet or green or purple." Wilfred is the first inventor whose experiments matured enough that he might be seen as the first kinetic abstractionist.

THE INNOVATORS OF ABSTRACTION

The first abstractionists created a form that departed from the illusionism perfected by Renaissance painters. Many Cubists, Futurists, Orphists, Rayonists, Suprematists, Constructivists, members of DeStijl, and other associated groupings felt driven to write about their discoveries.



Although their ideas are imprecise and often contradictory, the tone of their essays is exciting. They understood better those ideas which they rejected than those which they were developing. They rejected the past which is easier to know than the future. They embraced the modern world of technology and industry as Unberto Boccioni wrote "The opening and closing of a valve creates a rhythm just as beautiful but infinitely newer than the blink of an animal eye." They stressed that painting was based on reality.

Movement and time were central themes Words and phrases such as "pictorial dynamism," "Rhythmic Simultaneity,", "vibration," "go round and round the object," "speed," "action," "quest for space," "the fourth dimension," and many others like them are mentioned often in their essays. Rendering things frozen as seen from a stationary viewing eye, did not fulfill their wish to depict the motion and noise of industrial cities. They wanted to open the second eye and put both in motion.

In Du Cubisme written in 1912, Jean Metzinger and Albert Gleizes write, "Today painting in oil allows us to express notions of depth, density, and duration supposed to be inexpressible, and incites us to represent, in terms of complex rhythm, a veritable fusion of objects, within a limited space." In "The Realistic Manifesto" Naum Gabo asserts, "We affirm in these arts a new element, the kinetic rhythms, as the basic forms of our perception of real time." The Futurists talked about sound and wanted their paintings to be noisy. They supported a new futurist music as Umberto Boccioni wrote, "We do not draw sounds, but their vibrating intervals "

The pioneers of abstraction were enthusiastic about the future. Supporting the revolutionary hopes of the working class, they point to those new ideas that have given optimism to our entire century. Although they created a profound renewal in form and content they could not do so for the technology of painting Until the advent of the computer the only technology available to painters for the creation of abstract movement, alone or with sound, was the color organ or mechanical animation – the latter recorded on film. Those methods invited limited exploration by painters.

COMPUTING'S POTENTIAL FOR ABSTRACTION

Computing is an adaptable technology. It can mimic different media and replace their more primitive technologies. In word processors and spread sheets, the software designer provides simulations of the tools of creative writing and bookkeeping. Paint programs simulate the tools of easel painting. When we are given an icon of a brush or a pen or a spray can, we are supposed to make believe that the mouse is like its predecessors.

As painters who explore, understanding the potential of the computer without the mimicry of software has high value even though this value will serve a distant future. It is important to understand that the computer can be made to behave as though it had a lens in it. It does not. Making it behave that way to creates three-dimensional illusions through software is very important to production but not to the explorations of painters.

The monitor produces flat color and infinite space more readily than perspective and shading. And what is more, these colors are actually luminous. When turned on, an empty screen resembles the space of the sky in that it does not appear limited by perspective. We do not feel that we are looking into a room or at a wall but into something seemingly infinite. Luminous flat color and infinite backgrounds are primary parts of the visual language of abstraction. Robert Delaunay described the new space as "endowed with vastness (we see as far as the stars)."

Visually the monitor is a descendent of television which is a product of video In historical order, the antecedents of video are film, photography, and finally painting. In painting the frame is a window through which we see the world The boundaries of a visual work of art are the most basic and most significant of its formal methods.

The relationship of abstraction to the rectangle of the picture is a difficult one. As both abstraction and the monitor descend from three-dimensional illusionism, they inherited the rectangle as window frame. Since abstraction does not utilize single views then the rectangle as a window, through which we look while stationary, contradicts the dynamism of abstract space. These issues have been with abstraction since its beginnings. They are issues that future electronic technology might help us resolve. The development of high-quality LCD panels of large size, for example, might soon become available. I can imagine a kinetic painting on several panels of non rectangular shape

When we look at programming form we find a language that resembles modern life it is electronic and mathematical, making it similar to our culture today which includes all production, cities, distribution, and transportation. The resemblance is not accidental; it lies in what is intrinsic to both. For example, a function is like a factory: raw numbers or raw materials go in, work takes place, products come out. The essence of programming is much like the essence of the modern world which the first abstract artists sought to express

The simplest graphics commands construct images reminiscent of early abstraction. They create a line out of a set of sequenced dots and a shape from sequenced lines. As they are created the very heart of contructivist formal aesthetics is realized. In 1912 David Burliuk wrote, "Painting is colored space. The simplest element of space is the point. Its consequence is line. The consequence of line is surface."

What is important to abstraction is that these images lack perspective and shading and while the program runs they impart an illusion of motion. Abstract motion does not rely on the geometric relationship of the viewing eye directed to a perpendicular picture plane. Optics and the lens in film and video do the work of the viewing eye of perspective. Thus the possibility of animated images, freed from the formal dictates of a lens, is a critical condition for kinetic abstract space. Animated motion through a lens produces a kinetic three-dimensional space. The two are different.

In 1920 Paul Klee wrote "When a dot begins to move and becomes a moving line, this requires time. Likewise, when a moving line produces a plane, and when moving planes produces spaces." Motion itself and not simply the illusion of motion in a static painting, was on the mind of many of the early abstractionists

In the mid 1980s the Amiga was capable of producing sound A combination of electronic sound and picture has the potential to realize new forms. We as painters can now look at the world knowing that later when we paint, we will be searching our intuitions not only for how things looked but how they looked and sounded simultaneously.

Thus the computer, with its flat luminous color and infinite space and its potential for moving abstract shape without the use of perspective and shading and without a lens, is imminently suitable for the development of the futuristic dreams of the earliest abstract painters. Furthermore, the combination of sound commands with visual commands in one program particularly realizes the ambitions of the Futurist painters to represent simultaneously their many impressions of reality.

DEVELOPMENT OF THE NEW FORM

Early abstractionists considered the illusion of three-dimensional space, perfected in the Renaissance, to be inadequate for the new historical task in painting. The two formal pillars of three-dimensional space, shading and perspective, were not able to hold the new subject matter of a world in motion Consequently, abstract painters abandoned them.

Perspective was first replaced by superimposed views of objects. As the artists analyzed the results, they began to see the possibilities of a new space and arrived at a synthesis where objects seen from one stationary point of view disappeared.

When illusions of stationary objects disappeared, most depth clues of a measurable space disappeared. Known objects impart information of their specific size and establish a scale for measuring space. Without them shapes lose their measurability. They relate only to each other and to the background. They become unstable and seem to move back and forth in space – to "push and pull" in relation to the picture plane.

Thus the foreshortening of shapes and diminishing size, the two pillars of perspective, were abandoned. Their departure left the background seeming more like the sky than a wall. The background took on a sense of an infinite depth rather than a hard finite surface. The new space was based on the interaction of shapes on an infinite background as is defined by the Suprematist paintings of Kasemir Malevich. Within this space, line and color and texture also changed their behavior.

In three-dimensional illusionism line is the outline of stationary objects. In abstract painting line is a path of movement, a record of dynamic actions. The pioneers recorded this new use of line. In 1912 the Futurist Larinov wrote, "A ray is depicted provisionally on the surface by a colored line." In 1920 Paul Klee equated walking through an unplowed field with a line traversing a field. Umberto Boccioni called this new use "the dynamic line/force." And Naum Gabo wrote, "We affirm the line only as a direction."

In the early stages of Cubism, color was not important. A type of simplified shading was used to differentiate surfaces. In Synthetic Cubism and later on with the clearer emergence of a truly abstract space, as in the paintings of Kasimir Malievich and Piet Mondrian, color became significant. In relation to color it is important to recognize that if the artists make paintings conceived in motion, then to record one instant of illumination on a colored surface is contradictory. Shading contradicts abstract motion. In abstraction luminosity replaces illumination.

Thus abstractionists reject shading, the venerable chiaroscuro of the Renaissance. It is replaced by flat areas of color which act in relation to each other to create an ambiance of luminosity. In 1912, in a letter to August Mache, Robert Delaunay wrote "Direct observation of the luminous essence of nature is for me indispensable...observation of the movement of color." Larinov wrote that the Neofuturists replaced the static surface of a painting with a light-colored moving one.

The elimination of the object as seen from one point of view meant that the content of painting changed. Literary narrative and metaphor were replaced by the general principles of motion that connect objects. Abstraction cannot paint a portrait of the rich patron but it does describe distribution, rhythm, growth, development, and similar motions. It did provide the formal language which scientists now use for multi-dimensional illustration. Thus a new world of meaning opened to abstract painters who clearly felt the "liberation of the Great Art of Painting from the alien traits of Literature."

THE INTERSECTION OF COMPUTING AND PAINTING

Can the computer, with its potential for motion, self-luminous color, memory, and programming, be used to push twentieth century abstraction into newer formal realms not possible in static painting? Given the formal history of abstraction and the present state of the art of computing, the answer should be yes. They are perfectly suited. Can kinetic abstraction become as useful a way of imaging the world as Renaissance illusion? Yes!

It is at this point in our logic that the heart of the issue lies – at the point where we have done our historical and technological homework and begin our work to expand the visual language. As we learn to program, we need to remember that it is form in painting that we explore. Music, mathematics, geometry, and programming are not painting. While they have their own beauty and their own avant-garde of creative practitioners, the goals of these various abstract processes are different from those of painting. They hold a different kind of content and cannot replace the usefulness of painting.

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Connecting visual material with sound began with musicians whose perspective was that of music. It brings us to the question of whether we are adding visual material to music, sound to pictures, or trying to combine two wholly separate media with millennia of history behind each.

Most explorers hope to discover a principle that when fed into a machine would externalize what they believed was imagery inherent in music. They called their work 'visual music'. Some recent explorers have tried to find a principle that would generate both sound and image and thus guarantee their equality and coherence Some artists come with a background in painting, like myself, and consider that sound is an attribute of shapes as experienced in reality and thus is another of the dimensions of painting

ARTISTS WHO PROGRAM STATIC ABSTRACTION

In the following cursory survey no value judgment about the efforts of my fellow artists is intended nor is the survey complete. I briefly describe their work and make formal distinctions.

Artists who produce static pictures are generally interested in series of images that test controlled variables. The repetition and complexity of nature, with its seemingly infinite variation, is made part of the aesthetics of computed pictures through recursion. Artists working in this way generally use plotters to make black and white line drawings. As algorithmic painters they are more developed than those who do kinetic work.

Two artists who produced a mature body of algorithmic computer drawings were Collete S. Bangert and Charles J. Bangert. Their collaboration began in 1967. The beauty of their work is first artistic, then algorithmic. It invokes the principles behind natural complexity. They are pleased when viewers cannot tell the difference between drawings done by hand and those drawn by plotter. However, it is precisely the visual qualities, brought about by the medium of programming, that is most beautiful in their work.

In 1982 Roman Verostko began to develop a program he calls



Hodos which directs a plotter armed with pens and brushes to paint. The results are wonderful glowing painterly spaces made up of calligraphic strokes He believes that "The computer ... is altering the way we perceive the world." Verostko wrote, "If you are able to describe the artistic procedure, however uniquely individual, it will be possible to write the code." It points to the fact that most of our work is algorithmic by nature If we become conscious of the procedures, then we have gained insight and are ready to advance our work.

Manfred Mohr, who has his beginnings in jazz improvisation, opted for the control computing can give his creativity. An illusion of a cube is used as a basic element, which he then subjects to transformation. Processes such as adding, subtracting, sequencing, combining, restricting, framing, orienting, and more produce black and white paintings and drawings. The entire process from algorithm to hard copy is under intuitive control.

COMPUTED KINETIC ABSTRACTIONS

The first recognized master of kinetic computer imagery with sound was John Whitney. "I asked repeatedly what visual elementals might match the scales of tones of music...free to explore, I soon found that for the first time in history, visual periodicity and harmonics were accessible to dynamic manipulation through the instrument of computer graphics." A visionary, Whitney went directly to the heart of his curiosity and found himself building and inventing electronic machines.

In "Permutations," (1968) and "Arabesque," (1975) he delineates a marvelous and exciting new world. One senses a master choreographer. The movements are reminiscent of ballet. The shapes follow the dictates of formal geometry more than those of abstract painting. Movement is three-dimensional and the ambition for a more polished three-dimensional shaded space is apparent.

In 1968 an important exhibition marked the emergence of electronic as distinct from mechanical kinetic paintings. It was sponsored by Experiments in Art and Technology in collaboration with the Brooklyn Museum and with the Museum of Modern Art. What is pertinent to the subject of this paper are the abstract works which were based on computer programs. At the time these pieces were called "computer-generated films." Aaron Marcus, Duane Palyka, and Stan Vanderbeek in collaboration with Kenneth C. Knowlton, exhibited geometric abstractions. All of them utilized geometry in the way Whitney did. A later film by Vanderbeek called "Euclidean Illusions," (1979) uses geometric form and delineates all movement in a three dimensional space with perspective. However, Vanderbeek later published "Spectrum 6" which was more abstract in its space.

CONTEMPORARY KINETIC ABSTRACTIONISTS

In 1979 Robert R. Snyder began designing and building an image processor connected to an equal-tempered keyboard. He described it as being able to produce five colors in as many areas of the screen. Snyder, a musician, attempted to control a "luminous envelope" structured to coordinate with musical events. His videos are not abstract, although his keyboard image processor is capable of it. His work is significant to the development of kinetic painting performed in real time with musicians.

Bryan Evans is primarily a musician searching for "one principle as the generative device for both music and graphic materials". He describes an algorithmic "black box" which produces output translatable by various artists into their respective media. To integrate sound and picture, he focuses on mathematical and fractal principles. His work then is an attempt at visualizing music. The color of his shapes is variegated and graduated in lighting. Its shifting is beautiful. This graduation gives the illusion of shading that hampers the interaction of shape and color in an abstract space.

Lynn Pocock earned a degree in computer science followed by one in computer graphics. She considers her work to be visual music and her "interest has been to represent the structure and emotional content of music in a visual form." It is balanced between the two. She has used the methods of artificial intelligence to model the work of Wassily Kandinski. Another project uses a stream of musical information which is analyzed and which, through a rule-based system, is made to select from a pool of graphical fragments. As the stream is processed, the graphical events are sequenced. Pocock's work is not all abstract. Her contributions in the use of artificial intelligence to formulate a method whereby sound and picture can be manipulated simultaneously is significant.

Primarily a visual artist, Edward Zajec creates kinetic paintings that take music as a point of departure. His kinetic painting titled "Chroma," 1987, is made up of four sets of static pictures. Each set contains six to twelve pictures. Principles that he calls "thematic dissolves," "dimensional upgrades," and "thematic transformations" are then used to cause forms to interact Zajec is aware of abstract motion and very concerned with the "articulation of color and form in time." He is also conscious that this motion is different from animation created as though seen through a lens He writes that "to animate means to orchestrate the flow of color passages in time," after than to choreograph the motions of objects in space." Of the kinetic painters mentioned, his is the only work which matches the definition of abstract form outlines in this paper.

CONCLUSION

In kinetic abstract painting, computer technology has not been sufficiently explored by painters for sophisticated formal methods to develop. The visual language for such painting is still nascent.

The four formal attributes that are apparent at present are the rhythmic sequencing of noisy shapes and lines in time, the visual manifestation of digital programming form, the influence of memory on sequencing, and kinetic color Kinetic color is when the color of shapes changes in real time. Snyder called it "time-variant color progressions."

The marvelous new technology is here capable of fulfilling the most optimistic dreams of the pioneers of abstraction. Why are there only a few practitioners? Maybe it is because, unlike the pioneers of abstraction, we do not yet have reason to dream with enthusiasm about a future society. We do not yet know a new content that might invigorate abstract kinetic painting.

Pieter Huybers and Gerrit van der Ende (.nl)

Delft University of Technology The Netherlands

THE OUTLINES OF THE POLYHEDRIC WORLD

SUMMARY

Although we do not always realise this, the shape of most of the visible world around us is to a great extent governed by the geometry of polyhedra. A polyhedron is a shape that is covered by many (poly) flat faces (hedra). Even curved surfaces can often be considered as a three-dimensional tiling of infinitesimally small plane faces. If we use in this context the term 'polyhedron' we are generally referring to the so-called Platonic and Archimedean solids, which are convex bodies that are covered by a closed pattern of regular polygons. They have a form that is so perfect, that they exert a great attraction to both artists and technicians. Also in architecture they have been applied in many ways and they form the geometric basis of most buildings and structures. This paper deals specifically with the architectural use of these forms and with their influence on our man-made environment. They can either define the overall shape of the building structure or its internal configuration



Fig. 1. Review of the regular (Platonic) and the semi-regular (Archimedean) polyhedra.

The numbers P with an index, that are given here, will further be used as a reference.

THE PLATONIC AND THE ARCHIMEDEAN SOLIDS

The polyhedra that are considered here, comprise the 5 regular solids that are ascribed to Plato and the 13 semi-regular solids that are said to have been discovered by Archimedes. Two of them have 'enantiomorphic' or left- and right-handed versions: P15 and P18, the snub cube and the snub dodecahedron.



Fig. 2. The 6 different regular polygons that constitute the polyhedra of Fig. 1

These solids all are composed of 1, 2 or 3 kinds of regular polygons. All vertices lie on a circumscribed sphere and all vertex situations are identical, which means that the polygons always meet in these vertices in the same order of sequence. P7 and P12 are also called 'quasi-regular', because of the great regularity in their vertex situations: always 4 polygons in the combinations 3–4–3–4 or 3–5–3–5.

THE SNUB POLYHEDRA, A SPECIAL CASE

The two solids with the left and right variants P15 and P18 are derived by double truncation of the cube or the dodecahedron. They consist of either a square or a pentagon and a number of triangles, which are arranged in the form of caps in numbers corresponding with the vertices of the circumscribed solids. The icosahedron can by analogy be considered as a snub tetrahedron.



Fig. 3. The construction of a snub polyhedron.

THE RECIPROCAL OR DUAL SOLIDS

Each of these solids has its counterpart. It is found by choosing a point above each polygon and connecting it to those of all of its neighbours, so that the connecting lines bisect the polygon edges perpendicularly and that they also are perpendicular to the line from the midpoint of the edge to the centre of the polyhedron. The faces that thus are formed in such a reciprocal solid are flat and identical. This phenomenon is called duality. Two of these are well-known: the rhombic dodecahedron (R7) and the rhombic icosahedron (R12), that are derived from the quasi-regular solids. The reciprocals have the name R with an index number, corresponding to their related polyhedron.



Fig. 4. The principle of duality, demonstrated here for P12



Fig. 5. Review of the reciprocal solids R1 to R18





Fig. 6. Review of the compounds formed by the polyhedra and their reciprocals.

PACKINGS AND SPACE FRAMES

Polyhedra lend themselves to be put together in tight packings. That makes them suitable as the basic configuration for space frames, because of their great uniformity: identical members meeting under specific angles.



Fig. 7. Packing of P11's and another of half-octahedra (P3) and tetrahedra (P1).



Fig. 8. A packing of the quasi-regular P7, suggested for a hangar roof.

THE STELLATED OR KEPLER-POINSOT POLYHEDRA



Fig. 9. The four regular star-polyhedra, indicated here as C1 to C4.

Another group of regular figures that specially must be mentioned is that of the star-shaped polyhedra, in this context indicated as C1 to C4. They have faces that are formed by intersecting pentagonal star-polygons or pentagrams. C1 can also be considered as an intersection of 20 triangles and C2 of 12 pentagons. Hence they are called the great icosahedron and the great dodecahedron. C1 and C2 were discovered by Poinsot and the others by Kepler.



Fig. 10. A sequence of pentagrams, having a relationship of ((1 + (5)/2

PRISMS AND ANTIPRISMS

The regular prismatic and antiprismatic solids have similar characteristics as the uniform polyhedra, but they form in fact endless rows They are defined by two parallel n-gons The prisms have mantles that are formed by a row of squares



Fig. 11. Rows of prisms with polygons or polygrams as the defining factor.



Fig. 12. A few examples of prismatic shapes.

The antiprisms have triangular circumferential faces, and their n-gons are rotated with respect to each other. Both prisms and antiprisms have also star-shaped versions.



Fig. 13. Row of polygonal and star-shaped antiprisms.



Fig. 14. A typical antiprismatic structural form (B is A, in folded flat position).



Fig.15. Exercises with form A as starting the point.



Fig. 16. Same form A as in Fig. 14 with added-on quarter spheres



Fig. 17. Both groups have reciprocal counterparts also.

ADDITIONS TO POLYHEDRA

Upon the regular faces of the polyhedra other figures can be put, as long as they have the same basis. In this way polyhedra can f.i. – so to say – be 'pyramidized'. This means that shallow pyramids are put on top of the polyhedral faces, having their apexes on the circumscribed sphere of the whole figure. This can be considered as the first frequency subdivision of spheres.



Fig. 18. 'Pyramidized" version of P17.

In 1582 S Stevin introduced the notion of 'augmentatation' by adding pyramids, consisting of triangles and having a triangle, a square or a pentagon as its basis, to the 5 regular polyhedra. Recently, in 1990 D.G. Emmerich extended this idea to the semi-regular polyhedra.

He suggested to use also pyramids of 6–, 8– or 10–sided plan and that themselves are composed of regular polygons. There are 7 of such pyramids, that are suitable for this purpose and that in fact are parts of other polyhedra. Emmench found out that they can be combined to form 102 different combinations. He calls these: composite polyhedra.



Fig. 19. 7 regular pyramids, suitable for augmentation



Fig. 20. Stereoscopic pair of augmented P17

GEODESIC DOME SUBDIVISIONS

Any of the polyhedra can be used as the starting point for a more refined subdivision pattern of spherical forms, that are so often used in architecture.



Fig. 21. Example of subdivision pattern on the basis of P7

Subdivision patterns are written on the faces of these figures and the co-ordinates of the intersection points can be converted from cartesian to polar co-ordinates. If all distances are then taken equal to the radius of the circumscribed circle, the – originally polyhedric – form is turned into a sphere.



Fig. 22. Conversion of polyhedron co-ordinates to spherical co-ordinates.



Fig. 23. Sphere subdivision on the basis of the snub dode-cahedron P18



Truncations lead often to curved lower boundaries For building purposes it is necessary to adapt the vertical co-ordinates of the under-most points to those of the cutting plane



Fig. 24. Adaptation of lower boundary of icosahedral cap to horizontal plane



Fig. 25. Any pattern is thus produceable, like this hexagonal tiling on an icosahedron

In this way also the dual or reciprocal figures of the polyhedra and the prisms and antiprisms can be subdivided and converted to spheres.



Fig. 26. Subdivision of 'reduced' dual.

The vertices of this rhombic dodecahedron (R7) are first brought on one circumscribed sphere, before the subdivision and successive conversion take place.



Fig. 27. The hexagonal prism and antiprism, used as the basis for a spherical subdivision.

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Mike King, Reader in Computer Art and Animation (.uk)

CONCERNING THE SPIRITUAL IN CYBERSPACE

Summary

Cyberspace technologies provide new opportunities and questions concerning the spiritual. This paper looks the spiritual in 20th century art and science as the basis for examining the spiritual implications in cyberspace, itself the outgrowth of art and science. This is followed by a discussion of the virtual worlds of William Gibson and Frank Tipler. The emerging discipline of studies in consciousness is introduced as a link between the spiritual and the digital, and the prophetic work of the Jesuit Teilhard de Chardin discussed for his concept of the 'noosphere'. The spiritual implications of a conscious Internet are then examined

Keywords: spiritual, cyberspace, consciousness, Gibson, Tipler, Teilhard de Chardin, artificial life, virtual cosmogenesis

The Spiritual in 20th C Art and Science

In this paper I shall use a simple categorisation of the spiritual. a distinction between the religious, the occult and the transcendent. The 'spiritual' will be a broad term that covers these three distinct areas. The religious is intended to convey traditional and organised religious spirituality such as Christianity, Islam, or Buddhism; the occult an esoteric preoccupation with such matters as the paranormal, reincarnation, clairvoyance and disembodied beings; and finally the transcendent as dealing with a shift in personal identity from the physical and temporal to the infinite and eternal, or with mystical union, or with 'nirvana'. Clearly the boundaries between the religious, the occult, and the transcendent (as used here) are blurred, but can be useful in looking at the spiritual in art and science. The twentieth century has seen the development and promotion of alternative forms of spirituality, some of which have had a significant impact on modern art. The key movements in Europe at the beginning of the century include Theosophy, founded by H.P.Blavatsky and H S.Olcott, Anthroposophy, founded by Rudolf Steiner, and the work of G.I.Gurdjieff and P.D.Ouspensky. All three movements had explicit teachings on the arts, though Steiner and Gurdlieff made the arts more central to the lives of their students than Theosophy, which focused on the preparation for the new World Teacher (a conflation of the second coming of Christ and the Buddha). There is not space here to even introduce the teachings of these three movements, other than to say that all three have an occult leaning (as defined earlier), Gurdjieff and Theosophy share some transcendental elements, and Anthroposophy and Gurdjieff include strong Christian themes

In examining the spiritual in 20th century art we are indebted to art historian Roger Lipsey for ground-breaking work in his book An Art of Our Own — The Spiritual in Twentieth-Century Art One of the premises of his work is that the arrival of the abstract in modern art allowed a new exploration of the spiritual, he is also clear that Theosophy was amongst the important spiritual influences of the time. However the tension between the spiritual and artistic is immediately present in his choice of title, for it comes from a quote from Brancusi In the art of other times there is a joy, but with it the nightmare that the religions drag with them. There is joy in Negro sculpture, among the nearly archaic Greeks, in some things of the Chinese and the Gothic ... oh, we find it everywhere. But even so, not so well as it might be with us in the future, if only we were to free ourselves of all this ... It is time we had an art of our own.

The 'all this' we need to free ourselves from, and which 20th century Western artists and writers have done so thoroughly is the religious baggage of previous centuries. In Modernism and later art movements the 20th century does have an art of its own, but Lipsev is interested in where the spiritual lies within it. If the modern artist rejects traditional religion, what is the source of the spiritual? In the first decades of the century the answer, using the terminology of this paper, is in the occult, though 20th century innovation in art also maintained its ancient function: to act as a religious vehicle. This function of art will always remain while mainstream religions are part of mainstream culture, and innovators like Antonio Gaudi simply prove that religious art will always be fertile. However we are interested in new art and spiritualities that arise in conjunction with new thinking in the 20th century (particularly science) and how these meet in cyberspace. Returning to Gaudi: mainstream religion has lost ground to the two other types of spirituality categorised here, the occult and the transcendent. If the occult was the cultural preoccupation in the early part of the 20th century, there can be no doubt that in the latter part it has been the transcendent. We see this markedly with the American Abstract Expressionists after WW2, and I would argue that the transcendent is again the preoccupation with the artists of cyberspace.

The transcendent can show itself as a transcendence of the biological organism; many indeed speak of a post-biological world, or of 'obsolescence of the body'. This is the theme of the work of performance artist Stelarc. His visually stunning performances raise all kinds of questions regarding transcendence of the body, surrender of personal will, and the acceptance of pain, all of which are traditionally spiritual questions. In interview however he is rather wary of the direct spiritual implica tions of his work; even though he practised yoga for twenty years he does not want direct parallels to be drawn. Fakir Musafar is another performance artist, though working without electronics, but is less reticent than Stelarc about the spiritual --- indeed he criticises Stelarc for his silence on this area. Musafar's work turns us back to the occult (as defined here): it has its roots in out-of-body experiences, shamanism, and fetishism. An overwhelming spiritual experience at the age of seventeen (after fasting and a form of self-immolation) led to a conviction that he had lived before in a completely different culture and time, and that the erotic and bodily were deeply linked to the spiritual. He comments:

> That beautiful experience colored my whole existence. From that day on I wanted everyone to have that kind of liberation. I felt free to express life through my body. It was now my media, my own personal "living canvas," "living clay." It belonged to me to use. And that is just what I have done for the past thirty years. I learned to use the body. It is mine, and yours, to play with! I wrote a poem after the experience. It said:

> > Poke your finger into Red, Feel the feeling through. And when the feeling is no more, Feel no-feeling too!

Musafar is significant as an artist who occupies the spiritual territory of the fakir (usefully defined for us in the work of G.I.Gurdjieff), that is one who's path is through the body rather than through mind or heart. The transcendent implications in his poem, and the occult nature of his out-of-body experiences reminds one again that we cannot apply these categories too strictly however.

An important contemporary piece that has implications for the spiritual in cyberspace is Char Davies' Osmose, an "immersive virtual space" inspired partly by a mind-altering experience as a deep-sea diver. The work has transcendent overtones, rather than religious or occult, and operates via interaction with the user's breathing. Meditation on the breath is one of the fastest routes to transcendence in Buddhism, and in many languages the word for breath has the same root as the word for soul. Davies emphasises both breath (with its transcendent dimension) and balance (with its integrating dimension) in her VR piece, giving osmosis as the metaphor driving its conception: "transcendence of difference through mutual absorption, dissolution of boundaries between inner and outer, intermingling of self and world, longing for the Other." While transcendence is a theme here, so is integration, particularly of mind and body: "Our culture's privileging of the mind over matter has contributed to devaluation of the body, as well as women and various 'others.' " Her comment points up one of the paradoxes of the spiritual: transcendence in religious and mystical thinking is as often about integrating mind and body (Yoga, Walt Whitman) as about transcending it (Buddhism, Plato). This paradox is at the heart of spiritual issues in cyberspace; the recent "Religion Issue" of Mediamatic (for example) shows this in a number of essays. This paradox may not go away, but recent developments in science have made great contributions to understanding the issues involved. Books (mainly by physicists) have appeared in the last four vears with titles such as The Mind of God, or The God Particle, or with subtitles such as Science, Religion and the Search for God, or Modern Cosmology, God, and the Resurrection of the Dead. Many more are also in print that relate science, usually the 'New Physics' that arises from quantum mechanics, to spirituality. It is a reasonable assertion today to say that the subjective entered science with quantum mechanics (this is enshrined in a minimal kind of way in what is known as the Copenhagen Interpretation). Whether the spiritual does or does not is a question that is highly debatable; the erudite New Age guru and writer Ken Wilber denies it , while a more cautious approach may be to suggest that it gave the scientists the first real excuse to talk about the spiritual In addition to the approaches based purely on quantum mechanics there is another approach, called the anthropic principle, which finds wider evidence for the central role of human existence or consciousness in the structure of the universe. An example is the ratio of fundamental constants to each other, such as that of the mass to the charge on the electron: the tiniest change in this ratio would mean that the universe as we know it would be impossible. This theme is developed fully in Tippler and Barrow's The Anthropic Cosmological Principle .

Though many scientists, through the confrontation with quantum theory and other developments in the 'new' physics, were having to re-evaluate science itself, and in many cases found parallels in religion or mysticism, it was the physicist Fritjof Capra who first brought the parallels to popular attention in 1975 with his book The Tao of Physics. Gary Zukav, trained in the liberal arts rather than physics, followed with The Dancing Wu Li Masters in 1979. If we relate the works of Capra and Zukav to our simple taxonomy of the spiritual, then the parallels they draw are mainly to the transcendent, with references here and there to the occult.

Roger Lipsey's thesis in his An Art of Our Own is that the

transforming event for the spiritual in 20th century art was the development of abstract art. The transforming event for spirituality in 20th century physics is clearly quantum theory. What then can we say about the spirituality of the late 20th / early 21st century cyber artist, who effortlessly integrates the artistic and scientific progress of the 20th century? Do we agree with Roy Ascott that all art up to and including Modernism and Postmodernism is largely a failure and is both to be swept aside and consummated in cyberspace? These are difficult questions and rely as much on an understanding of science as they do of culture.

Gibson and Tipler: Jack In / Download

We cannot investigate the spiritual in cyberspace without reference to the man who coined the term: William Gibson. His seminal science fiction novel Neuromancer in fact raises many of the fundamental questions about cyberspace, though they are not in the first instance spiritual questions. One scene that poses the most difficult technical question is on the virtual beach towards the end of the story. If we really wanted to build a virtual reality that imitated beyond any doubt the real world (or a real beach) then we need to use physics - right down to the molecular level. The appearance and behaviour of objects depends on this: the exact distribution of momenta and articulations in the suspension of a car determines the way it corners for example; the exact distribution of pigments and carriers in the car's paintwork determines its finish (and whether the car looks new and expensive or old and cheap). A convincing reality requires modelling at the molecular (or even atomic) level, and for this you would need a processor for every molecule or atom. 'Molecular computing' as it is called does look in fact like a possibility, but even if we could build an information processor at the molecular size, we would land up needing one per molecule in our model: in other words you would need a whole universe to model a universe! Think back to Gibson's beach as Case and Molly survive on washed-up ration tins --- she comments that it (reality) is 'seamless' Would you need a computer the size of the beach (and the sea and the sky) to simulate it? The grains of sand fall off her ankle, it smells of brine, the teeth on his French nylon zipper are clogged with salt.

There is one escape from this restriction: procedural modelling. This is a technique whereby, for example, cities can be constructed using a rule-based system: by abstracting out the main principles whereby cities grow and their elements are constructed and appear to us, we can generate cities (or beaches) 'on the fly'. In addition we need (in visual terms) to be able to render any view of these constructed environments on the fly, but this is a separate problem requiring only that there is adequate processing power. An inadequate processing system might result in 'picture loss' if turning one's virtual head rapidly, or when directing one's gaze beyond the boundaries of the virtual world (what has Wintermute constructed for Case and Molly beyond the bluff at the end of their beach?) There is, sadly, an objection to the procedural modelling let-out: yes, it would require a computer some orders of magnitude smaller than the universe, but it would need to be orders of magnitude faster; and we know that the speed of all interactions are limited by the speed of light.

This objection to Gibson's vision of cyberspace is only a technical one however. Behind it there is a more fundamental one of cosmogenesis, which is a spiritual one: who or what has put the virtual show together. Before tackling this question, let us look at an even more radical version of cyberspace: that of Frank Tipler.

Frank Tipler is a physicist and author of The Physics of

Immortality. Tipler's ideas can be summarised as follows: modern cosmology predicts the elimination of biological life as we know it, either through the 'heat death' (lack of energy in fact) in an ever-expanding universe, or its consumption in the inferno of the 'big crunch' (the final singularity of the universe as it contracts again). In any case organic life on Earth has only some billions of years to go before the Sun wipes it out. However, the anthropic principle requires that life (consciousness) is central to the cosmos, and therefore the future evolution of it must be such as to ensure its existence (in some form or other) for eternity. From this premise Tipler deduces that we shall all be resurrected by God to live for ever in the far future: what's more he claims to have the scientific 'proof' for the existence of God and our immortality. Here is the conclusion to his book:

> The Omega Point Theory [the name is taken from Teilhard de Chardin's writings] allows the key concepts of the Judeo-Christian-Islamic tradition now to be modern physics concepts: theology is nothing but physical cosmology based on the assumption that life as a whole is immortal A consequence of this assumption is the resurrection of everyone who ever lived to eternal life. Physics has now absorbed theology, the divorce between science and religion, between reason and emotion, is over.

> I began this book with an assertion on the pointlessness of the universe by Steven Weinberg. He repeats this in his latest book, Dreams of a Final Theory, and goes on to say "... I do not for a minute think that science will ever provide the consolations that have been offered by religion in facing death."

> I disagree. Science can now offer precisely the consolations in facing death that religion once offered. Religion is now part of science.

To show that his premises lead to his (startling) conclusions, Tipler has to make a number of radical assumptions along the way. Firstly, life, including the personality of every person that ever existed, can exist as a digital simulation; secondly that robot 'probes' can colonise the universe (thus disseminating digitally encoded life) and engulf the universe with intelligence before its collapse has gone too far; third that this intelligent life can engineer the final collapse in an asymmetrical way (harnessing the features of chaos theory) in order to provide huge amounts of usable energy, fourthly that this collective intelligence (called the Omega Point) will be benign enough to collect all possible data regarding each one of us and initiate our eternal simulation on vast computers; and finally that the last infinitesimally small period of time before the final singularity will feel 'subjectively' to us like an eternity.

Each of these major assumptions then requires another group of assumptions to make them work: for example that colonisation of the universe will be achievable through matter /anti-matter engines (no-one knows at this point how to build one), and that mind is computable so that we can be 'uploaded' into computers (Roger Penrose, for one, disagrees with this). Our resurrection then depends on the fact that living persons now (and in the past) can be photographed billions of years in the future from the light-rays bouncing off the edge of the universe, and that will give the Omega Point sufficient information to run an exact simulation of us, preferably choosing us in our prime.

But what if it would it take a universe to model a universe, as I

suggest? Gibson as a fantasy writer does not need to worry about this, and Tipler clearly has not contemplated this possibility, merely extrapolating from the present progress in computer power to the assumption that an infinite computing power will be available in the far future. If my objection is right though, we can only create a virtual universe that is a low-resolution universe: we can only to model the salient features and leave out or fake the rest. (For a further discussion of faking it see my paper on virtual reality Virtual Reality: Give Us a Visual Clue.) This would mean restricting the possibilities for the virtual inhabitants, not expanding them as Tipler suggests.

While I believe that the anthropic principle deserves a place in modern thought, it is undermined in this work by Tipler's obviously emotional attempt to avoid his own, and others', mortality. The really interesting part of his work, and of a growing number of other scientists', is their willingness to use (some would say hijack) the language of religion. In terms of the categories of spirituality developed above, Tipler's work is clearly religious (or theological) rather than occult or transcendent.

One of the interesting spiritual implications of Gibson's or Tipler's virtual universes lies in their origins. The cosmogonies that we are familiar with from Genesis or Plato's Timaeus have competed with modern theories of evolution, and we have the same problem in virtual cosmogony. Is our virtual world designed by a person playing as God, is it designed by committee, or does it evolve from an initial set of conditions (a virtual Big Bang)? In religious terms we are confronted with the equivalents of monotheism, polytheism, and Deism Deism is the late Enlightenment / early Darwinist belief that God created only the starting conditions and then stood back and watched the universe unfold (though according to some he lost interest and got involved in more promising projects) One way of tackling the cosmogenesis problem is to ask the question of how consciousness enters the virtual universe. For Gibson it is easy: we use the traditional carrier of human consciousness, the human body/brain, and merely connect it electrically with the simulation: we jack-in to the virtual universe Stelarc and Char Davies show us this technology in its early stage. Tipler poses a much more difficult scenario however, as the body is discarded and consciousness itself is downloaded. To consider this problem we need to take a brief look at our current thinking on consciousness.

Consciousness

It is only possible to give here a brief summary of the positions of the key players and the key debates on consciousness, but the main positions can be usefully categorised as materialist and dualist. Francis Crick, famous for his part in the discovery of DNA, probably best represents the materialist or reductionist view of consciousness, summed up in his "astonishing hypothesis " that we are nothing more than a pack of neurons, and that all consciousness is merely neuronal activity. He seeks to find the neural correlates of perceptions (he works mainly with the sense of sight), thus tackling the qualia problem (i.e. explaining the 'redness' of red), and eventually to find the neural correlate of consciousness. Daniel Dennett, a philosopher, is a more moderate materialist who rejects the Cartesian duality of mind and brain, and wishes to replace the concept of a Cartesian theatre (where all sensory input are ultimately unified into a holistic perception) with the Multiple Drafts Model . This only accepts that perceptions are conscious when 'noted down' in memory, and proposes a continual editorial process as a model for consciousness (the "word-processing" model?).

The dualists in some way or other are forced to accept Descartes view of a "ghost in a machine", or some kind of distinction between brain and mind. Roger Penrose, is not happy with the term dualist, arguing that scientific advances since Descartes, particularly quantum theory, make the term less useful than in an era of Newtonian mechanics. Penrose believes that quantum-mechanical effects in the brain allow for the entry of important aspects of consciousness that cannot be explained by the 'classical' science of Crick and Dennett, these being indeterminacy (allowing for free will) and coherence (allowing for the holistic nature of consciousness). Penrose suggests that the transfer of quantum mechanical phenomena into the classical region of the brain is a result of physics that we do not yet understand, and proposes that structures called microtubules are the location for these effects. The basic problem that dualists face is this, how to explain that a non-material entity such as mind can influence the brain as matter (downward causation) and how matter can impinge on mind (upward causation) Downward causation is only a real problem if one privileges free will (most scientists consider this to be something of an illusion) while the problem of upward causation is simply a recasting of the basic problem of consciousness. Another way of putting the classical dualist position is that consciousness 'accrues' to organisms under the right conditions, this doesn't however provide an explanation. The more engineering-minded of consciousness scientists duck the philosophical issues for the time being and construct machines which could eventually be conscious, then, they say, we'll cut them up and see what makes consciousness tick. Dennett is pursuing a mild form of this, focusing on cognitive robots that specialise in vision, but the computer scientist lgor Aleksander for example has gone further in deliberately constructing a machine to be artificially conscious. It is called Magnus; it consists of an artificial neural net (ANN) of some 16,000 neuron equivalents, and is designed to tell us what it is like to be Magnus

Where both materialists and dualists probably agree is that the complexity of an organism, whether biological or technological, has a bearing on the potential for consciousness. Materialists can approach this position via chaos theory, and posit that consciousness is an emergent phenomenon requiring a certain level of complexity within the organism Dualists also agree that consciousness accrues to organisms depending on their complexity. Let us look at an influential writer on spirituality whose work supports this view. Tielhard de Chardin.

de Chardin and the Noosphere

Teilhard de Chardin (1881 - 1955) was a Jesuit priest and a palaeontologist with a special interest in evolution. His conviction that evolutionary theory was correct and applied to man (at least as far as he was an organism) ran, of course, headlong into his Church training, and hence he struggled with it in a way that a lay scientist would not have had to. The Church prohibited him from publishing his honest and unique attempt to reconcile his science and religion, with the result that his major works were published only after his death. In The Phenomenon of Man he shows how man was not merely the arrival of a new species, but an event for the whole planet: the creation of a new 'layer.' The first layer (itself composed of substrata) is the geosphere, the second the biosphere, and with man came the noosphere. Biogenesis gave rise to living organisms, psychogenesis gave rise to an animal with a mind, and noogenesis gives rise to a planetary mind or consciousness. The noosphere arises from us communicating with each other, and as this communication reaches speed and critical mass the noosphere is created Through this idea de Chardin accommodates both the biologists' discoveries and the Church teaching of the elevated position of man:

With that it bursts upon us how utterly warped is every classi-



fication of the living world in which man only figures logically as a genus or new family. This is an error of perspective which deforms and uncrowns the whole phenomenon of the universe. To give man his true place in nature it is not enough to find one more pigeon-hole in the edifice of systematisation or even an additional order or branch. With hominisation, in spite of the insignificance of the anatomical leap, we have the beginning of a new age. The earth 'gets a new skin'. Better still, it finds its soul.

De Chardin could not anticipate the exact nature of future communications systems, but many commentators now think that the Internet is the key structure that allows for the formation of the noosphere. Jennifer Cobb Kreisberg has introduced de Chardin to the Wired readership ; Paul Groot has introduced him to the Mediamatic readership ; both in connection with the Net. So can we conclude, like Kreisberg and Groot, that de Chardin predicted that the planet would 'finds its soul' through the Internet? And what could this mean? Let us explore this question through from the perspective of consciousness.

The Conscious Net?

The brain has of the order of 10 billion neurons giving a storage capacity of 10 to the 15 bits of information. The complexity of the brain may in fact be much higher than this if the work of Hammerof is proven correct: he proposes that the microtubules in each neuron interact with those in other neurons throughout the brain, giving a massively higher connectivity. (We may remember that Aleksander's Magnus has only 16,000 artificial neurons in comparison.) The Internet may have the potential to reach such connectivity, so why should it not eventually become conscious, fulfilling de Chardin's prophecy of the planetary soul? From both the materialist and dualist understanding of consciousness there are no immediate reasons why not, but I have reservations. Let us look at look at the relationship between consciousness and complexity in terms of what the Artificial Life people call the four F's: feeding, fighting, fleeing, and reproduction.

In a world of finite resources complexity grows as a survival strategy (according to Darwinian thinking). If you wished to evolve complex life, then a very simple strategy is to make its prime requirement, energy, scarce. The hunt for energy (food) then requires the evolution of complex sensory apparatus, and the ability to model the natural environment in order to anticipate the changing patterns of availability, favouring the development of mind and intelligence. This satisfies chaos theory, but what about dualism? Simply this: it is interesting to have to search or hunt for food. A fine balance then evolves between the anxiety that grows when insufficient food is found to maintain the integrity of the organism, and the delight in its procurement and consumption (energy is delight, said Blake)

As populations increase, and different species evolve different strategies for energy gathering, fighting for food becomes inevitable, but provides another major stimulus for the growth of complexity. Fighting may not always provide 'delight', but it always provides drama. A pacifist may find this a hard proposition, but without the possibility for conflict I believe that consciousness would fade and die. Fleeing is a natural counterpart to fighting: if the odds are hopeless then the intelligent thing to do is flee, and in complexity terms this provides stimulus for well-developed motor systems. In terms of dualism we have the introduction of a psychological element that is essential to the drama of life: fear I believe that fear is another essential component of consciousness

As organisms of any kind, however good their self-repairing systems are, must die (Plato points this out when he calls the body a "composite thing"), offspring are essential. For all the higher life-forms on this planet sexual reproduction seems to be the norm, despite the biologists' inability to find a good reason for it. For humans this introduces one of the major complexifying factors in behaviour: love

From chaos theory we learn that it is not enough that an organism is complex in terms of quantity (in this context the mere number of neurons or interacting elements), but it has to be in structure. Our four F's show how complex structures arise in life through the pressures on individuals, and the tensions between competition and cooperation in all four aspects. From this perspective we arrive at the first of several arguments against the conscious Net: there is only one Net. With no one to play with, or to fight with, or to mate with how would interest, aggression, fear, or love arise? And how would the necessary complexity for consciousness arise? Remember that quantity is not enough; structure is needed

A second objection arises from research into synthetic actors by the Thalmann team in Geneval They encode a virtual universe of sets and actors, and attempt to give the actors personalities through limited autonomy and personal goals. All this information is present within a single computer system, and has to be available to different subsystems at different times, in this respect no different to the Internet. It became a problem to keep the actors 'interesting' if they had complete access to the database. How can you make a detective movie with synthetic actors if they know the murderer from the start? How can there be any dramatic tension if a synthetic actor can 'see' through a wall to the vicious killer or terrified blonde on the other side? It turned out that the only solution to maintaining any kind of drama in the virtual universe is to keep its actors ignorant to some degree; they do this by endowing them with an artificial vision as an analogue to our own.20 For the Net to engage in any of the life-dramas necessary for complexity/consciousness it would have to 'partition' itself in a similar way and set parts of itself in competition with other parts quite at odds with the whole origin and ethos of the Net

The third objection to a conscious Net is the lack of a body, or at least an interesting one: what can you do if your physical manifestation is a sphere? There are no articulations and nowhere to go (except round and round in circles). It would have to find energy of course, but would its search be interesting? Would it have the fun of waiting behind a rock to pounce on a rabbit? Or of wandering like a cow through fields of sweetsmelling juicy grass? Or browsing through the delicatessen counter at the supermarket? None of these I suggest. For these reasons, I am not sure that the Net, or some equivalent noosphere has the right conditions for consciousness as we know it. However, the inexorable progress towards intelligent robots does satisfy all the conditions for artificial life, and we can empathise with the kind of consciousness they may potentially possess. But the Internet, or any similar monolithic neuronal structure with no body (worth speaking of), or similar companions to interact with, could not have consciousness as we know it. De Chardin was not suggesting this of course. his "confluence of thought" would surely create a unique consciousness; Tipler is moving in the same direction with his "Omega Point". I think that we are left with two possibilities: firstly that the Net as conscious being would 'partition' itself into multiple personalities and act out dramas in a virtual world similar to Gibson's, but if any of us tried this wouldn't it be treated as a sign of insanity? The second is that the Net would become God. Though I don't propose to debate this further, isn't it perhaps what de Chardin, and countless others perhaps, are looking for? Isn't it perhaps the driving obsession behind the technology?

The Spiritual in Cyberspace

To sum up: the cyberspace technologies of the Internet and immersive Virtual Realities present us with spiritual possibilities and questions that are not all new, but are sharply accentuated. However the highly speculative work of Gibson, Tipler and Teilhard de Chardin are all amenable to a criticism based in actual research programmes, whether in consciousness, VR, or synthetic cinema; likewise a broad base of spiritual tradition is needed. On a practical note, Web sites like SpiritNet provide a forum for debate and dissemination concerning the spiritual on the Internet, while immersive realities like Char Davies' Osmose challenge the assumption that mind should be privileged over body. The transcendence of the body is probably the key spiritual question in cyberspace; the question whether God will emerge from a glorified telephone system is attractive, but probably less amenable to proper debate. As electronic artists the immortality of our artefacts may be assured, but isn't the prospect of our own digital immortality terrifying?

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Ryszard W. Kluszczynski, PhD (.pl

professor at Film and Media Department, University of Lodz, Poland Media Art Curator, Centre for Contemporary Art - Ujazdowski Castle, Warsaw

THE CONTEXT IS THE MESSAGE. INTERACTIVE ART AS A MEDIUM OF COMMUNICATION

Summary

A distinction between two kinds of communication: transmission and interaction, based on the concept of shared space (physical or virtual), leads to another distinction: face-to-face communication and mediated one. The latter can assume one of three possible variants: mediated transmission, guasi-direct mediated communication, or indirect mediated communication. The most of types of the interactive art are related to the last of those three models. The context of interaction - the product of the artist, which plays in the same time the role of partner of recipient's interaction - is the only message in the mediated indirect communication The interaction creates an artwork - a result of creative behaviour of the recipient. A contact and the interaction have been separated. Between the recipient and the artefact/context occurs the intrapersonal communication. It can also appear in the space between the artist/sender and his/her product - artefact.

Key words: communication (direct, mediated, indirect, quasi-direct), connection, interaction, interactive art, mediation, transmission.

Interactive art - in general or at least its the most characteristic phenomena - can be recognised, in the framework of classic theories of communication with their three unit model (sender - message - receiver), as a medium which is unable to communicate. The more active an addressee becomes, the less possibility for communication an artist/sender can keep for himself/herself. On the other hand, however, numerous interactive works seem to be able to communicate. Many artists, critics and researchers consider the interactive art to be a medium providing a possibility of self-expression; works made by such artists become specific vehicles for messages. We have then to find out whether it can happen in spite of (or in opposition to) the medium's interactivity, or whether the interactivity creates a new way (and a new model) of communication. That means we will have to examine the phenomenon of interactivity, and interactive art. We would have to consider once more what are the functions of all elements involved in the process of an artistic (and non-artistic) interactive communication. We should also examine classic theories of communication to make sure whether any of them can be used to describe the model of interactive art communication.

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Interactivity, which in video appeared in a "rudimentary" form (or just as the announcement of the coming of actual interactivity) – only as a possibility of receptive behaviour motivated not by the structure of the work but by the needs of the viewer, could assume a fully-fledged form in computer art. In this case that means that interactivity has become the internal principle of the artistic communication, and the viewer – if s/he wants to bring the artwork into being – has to start a game/communication strategy which will result in the shaping of the object of his/her perception.

In reflection on cyberculture and various phenomena which constitute it, such as first of all interactivity per se and the art of interactive media, one can notice the existence of two separate trends.

The first one tends to consider interactive art in reference to the basic categories building the modernistic aesthetic paradigm. The most important dogmas of this system include representation, self-expression, and the conviction about the supremacy of the artist/author's position in the process of artistic communication. S/he dominates both over the very artwork (art as anything presented as such by an artist) as well as over its meaning (content), which consequently also means his/her domination over the receiver and the perceptive-interpretative process. This view of interactive art says that interaction we embark on is not an interaction with any artificial creature or artificial intelligent system, but a mediated interpersonal interaction with the author of the artwork (or of the software).

The other trend presents interactive communication as free from the traditionally defined concepts of representation and expression, from the concept of meaning prior to communication, and the modernistically interpreted concepts of the author/sender and recipient. The structure of the artwork (result of a viewer's creative interaction with the artist's product, which I call here the artefact in oposition to the artwork) and the process of its emerging from hypertextual structure of the artefact become the subject of attention. The artist/author ceases to be the creator of the seance of the artwork, which is created by the recipient in the process of interaction. The artist's task consists in the construction of the artefect - a context in which the recipient constructs the subject matter of his/her experience and its meaning. The recipient is thus no longer a mere interpreter of a ready-made sense waiting to be understood, or an agent perceiving a finite work. It is on the recipient's activity that the structure of his/her (aesthetic) experience depends. The process of communication in the interactive art assume often a character of a game (although the rules and roles of the game do not have to be ultimately and explicitly defined). The cognitive function is supplemented by the autocognitive one, and agreement assumes the form of joint participation. Communication therefore becomes in a sense a process of creating meaning, which is essentially a creative activity.

It is a structure of hypertext, along with the material that fills it in: images, texts, sounds, that is a the object of the artist's creative work. However, hypertext is not the object of the reciver's perception or his/her experience, but as I have said above, it is the context for that experience. The user of hypertext, faced with successive necessities for maiking choices and updating the elements thus selected, make use of only a small fraction of potential opportunities. The sum of all choices determines the work of art, the joint creation of the artist (who provides the material and the constructive rules – artefact) and the recipient (who chooses/select material and creates the structute of artwork).

One might be tempted to say that interaction with hypertext converts it into text. The final result of interaction is in all cases a closed finite structure – the result of choices that have been made. But such a statment would be erroneous. The recipient/hypertext user, who perceives the product of his/her interaction – the artwork, experiences both his/her own choices and their frameworks (software, hardware, spatial arrangement, etc.). When, at a certain moment, s/he concludes that his/her navigation is over and its result is the final work, s/he also experiences (and may realize that) the incompletes and indefiniteness which is inherent to interactive art. The two ways of understanding interactive media which I have presented above should be taken only as theoretical models. In the space delimited by those two poles, one can find a great variety of concepts, theories, activities and works. We can encounter artists working in the domain of interactive arts and believing that it is their duty to express their own opinions and shape human minds. We can also come across critics and researchers who, in an analogous way, think that each artwork, including interactive ones, is purely (or primarily) an extension of the imagination, sensitivity, knowledge and desires of the artist. But there are also artists and theoreticians whi think that interactivity means sharing responsibility with the reciver. And only their project seems to respect the internal logic of interactivity.

2

Generally speaking there are two models of communication. The first one we should actually name: transmission, or influential transmission, since this model sees communication as a one way transmission, as a process in which the sender has an impact on the receiver. This concept and its theoretical foundations were created by Shannon and Wearer (1949) Since then it has been developed by many other researchers, like for example Miller (1951), Schramm (1954), Gerbner (1956), Berlo (1960), Smith, Bealer & Sim (1962), Cushman & Whiting (1972), but its basic characteristics stayed the same. According to Lasswell (1948), we can summarise this kind of communication in the series of questions: who says? - what? - in which channel? - to whom? - with what effect? Communication understood as transmission has basically a monologue-like character. Nowadays, this kind of communication is perceived as typical for mass media. television, radio, cinema, as well as characteristic for the artistic application of those media, that means art cinema, video art. Different approaches to mass media tending towards involving viewers or listeners into a reciprocal interaction with a moderator of a program (so called broadcast teleparticipatory media) are considered to be quasi-interactive (Cathart and Gumpert, 1986a), or a special, non-typical form of mass media communication (Avery and McCain).

The second model assumes that communication is an interaction. In this perspective communication is seen as a negotiation and an exchange of views and ideas, that leads to enable meaning to be produced or understanding to occur (see for example O'Sullivan et al., 1995). Communication understood as interaction has a dialogue-like structure and creates interconnections between individuals involved in it. This approach to the theory of communication has been developed by such writers, like Reiley & White Reiley (1965), Reimann (1968), Klaus (1969), Sereno & Mortensen (1970), Stemmle (1971). And if the first model - transmission - was dominant in the first decades of development of the communication theory, the latter one is typical for the present opinions. For contemporary researchers communication simply means social, interpersonal interaction (see for example Thompson, 1995). There are a lot of differences between those two ways of understanding communication, between transmission and interaction. There are however some characteristics which they both have in common. Among them the most important one is that of interpersonal character of each communication According to such a concept, this is an interrelation connecting two poles of the process - the sender and the addressee - to create the process of communication. The majority of researchers just assume that there is no communication when there is no real connection between participants involved. This attitude influences both, the old theory of transmission, and the modern understanding of communication as interaction. An extreme stand concerning interactive communication expresses an opinion that the lack of real connection between individuals, in a real or virtual space, has its consequence in the

impossibility of interaction A very typical for this attitude opinion says that "interactivity means one individual talking to another () So called interactive television, CD–ROM's, video games, only allow interactivity with some pre-designed process, a series of predetermined givens and not with a real human being on the other end. This is a false interactivity and will only add to the frustration of a public looking for real exchange" (Foresta et al., 1995: 13). For the reasons I will be developing in the following part of this paper, I must disagree with such an opinion.

In view of the most of modern theories of communication, all kinds of communication are based on the concept of shared space (see for example Foresta et al., 1995; Johnson, 1995). This space can be physical - in this case we are involved in a direct, what means, face--to--face interpersonal communication - or can be virtual - thus communication becomes mediated. This differentiation, however, is not precise enough to distinguish between all sorts of non-direct communication. There is a great difference between a telephone-mediated communication and CD-ROM-mediated one. If we do not want to exclude CD-BOM and similar forms of mediation from the field of communication, we must find the proper place for them in the ensemble of communication strategies. Underdevelopment of the mediated communication theory is probably caused by the fact that almost until now media have played a very small role in theoretical discourses on communication. Cathart and Gumpert (1986) wrote, for example, that in the end of the seventies they could not find any one theory, in which media would be considered to be an important factor of the interpersonal communication process. Only just in the nineties we face a significant development in this field of research

To deal with this problem I propose to distinguish between a quasi-direct and an indirect communication as two forms of mediated communication. The first one is any kind of mediated communication in which we have to do with a real interaction between involved individuals. In a quasi-direct mediated communication the shared space has been expanded into dimensions which disable a direct, face-to-face contact, but still enable a real dialogue. As examples can stand letter writing, telephone conversation and so on. The latter one is a form of mediated communication where there is not either any direct contact, or an interpersonal interaction. A CD-ROM, an interactive installation, or a robot are examples of an indirect mediated communication

One might ask how can we still talk about communication in reference to the situation where there is no real interpersonal contact between the sender and the addressee. The reason is however quite simple: I do not assume that each interactive communication must be based on a real interpersonal connection.

Even in traditional, classic theories of communication we can find such definitions or qualifications attributed to communication, which allow us to accept the idea of communication deprived of real contact. For example, Fearing (1956) describes situation which can be identified as interpersonal communication through reference to four characteristics:

• In such a situation people enter into strategic relationship with each other, or with their surroundings;

•creating and using of signs and symbols is the fundamental attribute of such a situation;

 signs and symbols enable an exchange of knowledge, realising aims, and recognition of reality;

 signs and symbols are recognised as such by participants of communication.

Even in spite of the lack of any references to media in the Fearing's definition, we can easily demonstrate that in the fra-

mework of this theory interpersonal communication does not necessary involve interpersonal connections. We must only assume that each product belongs to the surroundings of its producer. This means that a CD–ROM, an interactive installation, a robot, or simply any artistic artificial creature can belong to the artist's personal environment. Since each artwork originates a symbolic discourse, we must agree that all conditions proposed by Fearing have been fulfilled, and we face the real communication process.

3

To realise what kind of functions are involved in the process of mediated communication we can take into consideration another classic theory, this time that formulated by Jacobson. His concept concerns artistic communication and deals with the work of literature. Literature we must locate, however, in a different type of communication than those discussed above; it is an example of communication understood as mediated transmission. We can study this case to better understand differences between this type of communication and both, quasi-direct and indirect mediated communication.

Jakobson distinguished between six elements of a communication process: the sender, the addressee, the message/text, the code, the contact and the context. Each element plays its own function in a whole process. The structure and hierarchy of all of them forms different types of communication. There is no need to analyse meticulously this theory. It is however worthy noticing that the contact function can be realised, according to Jakobson, even in literature: medium completely depriving a reader from a real connection with a writer Jakobson's approach was functional-structural; he fixed his interests on the artwork itself trying to find and analyse all elements and factors of communication as concentrated and objectified in poem or novel. This kind of approach is however inappropriate in the case of interactive art work, which should be rather considered to be a multi-layer, dynamic, processual and indefinite result of interaction. Also the notion of context, understood in Jakobson's theory as all sort of reference world, although inspiring, must be narrowed to become useful for an analyse of interactive art.

In the framework of the interactive art = the indirect mediated communication, I would like to propose to identify the context with the hypertextual structure being a base and a background for each individual experience of the work. In the first part of this study I have called it artefact, in opposition to artwork. The context is a product of the artist, who instead of providing with any traditional artwork - meaningful subject of hermeneutic interpretation and aesthetic experience, creates space for interaction. As I have written this is the interaction to bring into being a unique 'work of art' - theoretically different in each case product of individual, creative activity of an addressee/recipient. All that is the reason that we have to reverse the ontological order of elements of this model of communication; what is created first - by the artist - is the context, not the work of art in the traditional sense of the expression. Such a work of art is in fact created by the recipient in the context provided by the artist.

This approach to reconstruct the model of interactive, indirect mediated communication can also mean, that we will have to deconstruct the notion of the context itself, and distinguish between its two aspects. The context described above is in fact the context of interaction, not of communication. In the framework of interactive art communication we actually deal with two different dimensions of the context: the first one creates the relationship between the recipient and the artefact – the product of the artist; the second activates the relationship between the artefact super the artefact super the artefact of the context, in mutual feedback-connection form the relationship between the artist and the recipient

The context understood in such a way is the only message of the artist in the communication process characteristic for interactive art. This kind of message is just intelligible; it can be experienced only in theoretical, analytic approach, not in aesthetic one. And it should not be identified with artwork

4

As a consequence of this distinction between the context, which is never perceived as a whole structure, but only imagined or predicted as such - an extension of a sensual experience, and the artwork - object of artistic experience, another very important characteristic of interactive media art communication must be brought into consideration. An identity of the addressee's partner in the indirect mediated communication is different than the one of interaction. The first role is played by the artist/sender, the latter - by the artefact, which I have identified with the context, and which is a base for the hypertextual structure of perception and interactive strategies That means that we have in a sense to separate the communication and the interaction from each other; they both occur in the interactive art, but not on the same level, or in the same moment of the whole process. As I have said, the interaction occurs between the recipient and the artefact; as the result of this activity the context of it can emerge, and when it happens the communication between the artist and the recipient begins. This is a paradoxical and fundamental characteristic of interactive indirect communication, that the context, which is the only message in this kind of communication is in the same time a subject of recipient creative behaviour. But this is what creates the specificity of interactive art communication. Let us come back for a while to Jakobson's theory just to say, that all functions involved in his model play roles also in the mediated indirect communication process. The syndrome of all six elements of this model are subject and active factor of the message. The comparison between the model described above and that of Jakobson indicate also how far is from the classic genres of art = mediated transmission, to newly emerging art of interactive media = indirect mediated communication.

5

One can say that interaction is always a sort of communication and that we cannot separate them. We can try to cope with such an argument saying that there are in fact two kinds of communication involved in the interactive media art practice. The first one – the interpersonal mediated indirect communication between the artist and the recipient has been analysed above. The second one – the intrapersonal communication which accompanies the interaction will be the subject of this last part of this study.

Intrapersonal communication used to be defined as an internal dialogue between subjective I and objective Me, as a process of data transformation, enabling the individual to create his/her self-image (Mead, 1934) This kind of role taking activity seems to be an important factor of a process of creating the social Self (Duncan, 1962). Now interactive media bring with them the externalisation of this dialogue. Interacting with a computer program, CD-ROM or any artificial creature we act in a space which is in the same time private/intimate and public. Subjective I can be easily mirrored in objective Me, which in turn becoming the 'significant other' provided by interactive artworks. We are facing now the ongoing process of fragmentarysation of the Self. The interactive intrapersonal communication is a part of this process. And together with the interpersonal, indirect communication they create the interactive art communication

To summarise, a distinction between two kinds of communication: transmission and interaction, based on the concept of shared space (physical or virtual), led us to another distinction: face-to-face communication against mediated one. The latter one can appear in one of three possible variants, mediated transmission (e.g. literature, film), quasi-direct mediated communication (e.g. e-mail communication, interactive television), or indirect mediated communication (CD-ROM, interactive installation, robot, WWW, different artificial creatures, etc.). The context of interaction – the product of the artist's activity, which is in the same time the partner of recipient's interaction, is the only message in the mediated indirect communication The interaction creates the artwork – the result of creative behaviour of the recipient in the context provided by the artist. Contact and interaction have been separated. The intrapersonal communication appears a typical relation between the recipient and the context/artefact. This kind of comunication can also appear in the space between the artist/sender and his/her product

I would like to end by emphasising the fact this analyse of communication in the interactive world is nothing more than a handful of general hypotheses forming together an approach to understanding how development in interactive, multimedia technologies and their invasion into the realm of art change both patterns of communication and a character of the artistic praxis. Numerous problems left to be analysed and many questions to be responded. This study can only play a role of an introduction to the subject.

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string@interport.net

Barbara London & Grahame Weinbren (.us)

LOOKING FOR THE INTERACTIVE

Almost a year ago, after the end of the trial of OJ, the New York Post ran a front page that consisted of an image of OJ Simpson with a zipper for a mouth. It was a composite, of course, and without question a journalistic joke. Actually I think there are at least two jokes intended. Most obviously, the image is an instant commentary on OJ's abrupt withdrawal from a planned TV interview in which he was scheduled to 'reveal all'. His mouth is zipped shut. But I think the Post is also making a broader joke about the very idea of the newspaper photo

The image foregrounds the idea that photography is now as reliable guide to recent facts as illustration. Of course everyone knows this. We are, after all, in the Digital Age. But this widespread knowledge hasn't resulted in a change in our attitude towards supposedly 'documentary' photography, even when the manipulability of the photo is thrust in our face. Tomorrow's picture of a Mafia boss, or Princess Diana, Hurricane Herbert, the Kurds, or Saddam himself, will be still taken as reliable evidence of something that occurred.

In other words, no matter how blatantly it is undercut, the photograph retains its old place in our epistemological framework. The New York Post, or any other newspaper, even in its World Wide Web version, relies on an acceptance of photography - photographs are one the ways that the news is delivered, and the news consists of facts about the world.

Mere knowledge of the easy transformability of any photograph is not enough to shake its ideological baggage.

The photo on the front page sells the newspaper. The cover is advertisement, and we know it also reflects the point of view of the editors. Previously, an illustration occupied the front page. The drawing decidedly was a translation of reality. We are used to looking at the photo image on the cover as true, but it a coded icon. The issue at hand today is: what is truth?

Viewers of Stan Douglas's installation, *Evening*, initially think the talking heads are actual newscasters. The three figures face the viewer; news clips of the trial of the Chicago Seven and the Vietnam War appear behind them. It comes as a surprise that the newscaster are actors. In this well-scripted environment, Douglas is considering American television of the late 1960's, when the networks became less concerned with the editorial content of their newscasts, than with enhancing the stardom of their anchors. Instead of Edward R. Murrow style of journalism, television provided 'Happy talk news'. This was infotainment before we had a name for it.

The same point can be made with pornography: which gains an important part of its erotic effect from the viewer's unshakable, **desired** belief that the people in the image were, at some earlier point in time - in front of a camera - doing exactly what we see in the picture or on the screen. If a porn consumer were to discover that the performers were brought together by Photoshop, that in reality the German shepherd was in the backyard and the model in a photographer's studio, it would, I suspect, sanitize, de-eroticize the image for him. I am turned on not only by the scene shown by the image, but equally by the fact that it really occurred. Porn depends on a causal chain of events between reality and the image This chain of connections is an important aspect of its eroticism.

The argument here depends on the idea that we cannot miss the photographic basis of the image - it is indeed a **photo** of a zipper combined with a **photo** of OJ's face, but the relationship of face to zipper is **produced**. And though the truth value of an image may depend on the relations between its components, its pictorial base (i.e. what it is a picture of and how it was originally produced...) is harder to disguise - we know (or at least think we know), in most instances, whether the base layer of the montage was created with a lens or with a brush. All (nonessential) qualities can change: the color, the degree of foreshortening, shape, angle of view, while how the elements are combined is open and malleable, but there is a core - that I for one can't quite pin down - by which we know that something was produced with a lens-based technology.

In the 1920's, John Hearfield was combining illustration and photography. He turned Hitler into an evil clown perched on the border between fact and fiction, operating the propaganda machine. *Reichstag* (1929) obviously is a photo-montage that makes a political comment

To make *All that* (1995), the artist Michal Rovner began with a photograph of people climbing a cliff. Scanning that image into a computer, she modified the photograph. She printed the manipulated image onto a large carivas, using the Vutex digital airbrush system. Where is truth? Does it matter that she started out with a photograph? Is is only museums that have housekeeping concerns about whether Michal's work is a painting or a photograph?

Is there a change, parallel to the forthcoming change in our attitude toward photography, that we can expect in our attitude toward works that use the computer as much for the way it stores data, as for the way it displays it? The OJ/Post phenomenon is an implication of the **digitization** of images: but equally (if not more) significant are the implications of **random access** to data of any kind, particularly frames of film or video, which previously could be access serially by the computer.

It is random access that makes possible the fungibility of media, flippantly and clumsily called 'interactivity'. Only random access enables the possibility that the sequence of image/sound material can be determined equally well at presentation time as at a production time. Interactivity depends on the fact that time-based image projects need no longer have a fixed temporal shape.

I would like to suggest some criteria of interactive narrative, that will both differentiate it from non-interactive narrative and at the same time highlight what might be positive, useful, of expressive qualities of the medium. What is there to be gained from interactivity? The question is: why we would want to produce, why would we want to **view**, an interactive work? Or, to put it in more formal terms, are there any specific ways to distinguish the meaning or truth-value of The Interactive? We need to know what interactivity is going to bring to the table - the table of representation, expression, and communication.

Here are some features of The Interactive that I take to be salient:

- arbitrary sequence
- fungibility
- multiple streams
- · inclusion of extra-narrative material


- indeterminate (or undetermined) elements which the viewer can either insert himself into, or arbitrate, tie down, or fix in some other way.
- · potential for viewer affect on the flow of the presentation

In looking for examples that demonstrate these features, I have had the best success with contemporary fiction. A number of novelists have been influenced by the conceptual structure of the database - starting at least 30 years ago with such writers as Calvino and Cortazar. In the interest of space, however, I will mention only two books, that I have chosen for their recent publication - both appeared in the middle of 1996.

In Last Orders, Graham Swift describes a group of five or six men - long-time drinking companions - on a journey to dispose of the ashes to one the members of the group. The plot is simple - not much more than a single, largely uneventful, car trip. But the way it is narrated is audacious. The time of the narrative moves forward - the story is always told in first person, or rather in a first person, because the narrator's job shifts from one character to another, so that each leg of the journey is written from a different point of view. With each point of view comes a history, a set of memories, hopes, fears, perceptions of the other men as well as secrets kept from them. This set of viewpoints, taken together, draws an opulent composite picture of these interrelated lives, one that the author could never have achieved, had he remained within a single perspective. Which of the characters is telling the story at any given moments is more or less arbitrary - what is important is that it is not the same voice from one chapter to the next.

Viewers of Luc Courchesne's *Family Portrait* (1993) move among the eight lifelike portraits, two at each of the four kiosks. It is as if subjects and viewers are all at the same cocktail party. While the participant engages a single figure, each of the 'portraits' seems to be uncannily aware of what the other members of the portrait group are saying. Our encounter may be cut short due to lack of interest on either side, or the conversation may develop into a discussion of ideas and values, or personal experiences. The interaction is structured into levels of increasing intimacy; you must get to know and trust one another before moving on to confidential matters. The viewer affects the shifting sequences and gradually discovers what relationships exist among the group of people in the story Courchesne set up.

In the narrative space mapped by Graham Swift, an intricate network of relationships between the characters emerges. Exploring this network provides a particular satisfaction, in that many facts are never stated explicitly but must be pieced together from details gathered as the reader moves from one viewpoint to the next. One man has had an affair with the wrife of another, a fact known to a third man and deeply coloring his attitude towards the first two: the childhood love of the youngest member of the group for the daughter of the oldest, wished for by all parties but never consummated because of misunderstandings - these tiny details add up to a symbolic portrait of the frailty of the human condition, a composite available only to the attentive, active reader, who must use his memory and imagination like a keyboard and mouse.

One can imagine an interactive piece in which a story is told in this way The viewer would be able to select the story-teller at any moment, thus navigating a narrative space where time moves forward but in which the story is compiled differently each time we travel through it. One result of this would be an enhanced sense of realism: uncovering the narrative would like be discovering a situation is real life.

Inside Mary Lucier's installation *Oblique House: Valdez* (1993), a quartet of life-size faces frozen in time peer out from monitors on the wall. When the viewer approaches the moni-

tor to engage in a tete-a-tete, the person represented on screen starts to relate an episode from their life. The face freezes up again when the short story is over Depending on the movement of visitors in the gallery, the solo becomes a duet, or a trio or quartet of randomly told stories. As the video figures relate their stories, filters modulate the tonality of their voices. Phases weave in and out of this chance score.

A portrait emerges of Valdez, the Alaska town devastated in 1989 by Exxon's infamous oil spill. Although Exxon is talked about as an intruder, as the story develops, the corporation becomes a member of the community. (The landscape is projected onto the sloped ceiling high above the viewers' heads; a close-up pan of the pebbly beach, and a 360 degree panorama of the shoreline and nearby mountains.

With *Megatron* (1995), Nam June Paik is waffling on his Cagean, serendipitous roots. The images on Paik's video wall are themes, motifs that he reworks in the same way he would a music score. He threads together a net of symbolic facts and fantasy. The video wall technique is an effective visual way of making an allusion between Disney and the Olympics. The video wall introduces a new form of edit, which is a different kind of simile than a film cut.

John Barth's *On with Story* is a series of interlocking stories told by an elderly couple to each other - an *Arabian Nights* template followed through all the way, just as for Scheherazade, running out of stories, or coming to the end, bring with it an acceptance of The Big End. Along with its explicit subject-matter, which is an ironic meditation on the nature of love in our time, *On with the Story* incorporates a subtle discussion on the theory of narrative. It is a kind of Brechtian praxis, in which many of the point made about story-telling within the stories are demonstrated or disproved - mostly disproved - by, and in, these very stories. The first few chapters of the book are story-beginnings and consider the nature of the opening; the middle few stories deal with middles-of-stories, and the last set are endings and address the idea of closure.

One of the items on the ingredient list is the concept of extranarrative material: Barth weaves into his stories, as central elements, not only pieces of narrative theory, but also particle physics, a taxonomy of favorite fruits and a psalm of farewell to them, and one episode in which a character finds a page of the very book we are now reading - a page we haven't yet reached.

> "Out of context, at least, neither side of pp. 179/180 (so the leaf is numbered, bottom center) makes much sense to its present reader. A more knowledgeable and perceptive eye that B Three's might register that since the leaf's recto (179) happens to conclude one chapter of, or selection from the overall text, and the verso (180) therefore to begin another, the title of the book itself which would normally appear as a running head on the left-hand, even-numbered page - is missing, further, that masmuch as no author's name appears under the (unnumbered) title of the item commencing on 180, the unnamed book must consist of articles, stories, or whatever by a single (unnamed) hand, rather than by various authors. Neither a novel-page on the one hand, then (if it's fiction at all), nor an anthology-page on the other. What Bill registers is simply that the lines constituting page 179 (under the running sub-head STORIES OF OUR LIVES) read less like fiction than

like. Bill can't say what The page comprises a clutch of rhetorical fragments, concluding with Rwanda, Haiti, Bosnia, Kurdistan. The doomed marsh Arabs. The web of the world "

John Barth, "Stories of Our Lives" *On with the Story* [Little, Brown and Company, 1996] p 174

By this point, Barth has the reader wondering how the story is going to reach these words in just a couple of pages. I found myself leafing forward, like a user of a Director-driven CD-ROM might click on a forward arrow button, to check if it is indeed a page from this very story. Has the character found a page from the book that I, the reader am now holding in my hands? If so, is the page missing from my copy? The author, in other words, has made his reader break away from the ordered sequentiality of page turning, forcing him into a nonlinear approach to the book, skipping forward and back among the pages. Barth, with some self-deprecating humor, identifies the page and the book it is from, just before we reach it in the natural course of reading

> "a page that her current Baltimore boyfriend [.] obligingly ripped from some Postmodernist story collection that he happened to be perusing when perusing when Gerri casually asked him, as the pair were reading in bed, for something with which to mark her place while they make love" (p 178)

And incorporates the dazzling passage about the web of the world into textual dolly - out from the scene of the story of the world as a whole, the world seen "under the aspect of the eternal", as they say in Philosophy.

In Corridor Installation (1970), Bruce Nauman lined up six long passageways, as if offering a scout a choice of realms to explore. Three pathways are only wide enough to peer into, and the others are barely passable. One of the corridors has two monitors at the far end, stacked one on top of another On each screen in an image of that empty hallway. With the narrow corridor the confining space forces the traveler to proceed in small steps, elbows pressed tight against the body Suddenly an image of the explorer, shot from behind, appears on one the monitors. The monitor is live, in the present The recording camera, positioned above the entrance, is aimed directly at the viewer's head. When turning about to find the camera, their face appears on the monitor, but this image is not accessible The two events - a viewer looking into the monitor, and the image of their face on the monitor, cannot occur simultaneously in the present. The other monitor, showing an unchanging image of the empty corridor, mocks any effort to alter the order of events. Clearly, this monitor, analogous to memory, could show any series of images from the past - any empty corridor, a viewer's back, their face, in any order, or for any length of time. The representation of the past in not subject to a temporal ordering of events.

The written pull-back to a more universal or astronomical point of view is a device Barth uses frequently. The analogy in an interactive work would be the possibility of zooming the lens with which we are seeing the scene to wider angle for a broader perspective, or alternatively, to a longer lens for an examination of detail, either option giving the viewer a different way of understanding the fictional moment now passing.

Thus Barth offers written models of at least two aspects of an interactive fiction-the first a counterpart

of the experience (or activity) of viewing an interactive work , in which the book is transformed into a non-serial , more randomly-accesible object; and the second a

model of a possible architecture for such a work, here giving the viewer the option of seeing the scene from a broader perspective and perhaps finding himself contemplating more general expressive and philosophical implications.

The multiplicity of spaces that is understood in Einstein's conception, and that is perceived in Monet's painting, can be experienced in Dan Graham's Present Continuous Past(s) (1974). The installation consists of a square room with mirrored walls and a monitor set into the middle of one side. The reflections of everything within the enclosure stretch as if reaching toward a distant horizon. Usually a person within a multi-mirrored enclosure, such as a hall of mirrors in an amusement park, is seduced by the myriad reflections of themselves They notice only their own solid body repeated many time, but not the space they inhabit. Dan Graham's environment, however, includes a one-way mirror and a hidden camera The mirrored space is the image on the monitor and forms part of the endless of reflections. As a result, the focus of attention is the room, which appears as an infinity of spaces that are reflections of a single space - the mirrored chamber.

In Special Relativity, the notion of space and of time are bound to one another. Time has meaning only in reference to an associated infinity of space-times in relative motion. These concepts are difficult to fathom. Perhaps they are beyond comprehension. But Present Continuous Past(s) unites space and time by introducing a time delay of several seconds between the camera and the monitor. Each of the myriad reflections encompasses two space-times - the 'present' space-time of the enclosure, and the 'past' space-time of the monitor Though not an analogue of Special Relativity, the complexity of space-time embodied in the installation challenges traditional ideas about space and time. The sequence on the inset monitor bears a clear correspondence to a memory , which to be recognized as such, must have two qualities: it exists in the presents, and also is remembered to have existed in the past. These elements are explicit in German expression for memory: ist gestubin, which literally translated as is happened. Within Present Continuous the knowledge that the current moment will appear as a memory after a short time delay, adds an element of consciousness to the present instant Instead of performing for the camera as might happen with a live feedback, a viewer is more likely to be aware of the total surrounding that forms the memory.

We are considering, then, two ways of thinking about what makes an interactive work - either as a type of structure of architecture, or as something that makes a particular type of demand on its viewer. As I am coming to understand interactivity, this distinction is a crucial one. A true interactive work must have both elements. There must be qualities in the architecture of the work that demand the participation of the viewer. The work, that is to say will be lacking, in some way or another, until the viewer participates, and this is a consequence of the way it is constructed.

Architectural quality is not the first concept the term 'interactivity' brings to mind - which is of course that the viewer becomes a *user* who can affect the course, or content, or presentation of the work. It seems obvious to think of interactivity as primarily something that a spectator controls, or at least has input in. However, I think this is problematic. Viewer input is a secondary quality of The Interactive.

The main problem with conceiving viewer input as at the center of interactivity is that is overemphasizes the relationship of the viewer to the work in the mind of the maker. Placing too



much importance on the viewer forces an artist into an uncomfortable position. But it is the standard approach for someone who is producing for mass consumption and for whom the criterion of success is audience appeal and numbers.

Ernest Lehman (writer of *North by Northwest*) and *Family Plot*, Hitchcock's last film) describes the following conversation with Alfred Hitchcock:

> He'd had a few martinis, and in a rare moment of emotional intimacy, he put his hand on mine and whispered, "Ernie, do you realize what we're doing in this picture? The audience is like a great organ that you and Lare playing. At one moment we play this note and get his reaction, and then we play that chord and they react that way. And someday we won't even have to make a move - there'll be electrodes implanted in their brains, and we'll just press different buttons and they'll go 'oooh' and 'aaah' and we'll frighten them, and make them laugh. Won't that be wonderful? Donald Spoto, The Dark Side of Genius The Life of Alfred Hitckcock, [Ballantine Book 1983 J. p. 440

At the doorway to Tony Oursler's *System for Dramatic Feedback* stands a calico entity, a misshapen video face projected onto its cloth head. Over and over again the little effigy cries, "Oh no, Oh no" The voice is shrill and anxious, as if it were witnessing a harrowing event. The doll's emotional demeanor is poignant, and the state of alarm is archetypal Viewers can empathize, and thereby experience the trauma. It is an 'in extremis' situation, so powerful that it evokes nervous laughter among some spectators. Others simply step back and view the character as a carnival barker, warning them before they proceed.

Inside is a mound of stuffed, life-size rag dolls Stitched together out of Salvation Army hand-me-downs, each of these homey characters is animated by a small video projection that defines one distinct action. The dolls express their emotions as ritual acts that insinuate themselves into the viewers fantasies. The sensation is somewhat like that of watching a popular 'cop' series. The archetypal situation shows the good policeman successfully, if violently, dealing with evil, thus assuaging the public's fears. Whereas standardized television program's channel viewers through a narrow range of emotions, Oursler's effigies, lifelike and non-threatening, beckon them into an open-ended world of the imagination, where the mind is free to assemble its personal fictions.

What Hitchcock fantasizes is the reverse, the contradiction of an interactive work. Slavo Zizek, quotes the strange passage in his book *Everything You Wanted to about Lacan but were Afraid to Ask Hitchcock*, during a compelling analysis of Hitchcock's film work in terms of viewer's reaction - an analysis which in many ways matches Hitchcock's own descriptions of his work, if the terms - taken from Lacan - are somewhat different. I am mentioning Zizek here because he is the most recent of a long lineage of Hitchcock analysts whose approach finds the meaning of a work in its affect on the viewer, in the way the viewers' desires and identifications are directed and played with in a film like *Psycho*.

Keeping in mind the scene from *Psycho* in which the private detective is killed by Norman Bates' "mother", I would first ask if it is possible to re-imagine the horror film as interactive. Your stomach is saying to Detective Arbogast "Turn back! Turn

back!" - but the effect would evaporate if your inner pleas actually had an effect on the film...if because the viewer wished the detective would turn back, he actually did. Interactivity is a recipe for the vanishing of the delicious titillation of suspense, and the dissolution of the particular way viewers are psychologically trapped by the Hollywood fiction film.

Zizek's analysis of this classic scene turns around the idea that the spectator's viewpoint is controlled and manipulated by camera angle and shot distribution. He argues that at the moment when Arbogast's face is slashed, we find ourselves looking out of the eyes of the inhuman Thing that is performing the ghastly knife work, that we find ourselves identifying with this evil so far as to desire the death of the meddling detective. The switching of viewpoints, the deliberate manipulation of the viewer's identification and desire for closure: this is what binds the spectator to the screen, what makes the fiction film a spellbinding, compelling experience

Suspense always involves the withholding of some information that the viewer has in immediate wish to know, and this is the reverse of the structure of interactivity, which is, in principle, a means of giving the viewer access to information. And the idea that you need to pass some tests to gain that access (as in a game like Myst) does not do the trick. Suspense plays on belief and desire, while the slow release of information, under certain controlled circumstances, calls on different, less visceral mental states. It would take some revision and rethinking to create the sense of suspense in an interactive work, and I do beleive that it is possible - however, the sense of binding to the screen and the compulsion to reach a form of closure, is, if anything, stronger and more prevalent in a certain kind of interactive work. Five minutes observing a boy playing a videogame easily can convince anyone that a highly interactive form is at least as compelling as a horror film. But does a videogame rely on the same means to achieve this end - and is it even the same kind of experience?

The compulsion in the Sega cartridge game Sonic is the desire for mastery, which closely connected to the desire for narrative closure - the player wants to beat/finish/close the game, and is driven forward partly by an impulse (which is probably another way of describing the same thing) to master the machine. It is interesting, that although the kids who play the game describe the character they are controlling in the first person ("I have to beat the Boss to get through this level" - i.e. "I have to " not "Sonic has to ") the identification with the character with the character is not of the same order as that in a fiction film. No characteristics are attributed to the creature controlled by the keypad, and the emotion felt at its demise is frustration, not sadness. It is more like the relationship of a puppet to a puppeteer. The videogame player feels himself very much within his own body, and the desire for closure is not connected with a plot, but just with the ending of the game, or at least the level. The world is explored to its limits, and in this world success is the achievement of the next stage A necessary condition of a game's success in the market is that it is not too easy or too hard. Players have to fight for small victories, which must be kept just, only just, beyond the player's expertise. The frustration of the player is played like an instrument, exactly as Hitchcock plays point of view. The craft of composing a videogame, in other words, involves an almost fanatic identification with an imagined user

I want to compare the installation to a particular form of Japanese garden, the locked world which the observer travels through. Inside this type of garden, we walk along paths lined with stones that force us to look down and carefully place our footsteps. By the time we raise our eyes again, a dramatic new vista suddenly has appeared in the external landscape now framed by the garden. Here we have an unfolding narrative, complete with changing layers of time. Installations tend to be closed environments. Viewers are enveloped in the spaces, interacting with the parts, deciphering the artists' world view. The large vertical projection in *Borealis* (1993) by Steina Vasulka envelop the viewer. As in the Japanese garden, structure is imposed on nature. Nature provide the raw material for the narrative, creating a metaphor for life and death.

Chie Matsui created ornate tableaux, using ordinary objects which she places in unusual contexts. Viewers feel they have entered a Gothic fairy tale, where the glamorous and the humdrum are strangely linked. The viewer must decipher the symbols, assembling the story from parts. (A new work will be presented at the Museum next January in our ongoing "Projects" exhibition series)

A dining table draped with bright fake fur dominates Chie Matsui's installation. Sheets of clear glass unfold across the table top, like the leaves of an open book. The scene is illuminated by an old fashioned overhead lamp. On an adjacent wall hangs a dressing table mirror, its faceted surface reflecting a warped view of the room.

Matsui's installation encompasses the private and the public face of women. Here a dining table, traditionally set for family meals, sports a loud and sensual shawl. The glass covering adds a layer of cool fragility. In ordinary life a seductive stance might be rehearsed before a vanity mirror, the intimate space where new clothes and makeup are also tried out. Adopting what is fashionable usually means stepping back from tradition, a conflict for every generation.

"Composing's one thing, performing's another, listening's a third. What can they have to do with one another?"

John Cage, "Experimental Music: Doctrine," *Silence*, p.15

To make a videogame, or a Hollywood film, one must always consider the position of the viewer. Cage, however, suggests that listening is quite a different act than composing. And implicit in his suggestion is the idea that listening in not the composer's business when he is composing

I think that one aspect of the way we understand the artist in our society incorporates the idea that is is inappropriate for an artist to conceive his or her works in terms of spectator reaction.

We think of the artists as perhaps the only people whose 'jobs' depend their intuitive reactions and personal tastes. A medium that must be worked on with viewer always in the front of the creator's mind is problematic as a means of making art. Furthermore, the kind of meaning we attribute to work is often derived from imagining the viewpoint of the artist as they were making the work, and attempting to understand their non-verbal response to the medium. In recent years, artists have often demonstrated the expressive or formal possibilities of a given medium (many examples of this can be found in film and video): in the majority of cases, artists have either created ways to 'misuse' the medium so that it does what they need it to, or they have experimented and played with the medium, finding out what it could do. Considering the viewer's reaction to their work is anathema to both these working methods.

Upon entering *Reasons for Knocking at an Empty House* (1982) viewers immediately perceive Viola's dimly lit, multi-faceted environment as a rich conceptual realm. We enter his

world of darkness, which represents the nonverbal, more profound areas of irrational consciousness generally associated with night. Viewers become active participants, moving at their own pace through the long, harsh room, randomly discovering the integrated elements of this spare work that resembles a stage set. At the center of Reasons for Knocking at an Empty House is a monitor depicting the artist as a vulnerable presence. Not having slept for three days, he is there alone, confronting his nonstop subconscious thoughts. Through a carefully calibrated acoustic system, the space periodically fills with aggressive, sonorous boom triggered by the gentler second sound track, which can be heard only by the viewer occupying the one available spotlit seat at the center. Seated, the viewer faces a monitor and is confronted with the prerecorded image of an exhausted, immobile Viola, who stares intently ahead. He establishes the same direct relationship with the audience that home television viewers have with news personalities. Viola's attention keeps drifting off, but he is prevented from dozing by a hand that ominously and regularly appears to rap him on the head with a rolled-up magazine. The viewer wears clumsy, old-fashioned headphones and hears Viola's every gulp, sniffle, and loud rap on his head, which had been picked up during videotaping by microphones placed in his ears. This unedited, forty-five-minute recording was mixed with a soft, separately audiotaped stream-of-consciousness monologue about his boyhood reminiscences, so that the combined sound track gives the distinct feeling one is physically and mentally inside the artist's head. Seen and heard at such close range over an extended period of time, the work strongly evokes the artist's physical presence and demands a response. Viewers are either intimately involved participants, sharing the experience as much as they are able, or else peripheral observers. Both are kept off-guard in anticipating the irregularly occurring loud boom. The tightly focused work addresses the issues of identity and explores as well various states of consciousness. The length of the videotape invokes the states both of waiting for inspiration and of sublimated fury.

In Paik, in Viola, in Hill, we find a constant search for ways to incorporate and find an expression of the self - with its individuated desires, values, and failings - in the qualities and architectures of the video medium. The medium often becomes a metaphor for the self, the absence of the body of the artist compensated in a space where the body of the artist could be: in Viola's work it is a "sweet spot" from which the work can be perfectly seen, and which the viewer sometime cannot physically get to, in Hill's work it is the place the artist sees himself in the work, sometimes photographically, sometimes a space he is absent from.

The components of the body displayed in Gary Hill's *Inasmuch* as it is Always Already Taking Place are without any apparent distinction. Neither Adonis nor troll, neither fresh nor lined with age, the body suits the short endless loops that each body part consists of. The arrangement of rasters does not follow the organization of a human skeleton. Representations of a man's ear, and arched foot lie side by side, tucked modestly behind them is an image of his groin. Each raster invites meditation. Each image fills the frame of its screen. The monitor is perceived as part of the body: an enclosure, a vessel, no longer something that simply displays a picture. Raster and image exist as a unified object, a representation, as a living thing.

Although none of its segments are 'still', the installation has the quality of a still life. Typically, the objects in still-life paintings are drawn from everyday life - food and drink, musical instruments, a pipe and tobacco. Their placement appears arbitrary, and they do not communicate with each other. Often set out on a platform or table, the elements are positioned within arm's reach and appeal to the senses, especially to touch and taste. *Inasmuch* has most in common with a 'vanitas', a category of still life in which the depicted objects are meant to be reminders of the transience of life. In place of the usual skull and extinguished candle, *Inasmuch* depicts an animate being whose vulnerability underscores the mortality of flesh.

Does interactivity mean that we have to rethink the artist's relationship to the viewer? Is the artist now in the same position as the commercial filmmaker - projecting reactions, testing responses, and making changes based on the tests? Is one of the aspects of 'post modernism' that the artist now focuses on the viewer and controls the meaning?

Jim Campbell's *Shadow (for Heisenberg)* (1993-94) responds to the viewer's position in the gallery, but thwarts their desire to see details of making installations, Campbell does not put himself in the shoes of the viewer and say, "Now what do I do? What do I control?" He puts himself in the shoes of the work and asks, "What can I perceive?" and "How can I respond and reflect?"

Jim Campbell's idea is that the interactive artist does not make a work where he predicts and accounts for audience response - rather he makes a program, and the program interacts with the viewer. Campbell's project is the construction of a machine with certain behaviors, and then he releases this machine into the world where, by eliciting viewer response, it acquires meaning.

In *Sonata* I tried to find an architecture of film that can only play interactively. In the final scenes, two scenes are potentially on screen at the same time. The viewer determines what proportion of each scene is on screen by pointing at the image - where he points becomes the dividing lines between the two images, so he can see what is happening in two places simultaneously. So *Sonata* sets up a situation for the viewer to operate within - how the viewer acts (i.e. where he points) influences what happens on screen, and therefore how the scene is understood. So my search is for a kind of structure that can contain narrative, and needs a viewer for completion - the focus is on architectural qualities, not on viewer reaction or artist's expression.

The life-sized dancers in Teiji Furuhashi's *Lovers* (1994), are drained of life The naked figures have a spectral quality. Back and forth they move, and occasionally come together in a virtual embrace. One of the figures will stop and seek out a lone viewer. The figure pauses to face the viewer with his arms outstretched. The gesture is not a beckoning one; rather, the man is assuming a beatific pose, as if he is vulnerable and exposed In reaching out to a single viewer in a direct, personal manner, Furuhashi belies the notion that the human spirit must necessarily be overwhelmed by the juggernaut of technology.

So far we have looked at some works in terms of what the viewer wants and in terms of the maker wants. In a recent issue of the journal *October*, WJT Mitchell asks "What Do Pictures Really Want?" Does it want to be looked at and admired? Does it simply want to be understood? Does it want to have influence?

What pictures want, then, is not the be interpreted, decoded, worshipped, smashed, exposed, demystified, or the enthrall their beholders [...] The desires of pictures may be inhuman or nonhuman, better modeled by figures of animals, machines, or cyborgs or even by more basic images what Erasmus Darwin called 'the loves of plants'. What pictures want in the last instance, then is simply to be asked what they want, with the understanding that the answer may well be nothing at all.

W.J.T. Mitchell, "What Do Pictures Really Want?" October 77, Summer 1996, p.82

If we ask the same question about interactive works, I suspect that we will find that what they really want is time.

Time

And where (or when) is time? Interactivity is not, of course, a feature of computers alone. An elevator is interactive. But an elevator does not represent, does not picture reality. Interactive computer works have the possibility to represent an aspect of out experience of reality that nothing else can - that we can affect it. Our experience of reality is crucially connected to the idea that we can change what we perceive, and to incorporate this feature of experience into works of art can be something of great import.

But now we are talking about time. Because change or effect or influence always take place in time. So an essential ingredient of the architecture of interactivity is time; interactivity is a time-based medium. To ignore that is to make works may as well not be interactive

A work that does not acknowledge the passage of time as a fundamental aspect of its composition is simply not responding to the potential of interactivity (like music without time, possible, but exceptional, or acrylics without color, possible but making a statement)

Choice and time are more of less mutually exclusive-

choice must be done at the pace of the chooser choice means that you know what is going to hap pen next choice excludes story at the moment of choice choice is about shopping or fast food

Time brings in memory, anticipation, passage, suspense, hope, fear, desire (rather than drive), fantasy in short narrative So as artists working in interactivity, we must be concerned with response, not choice, and time.

What is is that an interactive work wants/needs? Time. More time.

As do most of us. As do we in this presentation.

In Nam Jone Paik's installation, *TV Buddha* (1974), a video camera captures a sculpture of the Buddha and transmits the live image to a monitor. The Buddha, gazing knowingly at his image on the screen, evokes an obvious question, a video koan. What is the difference between the Buddha staring at a live (present time) image of himself, and the Buddha confronted with a replay of a videotaped (past time) representation?

For a viewer studying the Buddha on the monitor, clearly there is no difference. An image on television does not carry a time signature. As Eastern philosophy teaches: time is an illusion, while among Western philosophers, 'Time is a human construct' expresses a similar conviction.

The monitor, housed in an ovoid plastic enclosure, is attractive, and the sculpture of the Buddha is particularly beautiful. The timeless wisdom of the East appears adequate to the challenge of modern technology. The confrontation is balanced, contemplative, but also suggests conflict. After all, Zen koans do have answers, traditionally dispensed by a traveling monk who wishes to supplant the reigning master of the monastery. To Paik's koan, the sojourn might respond by leaping into action and placing a hand over the camera lens. This gesture underscores the difference between a live feed and a prerecorded tape, but as with many koans, the rejoinder only launches other mind twisters.

plord@city-govt.ci.bellingham.wa.us	

.us

Roberta Lord, Writer

HOLINESS AND DREAD: POETICS IN ELECTRONIC ART

Summary

This paper discusses the structure and aim of poetry, and suggests that the electronic arts are uniquely suited to duplicate the poetic experience. It reviews an argument that our species developed the computer as a new frontier to be colonized by the expanding human brain. It discusses specific electronic art works that, by generating new forms of poetic experience, reinforce this view of new media as virgin space into which human imagination is growing. It mourns the schism between science and art, and between the mind and the soul, and entreats artists working with electronic media to work toward mending, rather than expanding, the rift

I took the title of this address from the final lines of Kubla Khan, where Samuel Coleridge offers an ecstatic description of the poetic experience. (Coleridge claimed he composed 200-300 hundred lines of Kubla Kahn in an opium-induced sleep, but upon awakening could only recall and write down 54 lines before he was called away from his task by-if you can believe it-an appointment!) The poem fragment describes a "pleasure dome" built in a Xanadu, near a sacred river flowing through icy caverns to the sea. In the fragment's final stanza, the narrator fantasizes about the lavish constructions he could build in his mind if only he could hear a certain piece of music.

A damsel with dulcimer In a vision once I saw: It was an Abyssinian maid, And on her dulcimer she played, Singing of Mount Abora. Could I revive with me Her symphony and song, To such a deep delight 'twould win me, That with music loud and long I would built that dome in air, That sunny dome! Those caves of ice! And all who heard should see them there, And all should cry, Beware! Beware! His flashing eyes, his floating hair! Weave a circle round him thrice, And close your eyes with holy dread, for he on honey-dew hath fed, And drunk the milk of Paradise

I love this image: that an artistic expression-here the Abyssinian maid's "symphony and song"-so powerfully affects its perceiver that he himself is transformed into an awe-inspiring vision, against which the reader is warned to "close your eyes with holy dread." These 18 lines of Coleridge's describe something I believe is worth striving for in all art, regardless of medium: the provocation of discovery. Why is discovery so important? As writer Annie Dillard wrote, musing about her life-long quest for illuminating knowledge and experience: What else are we here for?

Gravity, as you know, is said to have been discovered by Isaac

Newton But I contend that each of us discovered gravity. along with everything else. I grew up in Alaska. Until I was seven years old, my family lived in Fairbanks. Winters were brutal The temperature dropped as low as -60°F (-51°C), and for months it was dark almost around the clock. As a young child, though, I felt protected-by my family, by our apartment in an army barracks, and by a misunderstanding of my relationship to the earth's surface. I knew the earth was round, but I thought we lived inside it. I was in the kitchen one winter morning jabbering to my mother about this and that. She was getting me dressed to go outside-putting on my boots, snowpants, parka, hat, scarf, mittens-and I was describing something to her from the point of view that we lived inside the earth. She corrected me in passing-while she zipped and snapped-as if I had made only a small grammatical error. Though I respond fast enough to practical information. I've always absorbed big news in silence. I didn't say anything else to her. I went outside and stood on the porch and stared at the vast snow field across the street. I gripped the handrail tightly. I was dizzy, sure I would be swept into space if I let go of the rail. I hung on for a long time, trying to remain calm, while thinking as hard as I could I eventually convinced myself that something other than what I had envisioned must be in effect to keep me, and everyone and everything, from falling off the earth, and that whatever it was, it must be a constant force, and I could let go of the rail. That's how I discovered gravity.

Months later, at the end of the next summer, I discovered the link between art and technology. It was August, and I had received a box of crayons and a coloring book for my birthday. This particular crayon box was by Crayola and was new on the market. It held 64 crayons, a guantum leap from the 12- or 24crayon boxes available before. The spectral range was staggering, and each of the colors had a distinct, evocative name: Goldenrod, Royal Purple, Wild Strawberry, Sky Blue, Thistle, Spring Green, Salmon, Orchid, Cerulean, Carnation Pink. It was a poem, this box of crayons, and reading name after name while looking at the individual colors put me in a trancehypnotic and erotic But that wasn't all. This box, beyond its record number of colors, had a built-in crayon sharpener 1 recognized this as a profound technological break-through, a streamlined innovation. The crayon box was futuristic. It might as well have been made of titanium. I was thrilled with my possession, but I was uncomfortable about using it in my family's apartment. We lived in army barracks, as I said, and this was the '50s. Our furniture was heavy and graceless; we had ruffled curtains and flowered chintz upholstery. I hadn't paid attention to how domestic and old-fashioned my environment was until I got the space-age crayon box. While weather permitted, I took the crayons and coloring book out to the cara green Plymouth sedan with a lot of chrome-high-tech enough for me at the time-and sat in the back seat and colored. This crayon box, full of variety and innovation, changed my perception of who and where I was, and opened me up to a larger world

Looking back on these small events, I remember with most pleasure the moment of discovery-the shudder of excitement, the shiver of sudden knowing.

I admire the technological advancements and accouterments of electronic media, but my deeper interest is in its poetic capacity. 'Poetic' as Aristotle defined it able to approximate truth by imitating life. Imitation, Aristotle theorized, is natural to members of our species from early childhood. We like to do it, and we delight in viewing works of imitation. We appreciate and learn from vicarious experience just as we appreciate and learn from real experience. While a fair amount of visual art contains narrative prose, whole poems, or poem fragments, these elements don't automatically provide a poetic experience. They often intentionally serve a structural or propagandistic function, as in the work of Jenny Holzer. The poetic experience we derive from poetry itself-from an arrangement of words we read or hear-is about much more than the fact of the words themselves. Poetry comes to us in a bombardment of discrete units-sounds, syllables, words, with their individual and collective meanings, rhyme or lack of it, vocal rhythms, pauses. These discrete elements impinge upon our senses, they link up, in an almost-chromosomatic fashion, with receptive strands in our consciousness. As we consume a poem, its wholeness disintegrates, it flies to us in pieces, and it is (or is not) reassembled in our bodies. The school of literary criticism called "reader-response" holds that the poem does not exist until it has generated a poetic experience in someone's consciousness. If the poem works, there is an ah-hal moment, a moment when the reconstruction builds to a point that triggers a sudden transcendent experience. This impressionist flood of awareness frequently occurs before, and independent of, any understanding of the poem's concrete, word-by-word, meaning. If you accept this definition of a poem, then electronic media appears uniquely suited to duplicate the poetic experience. Our bodies absorb the media's disassembled, pixilated and/or pulsing emissions, and then internally reassembles the parts into a whole. Though television and film theoretically provide nothing but imitation and vicarious experience, it is rarely poetic. We make choices about whether or not to participate, and to so many of the experiences we are offered via this now-eternal animated effluvium, we say no. If we walk away with anything lodged in our brains, it is likely to be some annoying catch phrase or commercial jingle. It seems, in fact, that many people derive little experience, other than that of time passing, from popular media. We do derive information. but that's a different commodity. Maybe it is because we are forced to actively reject so much of what comes to us via electronic media that the field of electronic art, now well over thirty years old, remains marginalized. TV is a control freak, and we avoid this trait in media just as we avoid it in potential friends or lovers. Because the medium is the same for reruns of Dallas as for Bill Viola's The Theater of Memory, people jaded by the cloy manipulation of the former reflexively shy away from the latter. And the keepers of art history's flamescholars and academicians, those who must find work credible before admitting it into the canon-are, at least stereotypically, fearful of high technology, let alone simple innovation. It is ironic that so much of early video work was itself aimed at dissecting and critiquing the medium and the message of popular broadcasting.

However pervasive its presence in our lives, we tend-not so much as artists but as a species-to regard electronic media as a family of cold, inorganic inventions stumbled upon inadvertently. The astronomer Robert Jastrow suggests something guite different. In a 1981 book called The Enchanted Loom: Mind in the Universe, Jastrow traces the evolution of the human brain, and argues that we are currently colonizing computers in order to provide our brains with otherwise unachievable room for expansion. He points out that the human body has undergone little change in the last million years, and that the brain hasn't changed, at least in size, for the past 100,000 years. Organization may have improved, but the amount of information and circuitry that can fit in a cranium of fixed size is limited. Human head size is restricted by the size of the birth canal. Evolutionary forces promote survival of the animal as a physical entity, but they don't seem refined enough to respond to the advantage of increased intelligence by naturally selecting the broader female pelvis. And, of course, no one is sure that expanded brain function is beneficial to the survival of the human species. And even if this selection-for-intelligence were in operation, evolution is a slow process. Jastrow concludes, "The fact that the brain is no longer expanding, after a million years of explosive growth, suggests that the story of human evolution may be over." Then he suggests another possibility, that in computers we have created new frontiers for our brains to colonize-that computers are not a

distinct, discrete entity that the species can do with or without, but are instead a silicon-based sub-species that carbonchemistry life invented in order to engulf.

We annexed the first computers to our quantitative memory: they help us count and keep track of things. We annexed another generation of computers to our eyes: aided by lasers, fiber-optical technology, and electron bombardment, micro-processors assemble images beyond the range of human visual capacity. Through this stage of development, computers were performing relatively linear tasks, they may have duplicated or improved on a human capability, but it was only on a single capability. The current exploration into virtual reality is looking into every aspect of the three-dimensional human experience. Suddenly, technology's range is expanding at warp speed, eliminating in the process any clear difference between the way we think and the way our machines think.

For the rest of my time here, I'd like to look at works of electronic art that bridge the distance between man and machinethat stimulate the viewer's visceral awareness in a manner very much like real experience.

In the 1950s, during one of his early crusades, the American televangelist Oral Roberts placed his hand, palm facing outward, in front of the studio camera and said to his nationwide television audience, "Put your hand on my hand." Roberts did not believe his touch could heal. He was, however, genuinely convinced that this "point of contact" (Roberts' term for the moment of physical connection) permitted his followers to release their own faith, which in turn opened them up to the healing power of God. Place Roberts' video-induced "performance work"-tens of thousands of viewers, all across America, with their hands on their television screens, feeling themselves flooded with health and well-being-in the context of the last several decades of video art, and it is hard to find another work that so thoroughly engages so many people at once. I have talked to a number of people at Oral Roberts University in Tulsa, Oklahoma about their founder's prescient awareness of television's unique power to communicate and to connect Someone I spoke to just a couple of weeks ago told me that Roberts stopped doing the "hand thing" on television when he felt it had become too much of a spectacle. But he continued to promote physical contact as a trigger to release spiritual belief. In the '70s, according to the person I spoke with, Roberts suggested to members of his television audience that they take the hand of someone else in the room, and in doing so, agree to believe in the Lord. If there was no other person in the room, but if there was a dog or a cat, he urged taking one of the pet's paws, and in that moment of contact with another living creature, agreeing to believe

I first heard about Roberts' early television work from the American artist Doug Davis, who in his 1974 Austrian tapes did a series of performances works that suggested body contact with the interior of the video monitor. In one work, he, too, appears to be inside the monitor pressing his hands outward; in another he appears to be holding the monitor up in the air from the inside, in a third he appears to be standing on the inside of the monitor's face. Looking back, these are simple manipulations, but also quite sophisticated-they remind us simultaneously of the media's real and surreal qualities.

In 1980, when he was a Fellow at M.I T 's Center for Advanced Visual Studies, German artist Bernd Kracke, in collaboration with Aldo Tambellini, created the slow-scan media event called transmitted sculpture. The work was first transmitted from the M.I.T. media studio in Cambridge, Massachusetts to a studio in Atlanta, Georgia. The idea was to use pixel-by-pixel, slow-scan transmission to transmit and reconstruct the life-size image of nude model's body. I saw the reception of this work in the BMW headquarters in Munich, during M.I.T.'s 1983 Sky Art Conference. It was mesmerizing to watch the nude body fill the eight video monitors as slowly as sifting sand. It was like watching new life form, except instead of a mitotic process, where a whole splits into parts, this was the child of alien genetic systems, something neither organic nor inorganic, yet beautiful and-in its steady, dream-like, assembly-method of procreation-hopeful.

Tall Ships by video artist Gary Hill comes close to the sense of physical contact achieved by Oral Roberts. Tall Ships was exhibited at Documenta in 1992 and at the Whitney Biennial in 1993. Sensitive to the position of a viewer traveling down a narrow, completely dark corridor, electronic switches trigger the projection of an image on the wall immediately adjacent to the viewer These images, which emerge one at a time in sequence as the viewer moves down the corridor's length, are black-and-white laserdisc "movies" of individuals of varying ethnic origin, age and gender, initially occupied with some activity-a man working under the hood of his pick-up truck, a woman washing dishes, a young girl on a swing. The people in these images look up with recognition when the viewer nears, stop what they are doing-the man puts down his wrench, the woman leaves her dishrag, the girl hops to the groundand walk toward the viewer as though toward an acquaintance As they approach, the figures' dimensions increase until they are approximately life-size. The sophisticated technology used by Hill to produce this encounter is both literally and virtually invisible; it is as if the figures simply materialize in response to the viewer's presence. In startling contrast to the many variations on the theme of alienation that dominated the '93 Whitney show, Tall Ships offered a sympathetic encounter with almost-warm flesh and blood.

L A. artist Brad Braverman died of AIDS in January 1996 at the age of 34. His final work, a 50-minute, four-vignette video called Rawshock (a play on the word "Rorschach"), confronted the majority of sexual taboos currently woven into the fabric of American culture. In a format of hardcore, homosexual pornography, the vignette "Dog Daze" refers lightly, poetically, and almost humorously to bestiality, "TV Violence" deconstructs to minute detail a rape scenario, "Ken Doll" makes a heart-wrenching allusion to pedophilia, and "The Last Kiss" presents necrophilia as a final and exquisitely passionate act of love. "Nudes have always been the focus of my work," Braverman said. "The shift from painting nudes with erotic overtones to creating what I regard to be genuinely erotic and artistic pornography was a natural one. I like pornography, it interests me, but my significant relation to it is as an artist, not as a consumer." Braverman's first two full-length productions-Fetish and Dis/connected-were designed to be marketed within the pornographic industry. Lead-in text describes the works as "visual fantasy presented as one viable alternative to actual sexual contact with another person." (Here Braverman echoes Aristotle's argument for the value of mimesis, or imitation, in providing the perceiver with a useful and enlightening vicarious experience.) Braverman's work investigates a broad range of erotic stimuli, from, at one extreme, acts which are by strict legal definition obscene in most American communities (e.g., penetration with a gun or police nightstick), to, at the other extreme, the subtlest of gestures-lighting a cigarette, picking up a glass of water, unzipping jeans, stroking hair. It is in this latter territory-that of the sublime, supporting detailthat the uniqueness of Braverman's artistic approach is most easily apprehended. "There are a million details which make people sexy and intriguing. I'm interested in thoroughly eroticizing the actors, in making them more sexual, more powerfully potent " For every 5 minutes that made it into his final videos, Braverman shot an average of 60 minutes. This 12-to-1 ratio is in sharp contrast to the industry average of 2-to-1. He cited current research indicating that men fantasize to repetitive brief images-an erotic gesture looped by the mind to be

watched again and again and again-while women fantasize to a more linear, story-like progression of imagined events. The strobe-like flashing and looping of image in Braverman's early work was designed to parallel the fantasy patterns of men.

The combination of strobe and body produces an astonishing and thrilling effect in "Caught," a 1982 work by New Yorkbased choreographer David Parsons. At the onset of the dance, the stage is lit by single overhead spot, and Parsons is moving from corner to corner. He is a tall man, with a powerful body. Enough time passes for the audience to become accustomed to his form and his sharply defined movements; then the overhead spot goes out, the stage is completely black, and Parsons begins to execute a series of high jumps from one part of the stage to another. He has a hand-held control for a strobe light; at the height of each of his leaps he triggers the strobe. The audience sees Parsons only when he is in the air; it is as if he is flying, and in one passage he appears to walk on air. At various points through the course of the piece, the overhead spot comes back on to reveal Parsons standing, quite relaxed, in the center of the stage Then the light goes out and the indestructible illusion begins again.

Artists Yukio Fujimoto and Dale Eldred have used the strobe to imprint eerie after-images on the viewer's inner eye. Fujimoto's 1988 work Printed Eye looks disarmingly simple, like a toy A slide scope with a flash attachment and a release cable is mounted above a small rectangle of perforated steel plate. The words PRINTED EYE are spelled out in blue and red plastic letters glued to the plate. The viewer is invited to look into the scope and push the release button. What you see in the scope is a black-and-white slide bearing the word GHOST. When you push the release, the light flash goes off in your eve, causing momentary blindness. For a long time after the experience, the ghost-like image of the word GHOST continues to float in front of your viewing eye. Eldred's Color/Light/Memory II, also exhibited for the first time in 1988, consisted of twelve conical piles of raw pigment-red, yellow, and blue-arranged on pedestals in a grid pattern in an otherwise empty gallery, and strobe lights mounted directly above each cone. The room was dark but for a strip of floor-mounted LEDs delineating the area where viewers were to stand. The strobe lights were timed to go off every 15 seconds. When they flashed, the vision of color was so instantaneous that it appeared to viewers to have occurred more in imagination than in real space and time. In the dark aftermath of the strobes' flash, the ghost image of whichever pigment cone the eyes had been focused on during the strobe remained in the viewer's mind's eye, floating up and away from the real form. Because the eye's pigment cones for the particular color-red, for instance-were saturated by intense exposure, the other two color cones were all that was available to fill the afterimage. If you were staring at a red cone at the time the strobe went off, the after-image would be blue-green. If you were staring at the blue cone, the after-image was a muddy mix of green and red. Fujimoto's and Eldred's works induce a startling revelation: The body can register experience the mind knows nothing about. In neither Fujimoto's nor Eldred's work does the viewer's mind's eve "see" an event that violently stimulates the body's consciousness.

A former-writer-now-attorney friend of mine named David Shoup once described the physical environment as made up of "air, and all that which isn't air." Maybe we can talk similarly about "pragmatic consciousness, and all that which isn't pragmatic consciousness," with the latter being a state of mind available to art, and to the poetic construction. We know now so much more than 20-30 years ago about how people take in information. We know that some people's brains are more acutely receptive to the written word than to image, and others, vice versa. As I said earlier, the idea of electronic technology as a tool to further our species' collective intelligence

is not a popular one. Many believe television threatens, or has already destroyed, literacy An understanding of the potential relationship between electronic media and literacy-not just the fact of "reading," but the phenomenon of "reading" (absorbing, comprehending, synthesizing)-is only just beginning. I've written recently about an artist in Kansas City named Michael Rees who says the forms in his work derive from his dreams. And dreams, he believes, are the human counterpart to computer-based virtual reality. Via the computer, we can explore the physical dimensions in our psyche, even going so far as to recreate and build the components of our imaginary and dream lives. Rees points out that the computer world is entirely based in text. Even 100% visual images are 100% language-based. What we desire linguistically results in a threedimensional, visual object. And what we desire visually, the computer must absorb linguistically. We are in a paradigm shift, this is the first time that image is as powerful in the language process as the language itself. Image now has the potential to be literate." Rees says, "As an artist with a computer, I feel a little like Alberti, the 15th century architect, who forced people to peer at the scene inside his 'miracle box' while he raved on about the newly-discovered principles of perspective. The computer allows a similar phase of artistic investigation. For me, it's like the Renaissance in a box."

The terms "image" and "text" distinguish two forms of information delivery. In the history of humans' manifesting consciousness and memory by means other than speech, image was first, then written language. Writing removes us, to differing degrees, from the experience of a moment. Legal language, for instance, attempts to achieve great distance from the moment, while poetry works to stay as close as possible. All writing has to be processed through the intellect before reaching the senses, but poetry attempts to run the circuit quickly, to strike sensory chords before the rational brain engages. Western civilization is clearly on a path away from the experience of the moment-our social, political and religious institutions encourage removal, disengagement, isolation. Electronic media can further this distancing, or it can be used by artists to create powerful poetic events that openly explore the finely-tuned workings of our own and others' inner lives. Electronic art, with its incorporation of motion and sequence, audio and video, has the capacity to bridge the long-standing schism between art and science and the ever-growing schism between the mind and the soul. When I think about my discovery of gravity, or of my passion for the high-tech crayon box, I know that the thrill came from comprehending something both physical and metaphysical, and that the comprehension was triggered by a ribbon of real experience, slowly unfurling.

These schisms-even the concept of "schism"-traces back in Western culture to the Garden of Eden, our myth of beginning. Eve was punished because she lusted for-physically craved-knowledge. Eve didn't want to count the apples on the Tree of Knowledge, she wanted to eat them. Because I've placed so much stress on poetry here, I'd like to end with a poem by Louise Gluck that addresses the tragedy of the rift. It's from the collection Wild Irises.

THE GARDEN

I couldn't do it again, I can hardly bear to look at it-

in the garden, in light rain the young couple planting a row of peas, as though no one has ever done this before, the great difficulties have never as yet been faced and solved-

They cannot see themselves, in fresh dirt, starting up without perspective, the hills behind them pale green, clouded with

flowers-

She wants to stop; he wants to get to the end, to stay with the thing-

Look at her, touching his cheek to make a truce, her fingers cool with spring rain; in thin grass, bursts of purple crocus-

even here, even at the beginning of love, her hand leaving his face makes an image of departure

and they think they are free to overlook this sadness.

eduardo@music.gla.ac.uk

Eduardo Re	(.uk)	
Centre for University	Music Technology - of Glasgow	

MACHINE LEARNING AND SOUND DESIGN: A CASE STUDY

Abstract

In this paper I discuss the role of Machine Learning (ML) in sound design. I focus on the modelling of a particular aspect of human intelligence which is believed to play an important role in musical creativity: the Generalisation of Perceptual Attributes (GPA). By GPA I mean the process by which a listener tries to find common sound attributes when confronted with a series of sounds. The paper introduces the basics of GPA and ML in the context of ARTIST, a prototype case study system. ARTIST is a sound design system that works in co-operation with the user, providing useful levels of automated reasoning to render the synthesis tasks less laborious (tasks such as calculating an appropriate stream of synthesis parameters for each single sound) and to enable the user to explore alternatives when designing a certain sound. The system synthesises sounds from input requests in a relatively high-level language; for instance, using attribute-value expressions such as "normal vibrato", "high openness and sharp attack. ARTIST stores information about sounds as clusters of attribute-value expressions and has the ability to interpret these expressions in the lower-level terms of sound synthesis algorithms. The user may, however, be interested in producing a sound which is "unknown" to the system. In this case, the system will attempt to compute the attribute values for this yet unknown sound by making analogies with other known sounds which have similar constituents. ARTIST uses ML to infer which sound attributes should be considered to make the analoaies.

long papers 49

1 Introduction

Recent studies in acoustics, psychoacoustics, psychology and cognitive sciences have vastly expanded our knowledge of the nature and perception of sounds and music. The sound domain of Western music is no longer demarcated by the boundaries of traditional acoustic instruments. Nowadays, composers have the opportunity to create music with an infinite variety of sounds, ranging from "natural sounds" (those produced by acoustic devices and different sorts of mechanical excitation; such as the sounds produced by blowing a pipe (Rossing, 1990)) to synthesised, "artificial sounds" (those sounds that cannot be produced by acoustic devices; such as the sounds produced by acoustic devices; such as the sounds produced by acoustic devices; such as the sounds produced by a coustic devices; such as

Computer technology offers the most detailed control of the internal parameters of synthesised sounds, which enables composers to become more ambitious in their quest for a more effective use of sound synthesis technology. In this case however, the task of sound composition becomes more complex. A composer can set the parameters for the production of an immeasurable variety of sounds, but this task is still accomplished unnaturally by inputting streams of numerical data specified manually (as in the case of the Csound score files, for example (Vercoe, 1991)). Even if composers know the role played by each single parameter for synthesising a sound, it is both very difficult and tedious to ascertain which values will synthesise the sound they want to produce. Moreover, composers often need to master a sound synthesis programming language in order to communicate with the computer (as in the case of CLM, for example (Schottstaedt, 1992, 1994)). Even if they master this language, the design of an instrument is not a straightforward task. In such a situation, higher processes of inventive creativity and abstraction become subsidiary to time consuming, non-musical tasks. Composers need a better working environment.

It seems that the interdisciplinary knowledge we have about the nature and perception of sounds (that is, acoustics, psychoacoustics, psychology, etc.) has not been taken into account by sound synthesis software engineers. Better sound design systems can be provided if we devise ways for including this knowledge in a sound design software. I believe that this situation can be improved by combining computer sound synthesis technology with Artificial Intelligence (AI) techniques. Al techniques are aimed here to help us to devise sound synthesis systems that take into account the interdisciplinary knowledge mentioned above

I have been working on an Artificial Intelligence–based approach for improving sound design systems. In order to test this approach, I have designed ARTIST: a prototype case study system that allows the design of sounds by thinking in terms of user–customised qualitative descriptions rather than in terms of numerical streams. Moreover, this system also works in co–operation with the user by providing support for the exploration of ideas.

In order to design sounds, composers often explore a variety of possible solutions by trying out possibilities within a certain personal style or idiom. ARTIST maintains user-customised descriptive information about known sounds on a knowledge base. The user can request sounds either by using its name (if the sound is known) or by using a number of sound descriptors (if the sound is unknown). In the latter case, the system attempts to create the sound by making analogies with known sounds. To accomplish this, ARTIST uses machine learning (ML) to infer which sound attributes should be considered to make the analogies.

In this paper I will focus on the ML engine of ARTIST. I begin with some background concepts, including a brief presentation

of the architecture of the system and a discussion about its knowledge representation technique Next, Lintroduce the basics of ML and discuss the ML engine used in the system Then, I present an example operation and end with some final remarks and envisage further work. More details of ARTIST's underlying philosophy, architecture and functioning can found in (Miranda 1994a; 1994b; 1995a; 1995c; Miranda et al., 1993). On–line documentation and a demo will soon be available at :

> http://www.music gla ac.uk/ HTMLFolder/Staff/EduardoInfo.html

2 Background Concepts

2.1 Sound Synthesis as Knowledge–Based Design Problem Design is a complex kind of intelligent behaviour. It is concerned with engaging in cognitive and physical acts in order to establish the suitability and effectiveness of our creations prior to actually constructing them. In attempting to solve design problems, designers explore the space of possible solutions by trying out possibilities and investigating their consequences.

One cannot hope to fully understand design by adopting a single perspective on its study, but we must combine the perspectives of many different disciplines. Nevertheless, I am interested for present purposes, in a limited aspect of design design as an explicitly knowledge-based kind of intelligent behaviour. It is therefore assumed that it involves the explicit organisation, application and generation of knowledge

Artificial Intelligence is a science which aims at understanding intelligent behaviour and how it might be artificially created to serve specific goals (Luger and Stubblefield, 1989). In this context, in order to understand design as a kind of intelligent behaviour one needs ways to describe and express aspects of the behaviour being investigated how one thinks this behaviour can be modelled and how one thinks it can possibly be aided, or even simulated by a computer.

As I am primarily interested in electroacoustic music (Emmerson, 1994), this work is based upon the assumption that composition is not only considered to be the combination of pre-existing sounds; it also involves an effort to elaborate the sound material (that is, creating the sounds themselves, rather than merely composing with existing sounds)

It is generally agreed nowadays that there are no invariable boundaries between the design of sound and the composition of music A composer might either think of an evolving single sound that is in itself a piece of music, or of a combination of several discrete sound events. When synthesising sounds to be used in a piece of music, musicians have an intuition about the possibilities of the organisation of these sounds into a musical structure. In attempting to obtain the desired sound, composers explore a variety of possible solutions, trying out those possibilities within their personal aesthetic (Roozendal, 1993). This process of exploration frequently results in inconsistencies between the composer's best guess at a solution and the formulation of the requirement. If no solution meets the requirement, then this requirement either has no solution at all, or it must be redefined. Sound design is seen in this context as a problem which demands, on the one hand, clarification of the requirement and, on the other hand, provision of alternative solutions. For example, suppose that a composer wants to synthesise a "high-pitch sound". In order to produce this sound, the system might need the expression "high-pitch sound" to be clarified by enunciating that "high-pitch" actually means a fundamental frequency above a certain threshold. If the system still does not understand the clarification, then some sound at least should be produced, which would give some chance that the sound produced may satisfy the user's

requirement

2.2 Representing Knowledge of Sounds

Knowledge representation is a fundamental aspect of ARTIST and knowledge-based systems in general. The representation technique defines the nature of the information and the mechanism for processing it.



Figure 1: ASS is a multi-levelled structure which mediates sound descriptions and their correspondent synthesis parameters.

It is generally assumed that intelligent activity is mediated by internal representations. There is no consensus, however, on what these representations are; some regard them as neuro-physiological states, whilst others may define them as symbols or even images. A system such as ARTIST needs a technique that supports the representation of both, sound description and synthesis. For the present purposes, I speculate that descriptions of sounds are based upon a kind of sonic image of sounds' contours in a phenomenal field, which helps our mind to identify their attributes. On a computer, this phenomenon can roughly be simulated using schemas (Miranda, 1994a; 1994b; 1995a; 1995c).

The schema devised for ARTIST is called Abstract Sound Schema (ASS). ASS is a multi-levelled structure aimed at mediating sound descriptions – that is sound attributes, created from a user-defined vocabulary of descriptors – and their respective synthesis parameters (att=attack, amp=amplitude, sust=sustain, rel=release, f0=frequency). The role of the ASS is twofold. it embodies a multi-levelled representation of the signal processing of an instrument and also provides an abstraction to represent sounds (Figure 1) The ASS consists of: nodes (black squares), slots (black circles) and links Nodes and slots are components and links correspond to the relations between them Both nodes and slots on the ASS are labelled. Slots are grouped "bottom up" into higher level nodes, which in turn are grouped into higher level nodes and so on until the top node. Each slot has a label and accommodates either a sound synthesis datum or a pointer towards a procedure to calculate a sound synthesis datum; this information is stored in a knowledge base. Higher level nodes correspond to the modules and sub-modules of the signal processing architecture, they also have labels (Figure 2).



Figure 2: The ASS representation of the instrument shown in Figure 2.

ASS enables the organisation of knowledge of sounds based upon the signal processing model that produces them, (e.g., a Physical Model algorithm (Borin et al., 1992; Smith III, 1996)). A sound event is represented here in terms of the various perceptual features which contributes to its identity. These features must however be tied to the signal processing model in some way. It is assumed that each descriptive attribute (identified in a sound event produced by an instrument) is caused by a certain component, or a group of components, of this instrument. Let us take as an example the instrument shown in Figure 1. If we tie an attribute called "pitch" to the oscillator component, the attribute value "high-pitch" could be made to correspond to a high frequency value; for example, f0=1760 Hz.

2.3 The Architecture of the System and Basic Functioning

Figure 3 illustrates the main modules of the system's architecture and their connection. ARTIST synthesises sounds from requests in a relatively high-level language, via the User Interface. Information about sounds and attributes are stored in the Knowledge Base as clusters of expressions (Figure 4) The Assemblage Engine consults the Knowledge Base in order to compute the slot values of either the whole ASS structure, or single nodes (i.e., the Assemblage Engine "assembles" the sound) An assemblage of the whole schema corresponds to a sound, whereas assemblages of single nodes correspond to sound attributes.



Figure 3: The main modules of ARTIST.

In order to synthesise a sound, the user may enter either the name of the sound, or a list of attribute values. If the list is incomplete (i.e., there is not enough attributes to assemble the sound) or opaque (i.e., the system does not recognize some of the attribute-values), ARTIST will attempt to guess missing or inconsistent information using the rules produced by the Machine Learning Engine, stored in Induced Rules.



Figure 4: The Assemblage Engine firstly collects the appropriate slot values in order to assemble the desired sound and then activates the synthesis algorithm.

3 Machine Learning

Machine learning (ML) is a major sub-field of AI, with its own various branches. Perhaps the most popular current debate in ML, and in AI in general, is between the sub-symbolic and the symbolic approaches. The former, also known as connectionism or neural networks, is inspired by neurophysiology; it intends to provide mechanisms so that the desired computation may be achieved simply by repeatedly exposing the system to examples of the desired behaviour. As the result of learning, the system records the "behaviour" in a network of single processors (metaphorically called "neurones").

ARTIST currently uses the more traditional ML symbolic approach (Winston, 1984). Several algorithms for symbolic learning have been employed in Al systems. These range from learning by being told to learning by discovery (Bratko, 1990; Carbonell, 1990). In the former case, the learner is told explicitly what is to be learned by a "teacher". In learning by discovery, the system automatically discovers new concepts, merely from observations, or by planning and performing experiments in the domain Many other techniques lie between these two extremes The criteria for selecting a machine learning technique depends upon many factors, including its purpose and the representation scheme at hand. In this work, the selection was inspired by a psychoacoustic speculation.

3.1 A Psychoacoustic Speculation: The Generalisation of Perceptual Attributes

It is believed that, when people listen to several distinct sound events, they tend to characterise them by selecting certain sound attributes which they think are important. When listening to several distinct sound events, it seems that the human mind prioritises the selection of certain attributes which are more important in order to make distinctions among them (Miranda, 1994b). If one carefully listens to a series of sound events, there will probably be a large number of possible intuitive generalizations. It is therefore essential to select those generalizations we believe to be appropriate. These depend upon several factors such as context, sound complexity, duration of events, sequence of exposure and repetition, which make a great variety of combinations possible. Humans, however, are able to make generalizations very quickly; perhaps because we never evaluate all the possibilities. We tend to limit our field of exploration and resort to some heuristic. I believe that this plays an important role in imagination and memory when creating sounds and composing with them

The purpose of ML in ARTIST is to induce general concept descriptions of sounds, from a set of examples. The ML technique selected for our investigation is therefore the inductive learning technique (IML). The benefit of being able to induce general concept descriptions of sounds is that the machine can automatically use induced concept descriptions to identify unknown sounds and to suggest missing attributes of an incomplete sound description

IML provides ARTIST with the ability to make generalizations in order to infer which attributes are "more distinctive" in a sound. The term "more distinctive" in this case does not necessarily refer to what humans would perceive to be the most distinctive attribute of a sound. Current ML techniques are not yet able to mimic all the types of heuristics used by humans. Nevertheless, I propose that one kind of heuristic might use information theory to make generalizations. The algorithms used in ARTIST thus use information theory to pursue this task. Once the generalizations have been learned, the user may use the descriptive rules to specify new sounds, different from those that were originally picked out as typical of the sounds that the system already "knows".

The aim of inducing rules about sounds is to allow the user to explore further alternatives when designing particular sounds. The user could ask the system, for example, to "play something that sounds similar to a vowel" or even "play a kind of dull, low pitched sound". In these cases the system would consult induced rules to infer which attributes would be necessary to synthesise a vowel-like sound, or a sound with dull colour attribute.

3.2 The Inductive Machine Learning Engine

The target of IML in our system is to induce concepts about sounds represented in a training set. The training set can be either new data input by the user, or automatically inferred by the system, from its own knowledge base.

Inductive learning can be either incremental, modifying its concepts in response to each training example, or single trial, forming concepts once in response to all data. A classic example of incremental inductive learning is a program called ARCHES (Winston, 1985). ARCHES is able to learn the structural description of an arch from examples and counter-examples supplied by a "teacher". The examples are processed sequentially and ARCHES gradually updates its current definition of the concept being learned by enhancing either the generality or the specifity of the description of an arch. It enhances the generality of the description in order to make the description match a given positive example, or the specifity in order to prevent the description from matching a counter-example.

The Iterative Dichotomizer 3 (ID3) algorithm is a classic example of single trial inductive learning (Quinlan, 1986) ID3 induces a decision tree from a set of examples of objects of a domain; the tree classifies these objects according to their attributes. Each example of the training set is described by a



number of attributes. The ID3 algorithm builds a decision tree by measuring all the attributes in terms of their effectiveness in partitioning the set of target classes; the best attribute (from a statistical standpoint) is then elected as the root of the tree and each branch corresponds to a partition of the classifications (i.e., values of this attribute). The algorithm recurs on each branch in order to process the remaining attributes, until all branches lead to single classification leaves.

I propose that ARTIST should not be restricted to a single IML technique. In principle, any technique that produces classificatory rules based upon attributional descriptions could be useful. Ideally the system should use various IML algorithms in order to provide more than one classificatory possibility. The ability to have more than one classificatory possibility is useful in a situation where, for example, the user inputs a request to produce a sound and the system must check whether it knows a sound that matches this request. Therefore by having more than one classificatory rule, the system has a greater chance of finding a matching sound and indeed of finding more than one sound which satisfies the requirement. To this end, I arbitrarily implemented two single trial IML algorithms: the Induction of the Shortest Concept Description (ISCD) and the Induction of Decision Trees (IDT) (Dietterich and Michalski, 1981, Bratko, 1990).

The ISCD algorithm aims to induce the shortest description(s), that is, the smallest set(s) of attribute values of a sound (or class of sounds) which can differentiate it from the others in the training set. The IDT algorithm also induce classificatory rules, but not necessarily the most succinct ones. In this paper I focus only on the latter algorithm; the former has been discussed in (Miranda, 1994b; 1996). ARTIST's IDT algorithm is an adapted version of a Quinlan's-like algorithm described in (Bratko, 1990). The result of the learning is represented in the form of a decision tree DT, where internal nodes are labelled with attributes and branches are labelled with attribute values (note, however, that the DT is not the same as the ASS representation discussed earlier). The leaves of the tree are labelled with sound classes. To classify a sound event, a path in the tree is traversed, starting at the root node and ending at a leaf. The IDT algorithm (see appendix) proceeds by searching, at each non-terminal node, for the attribute whose values provide the best discrimination among the other attributes, that is, the Most Informative Attribute (MIA); the formula for the selection of the MIA has been explained in (Miranda, 1994b).



Figure 5: An example DT induced from an hypothetical training set.

Figure 5 shows an example DT induced from an hypothetical training set such as follows:

```
Sound Name: dull
Sound Attributes:
openness = wide
pitch = high
vibrato rate = default
Sound Name. wobbly
Sound Attributes:
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openness = wide pitch = low vibrato rate = fast

etc ...

Once the DT is induced, to identify a sound a path is traversed in the tree, starting at the root (top sound attribute) and ending at a leaf. One follows the branch labelled by the attribute value at each internal node. For example, a sound described by "wide openness, low pitch and fast vibrato rate" is classified, according to this tree, as woobly.

4 An Example Operation

Suppose that ARTIST holds knowledge of a synthesiser that has three components (Vibrato Source, Pulse Generator and 1st Formant) and five parameters (rate, width, f0, f1 and bw1); its ASS representation is shown in Figure 6 and the Knowledge Base is partially illustrated in Figure 7. Note that the Knowledge Base also contains a dictionary of nodes, in addition to clusters of slots and attributes. This dictionary relates user–specified labels, or attributes, with the components of the instrument; for example, the attribute "openness" has been attached to the 1st Formant component and values for this attribute (e.g., "wide") will depend upon the values of f1 and bw1. Also, assume that the Machine Learning Engine automatically made a training set out of the Knowledge Base and induced the DT illustrated in Figure 5.



Figure 6: The ASS representation of the example operation instrument.

If the user requests a sound called "wobbly", ARTIST immediately retrieves the slots from the Knowledge Base, assemble the ASS and synthesises the sound; for example, ARTIST knows that the "wobbly" sound has "wide openness", that openness corresponds to the "1st Formant" component, that the parameters for this component should value f1=650 Hz and bw1=65 Hz, and so forth. In this case, there was no need to consult its induced rules.

Conversely, if the user requests a sound by using attributional descriptions, such as "wide openness and medium pitch",

ARTIST will realise that this description is incomplete (i.e., it does not mention the vibrato rate) and will consult its induced rules in order to deduce suitable values for the missing information. The DT (Figure 5) suggests that the "female vowel" sound is a good candidate to fulfill the requirement, regardless of its vibrato. ARTIST shall then synthesise the "female vowel" sound. In this case, the user might or might not be satisfied If not, the system may either suggest other sounds (if there are any other possibilities) or ask for additional information to enhance the request.

Knowledge Base

Dictionary of Nodes		
1st Formant⊨ Openness Pulse Generato⊭ Pitch Vibrato Source Vibrato Rate		
Attributes		
Openness= wide 11 = 650 Hz bw1 = 65 Hz		
Sounds		
ASS = wobbly Openness- wide Pitch= Iow VibratoRate⊧ fast		

Figure 7: An example of a Knowledge Base.

5 Final Remarks and Further Work

At the beginning of this century, Stravinsky envisaged the type of working environment where he could give sound descriptions to an engineer (such as, "something electronic, kind of middle range, bassoon-trombone like") in order to manufacture electronic sounds A few years later, Boulez made the avant-garde composer's dream possible: he created IRCAM, a research centre full of engineers, based in Paris IRCAM's engineers designed a large computer music system, called 4X, and provided support to Boulez (and to composers who could afford to visit Paris) to "manufacture" the sounds for his compositions. Fortunately, modern computer technology enables the simulation of 4X-like systems on smaller personal computers Most composers can take advantage of this technology, but they still need, however, better ways to operate such machines New systems, such as ARTIST, are therefore a natural progression.

In this paper I discussed the role of Inductive Machine Learning (IML) in ARTIST I focused on the modelling of a particular aspect of human intelligence which is believed to play an important role in musical creativity: the Generalisation of Perceptual Attributes (GPA).

At the moment, the attribute-value pairs for sound description are specified manually. I plan to automatize this task by adding the support of a sub-symbolic level to the symbolic IML level of ARTIST Neural networks technology is suitable for this task (Forrest et al., 1987) I propose that a neural network based upon auditory modelling techniques has great potential for raising new paradigms for sound representation. In addition, this would enable the creation of a more perceptually-oriented tool for sound analysis and therefore facilitate the definition of sound descriptors for a sound. The sub-symbolic level would then be aimed at the identification of prominent classificatory features in input samples of sounds and provide ways of referring them using symbols to be processed at the symbolic IML level.



Figure 8: Each time a new MIA is selected the algorithm constructs recursively sub-decision-trees ST for each attribute of the MIA.

Each time a new MIA is selected, only those attributes which have not yet been selected in previous recursion (that is, used in the upper parts of the tree) are considered (Figure 8)

When the available attributes are insufficient to distinguish between classes of sound examples (that is, sound examples that belong to different classes may have exactly the same attributes) then we say that these are conflicting examples. If the algorithm cannot find a new MIA, then it records a list of conflicting examples together with the number of occurrences in TSet of each element of the conflicting list. This information is used as a weight if a selection among them is eventually required.

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Appendix The IDT Algorithm

To construct a decision tree DT from a training set. TSet do.

1. If TSet is empty then DT is a single-node tree labelled null 2. Else

2 1. If all the examples in TSet belong to the same sound class SOUND_CLASS

2 2. Then DT is a single-node tree labelled SOUND CLASS

2 3 Else select the most informative attribute MIA
2 3 1 If there is no MIA to choose
2 3 2 Then DT is a single-node tree with the list of the conflicting examples
2 3.3 Else
2.3.3 1 From the MIA obtain its attribute values
atv(1), atv(2), , atv(n),
2 3 3 2 Partition TSet into TSet(1), TSet(2), , TSet(n), according to the attribute
values atv of MIA,
2 3 3 3 Construct recursively sub-decision-trees ST(1), ST(2),
, ST(n) for
TSet(1), TSet(2), , TSet(n),
2 3 3 4 The result is the tree DT whose root MIA and whose

sub-decision-trees are ST(1), ST(2), ..., atv(2), ..., atv(n)

Jon Van Oast and Ed Stastny (.us)

SITO + http://www.sito.org/

SITO: THE PAST, PRESENT, AND FUTURE OF COLLABORATIVE ART ON THE INTERNET

Summary:

SITO is one of the biggest Internet–based art cooperatives, with thousands of images, hundreds of artists, and numerous online collaborative projects. Since its birth nearly four years ago, SITO has grown dramatically in both size and complexity. How can one address some of the day–to–day maintenance problems of an online art site while simultaneously making it easier for people to participate as both artists and audience? Keywords: online art, collaboration, gallery administration, distributed art databases, collaborative programming

HISTORY

At the very beginning of 1993, a directory was created on an obscure ftp site found on a renegade machine in a busy .edu domain The directory was the beginning of a project called OTIS — "the Operative Term Is Stimulate".

The dream was simple, and yet, at the time, fairly revolutionary: create a place where artists could distribute their works digitally, via the Internet. Although now the concept of the "online gallery" is an all-too-common one, at the time of its birth, OTIS was one of the first. Even to this day, many of its features are still unique or rare among the net's galleries — free to anyone, non-digital works scanned for free, highly active mail list, evolving collaborative projects, etc. Within months, many artists were submitting digital works from all over the world, and still more were having paper-, film-, and canvas-based works scanned and displayed on OTIS.

From the very beginning, a second side of OTIS emerged. It was known as "SYNERGY", and it was the blanket name for the OTIS collaborative project initiative. OTIS:SYNERGY started out with simple concepts like collaborative tarot card decks (SYNERGY:ARCANA) and free-for-all real-time online get-togethers, SYNERGY:PANIC. To this day, PANICs occur nearly every weekend with a handful of online artists chatting, handing images back and forth, manipulating them, and passing them on.

Soon, the World Wide Web was the tool of choice for informa-

tion perusal on the Internet. OTIS quickly converted its holdings to this new format, and developed further ways to simplify both the OTIS gallery and SYNERGY usage and interaction. With hundreds of artists playing in its spaces, OTIS grew and grew Due to a tiny legal mix–up, OTIS became SITO. More SYNERGY projects were dreamt up and some even worked. The gallery — newly christened as "Artchives" — fattened with still more works.

PRESENT

This brings us to the current state of SITO. As one of the largest art cooperatives on the net, we feel it is our goal to explore as many ideas in this relatively new world as we can. A large part of SITO (and the biggest cause for its success) is the community of people involved. SITO supports a very active mail list. It offers a very open arena for critique and experimentation. People who never otherwise would consider themselves artists (and who probably still don't!) are given a chance to show their works to a potentially large audience, risk-free. The SYNERGY projects offer infinite opportunity for explorations into the possibilities of communities and collaboration on the Internet.

But, as one might suspect, this kind of growth, depth, and experimentation comes with a cost. We at SITO also feel it is our duty to share our administrative experiences with those who are undertaking similar projects.

Offering the ability for anyone, anywhere, to display potentially unlimited numbers of works for free is a hefty task to say the least! SITO has been very fortunate not to have had too many negative experiences with this policy. Other than the obvious work overload and rare attempt to exploit our kindness, things have gone fairly smoothly.

How, though, does one address some of the day-to-day maintenance problems of an online art cooperative while simultaneously making it easier and easier for people to participate as both artists and audience?

We will look at this problem the point of view of each of the two major parts of SITO: the Artchives and the SYNERGY projects. After discussing the current methods employed, new ideas being explored and developed for the future will be covered

ARTCHIVES

As a hold-over from the early conversion to WWW format, the SITO Artchives are still maintained as a

file-hierarchy-based space. Each artist has associated pages providing information like biographical data and listings of works in SITO. Although there is a system of categorization of the artwork (by medium as well as subject), this, too, is maintained by hand, on a strictly straightforward text file basis — e.g., editing the photography html page to add new works. While this method is thorough, it does not allow for any flexibility in the way the Artchives are browsed. Visitors who want to look at oil-painted portraits are stuck choosing either the "oil painting" page or the "portrait" page.

An obvious choice for improvement would be automation of some or all methods of displaying the contents of the Artchives. However, the problem goes deeper than just browsing. The administrative duties of SITO are becoming increasingly more difficult and backlogged. It is important to stress the need for automation of the maintainers' jobs as well as the task of simply looking at the works.

The structure and goal of the Archives has changed little since SITO began. You can look at art, and decide what you are going to look at by subject, medium, or artist. However, an automation of the entire SITO Artchives is currently under development and will be discussed in detail in the "FUTURE" section below.

SYNERGY

SITO:SYNERGY, by its very nature, is a changing, dynamic cre-

ature. This makes it slower to develop and more complicated. There have been "failed" attempts at SYNERGY projects (we call them "lessons"). There have also been very successful collaborative ventures.

While the Artchives are basically a digital analogy of a real-world phenomenon, SYNERGY (and indeed most online collaborative projects) is often charting new territories, both logistically and technically.

Most SYNERGY projects start as an idea spewed forth on the mail list: "Hey, why don't we do something like ...?" If there seem to be enough people who like the idea, then the SITO powers-that-be decide to pursue it. But, what does this entail? A great idea can often become a nightmare to the poor souls who have to develop it. On the net, this usually means setting up elaborate programs to do all sorts of magic things — in addition to the very human job of coordinating how groups of people all over the world interact.

Unlike online galleries, net collaborative projects often require entirely new concepts and tools in order to come to life. SITO is fortunate to have volunteers who spend time pounding out Perl code and keeping groups organized. Some SYNERGY projects (like the PANICs) are simple for both administrator and participant — everyone gets on irc, uploads and downloads files from an ftp directory, and plays with the images Others require both complicated procedures on the server and a delicate balance between ease of use and complexity for the participant.

An example of the latter type is the latest SYNERGY project, HyGRID This is not only the most successful SITO:SYNERGY undertaking in terms of participation, with nearly 50 artists and 500 pieces; but, it is also SITO's most successful in terms of praise, interest, and — seemingly — viewer enjoyment. We believe effectiveness and success in online collaborative ventures can be linked to the two base rules we have seen as a pattern in our past SYNERGY projects:

1. Make it interesting aesthetically and conceptually, and, if possible, dependent upon, or relevant to, the Internet as the medium.

2. Make it incredibly simple to use, contribute to, and administer. The net already confuses enough people — why make it worse?

These are no small tasks indeed!

THE FUTURE - ARTCHIVES

The aforementioned automation of SITO's Artchives is currently under development. This system is known as EGADS — Electronic Global Arts Database System It address the two important points of flexibility for the viewer and maintainability by automating both as completely as possible Searching for art by keywords, artist data, subject and so forth is easily performed on the core database of artists and their works. In addition, the curator's job of moving a submitted work into the system is automated as much as possible administrators are notified of new submissions, view the works and the corresponding informational data (title, media, etc.), make adjustments and related enhancements (such as automatic thumbnail generation), then approve the submission for inclusion into the system.

In addition to developing this for our own needs, we are also attempting to create a system that can be used by other online art curators. Flexible and reusable software systems have been at the core of the successful operation and growth of the Internet. We hope we can help contribute something to online gallery curators in a manner keeping with this net tradition. Issues such as efficiency and simplicity of EGADS will be constantly under evaluation and improvement. With any luck, a free product will be created that will be useful and simple for both the browsing online art audience and the people who work behind the scenes to organize online gallerries.

EGADS will also incorporate several other unique and exciting features, which also will be evaluated for feasibility, useful-

ness, and so on. For example, viewers can modify the way they want their search results displayed (with thumbnalls, sorted by date, etc.) and save these preferences for their next visit.

Also — and this is where the "G" in EGADS comes in — EGADS uses a protocol to communicate between one EGADS site and another. This means a visitor can potentially search every EGADS art site from any single one. For example, a user might request "Show me all [STILL LIFE] works by artists from [CANADA]" and get results regardless of where the artwork is stored. This inter-server protocol is developed to be configurable and optimize network resources and search times, and still maintain an acceptable degree of accuracy and scope.

THE FUTURE --- SYNERGY

As previously mentioned, collaborative projects are more complicated and vary greatly from one to the next. This makes it very difficult to establish any simple system to ease the development of such projects. However, we have found many existing tools that are useful and promising, and many more are being developed. By sharing tips and success stories, the online community-at-large will benefit greatly. Ultimately, protocols and recyclable building blocks will be created to help aid the process of turning an idea for a multiple-participant project into a working software application.

In its simplest form, net-based collaboration is essentially communication and interaction. Some guidelines that should be remembered are:

1. Follow consistent procedures from project to project, whenever possible. e.g., use a similar ftp uploading practice and filename convention for everything; allow users to "register" or "sign up" once and let that identification be used for any project they partake in.

2. At all costs, put the burden of functionality on: first, the server and its programs; second, the administrators; then, finally, the participants and audience. Simplicity sells the idea and makes it more likely to be used. A collaborative project without anyone participating isn't very collaborative.

3. Use or re-use tools that exist or you have already developed. If you have found a method or piece of code that seems very conducive to collaborative work, share it. Ask others (like us at SITO!) how they do things and what they think of your idea. Collaborate on the development of collaborative projects!

With regard to item (3), we would like to list some tools we have found to be worth keeping in mind:

 world wide web — For obvious reasons, you should design your collaborative projects interaction around the web as much as possible. That's where your audience is, and its easy to use (and build!) and flexible. Learn the world of the behind-the-scenes magic of the http world. Ask yourself "What would I want to do?" and "How would this be easiest to use?" Familiarize yourself with what is possible with web-based forms and pages that are built automatically by programs running on the server. Ask around and check in on some of the comp infosystem.www. newsgroups.

• ftp — This is the universally accepted file transfer method. Don't bother trying to add things such as email-based file submission for collaborative projects; its much too complicated and slow, formats can vary, and ultimately it will require more human moderation for the coordinators.

 irc/CU–SeeMe — When you want to add a real-time discussion attribute to your project, the old standby irc can be very useful. CU–SeeMe is becoming increasingly more widely used and more stable. Web-based "chat" systems can often be slow or tedious or just plain overkill If you just want a way to communicate in a chaotic manner, you can't beat a channel on irc or a reflector of your own for CU–SeeMe.

Perl - You can't go wrong with this do-all slicer/dicer scripting language. Not only are there plenty of pre-built tools available to bridge the gap between the web and Perl, but this language is almost fun to use. Granted its still programming, and far from "plug-n-play collaborative projects", but Perl is very flexible and very portable. Often, once you have trudged your way through your first Perl-based collaborative web script, you end up with dozens of new ideas based on what you just learned. Up until recently, most collaborative tools on the net have been very proprietary - they were built for one collaborative thing and that's it. However, more people are developing tools that have a broader use and audience. Also, many Internet tools (such as CU-SeeMe) are allowing users to develop "plug-ins" that can add small bits of functionality. Shared "whiteboards" or drawing spaces are being developed by many different parties using the web and Java and other resources, such as the years-old drawing add-on for the Mac irc client, Homer.

An example of one of the more interesting collaborative tools being developed is Potlatch. It is an ongoing project that is attempting to develop protocols and tools that provide very broad and flexible ways to facilitate tasks like exchanging and merging images and sounds in real-time.

Keeping an eye on art or graphic programming newsgroups, the SITO mail list and SITO:SYNERGY, and online technology-art organizations and newsletters will help you learn about new collaborative tools that are available or in development. And finally, don't hesitate to look for assistance — If you are an artists who likes computers, you just might find a programmer who likes art.

RELATED INFORMATION

This document, including links to many of the concepts and software mentioned, can be found online at http://www.sito.org/isea96

giftwrap@acpub.duke.edu



VIRTUAL PERSPECTIVE AND THE ARTISTIC VISION: A GENEALOGY OF TECHNOLOGY, PERCEPTION, AND POWER

Introduction

My paper proceeds from three points: 1) seeing and being are intrinsically interconnected; 2) the alteration of perceptual forms by artists alters the forms of perception of viewers; and 3) points one and two above have political ramifications. Using the history of one-point perspective as a foil, I shall explore these three points by examining sources from a variety of disciplines, including art history, philosophy, and media criticism, supplemented by my own analyses of works of art from various epochs. This foundation forms the springboard for theorizing and problematizing how the use of emerging technologies by contemporary artists are reconfiguring perception and contributing to epistemological and ontological transformations that are not only culturally significant, but politically charged.

It is clear that the development of one-point perspective by Bruneleschi and Massaccio in the early 15th century marks the emergence of a system for envisioning space that remains paradigmatic to this day. What may be less evident is that perspective is a form of perceptual technology, a tool for measuring and representing the visual world. The technology of perspective has itself been adopted and further reified by another visual technology: photography, and by the status of that medium as a representational norm. The result is that perspective has become such a powerful and pervasive paradigm that it is difficult to imagine perceiving the world without it. At the same time, its effects on human consciousness are so subtle and insidious that one is rarely aware of it. Perspective is like part of an invisible operating system running in the background of the brain's perceptual program. My reason for referring to perspective as a technology is because I want to emphasize its status as a tool, while at the same time denaturalize it by pointing out its embeddedness in a genealogy of human ideas.

As a common protocol by which the visual world is conceived. perceived, and represented, the idea of perspective as a technology serves as a port of entry into a more general discussion of how changing visual forms alter seeing and being. In The Gutenberg Galaxy, McLuhan noted the dual aspects of perspective as a visual system of spatial representation and as a social system of monadic points of view. He suggested that the mathematical relationships that represent perspectival space paralleled changing social relationships in which the indisputable hierarchy of divine right and indentured servitude was being replaced by a self-serving sense of personal identity and entrepreneurship. Together, these two aspects of perspective comprised a conceptual paradigm of sweeping significance. McLuhan recognized that changing perceptual technologies played a significant role in transforming consciousness.49

In other words, the perceptual technologies by which forms are configured within a culture mediate certain patterns of association that affect the perceptual disposition of that culture. It follows that when perceptual technologies change, the perceptual disposition of the culture may also undergo a transformation In more simple terms, if a person grows up in a landscape of discrete pyramids, s/he will tend to think in terms of pyramids, and an encounter with a cube might be quite baffling. If, however, the person learns how to combine those pyramids to make a cube (it takes a factor of six); then her/his perceptual disposition will be vastly expanded, and a richer universe of forms will emerge. I think that this is an appropriate analogy for what artists do

Artists throughout history have consistently worked to envision alternative modes of visual representation often at odds with the dominant conventions of the time. By manipulating and altering form, artists transform human consciousness. I have invoked a comparison of Baroque perspectival techniques in order to show how varied representational schemes suggest such a different relationship between the viewer and the work, that the viewer's sense of self and relationship to the world is dramatically altered.

New technologies demand new visual protocols, and contemporary artists like Miroslaw Rogala and Roy Ascott have used state-of-the-art perspectival rendering, computer-controlled, interactive environments, and advanced computer telecommunications to make important contributions to theorizing and developing new artist-object-viewer roles and relations. Their work may be seen as artistic inventions/interventions, as acts engaged in a politically charged process of reconfiguring the world. Through electronic forms that alter and expand modes of perception and consciousness, viewer-participators in their artworks are challenged to change not only the way they perceive the world, but to change the way they exist in the world, and, moreover, to change the world itself.

Quadri Riportati Versus Quadratura:

How the Alteration of Form Alters the Form of Perception As an early example of a politically charged visual reconfiguration of the viewer's relationship to the world, and one which, incidentally, has important parallels in the emerging field of virtual reality, I would like to compare the Baroque painting techniques of quadri riportati and quadratura. The former, illustrated in the central section of Annibale Carracci's Farnese Ceiling (1597–1601) is characterized by the illusionistic representation of a gallery of framed paintings depicted on a ceiling vault. The latter technique, illustrated in Fra Andrea Pozzo's Glorification of San Ignasio (1691–4) involves a dissolution of the actual architectural space altogether and the representation of a perceptual continuity that, like VR, conjoins the viewer seamlessly with the illusionistic environment.

In the Farnese Ceiling, the visual field is segmented into distinct units that frame each scene as a discrete object, severing perspective lines between the space of the viewer and the space of the image In so doing, Carracci emphasizes the physical and psychological gap between the viewer and scene represented. The images on the Farnese Ceiling are like Albertian windows on the world. As simulacra, however, Carracci's paintings of paintings do not permit a transparent gaze through their illusionistic representation of a scene, but rather demand and admit only a spectacular glance at their own self-representation as an illusion of a painting.

By contrast, in the San Ignasio ceiling the visual field is not only unbroken, but absorbs the viewer in the infinite perspectival vacuum of its seductively illusionistic vortex. The window is gone altogether. In the absence of a mediating frame and through the dizzying force of unperturbed perspectival projection, the viewer, like St. Ignatius, may defy pictorial gravity and ascend through the ecstatic, angel-filled ether to join the lord on his holy throne. The point I'm trying to make is that quadri riportati and quadratura are not just two different ways of depicting space, but represent substantially different ways of configuring the viewer's relationship to the world. The viewer of quadri riportati is on the outside looking in, while the viewer of guadratura is an integral element participating directly in the action. Phenomenologically, the experience of space these visual techniques invoke in the viewer produces a different sense of self, relation to others, the polis, and God. Because quadri riportati and quadratura constitute different worlds, they demand and produce different viewers by transforming consciousness. As a result, these divergent visual innovations have significant political consequences.

One of the political challenges raised by new technologies is the question of how a viewer is to learn to identify, absorb, and utilize the transformative elements embodied in artistic form while they still have currency, i.e., before they are appropriated by the status quo. This consideration again raises the issue of the relationship between consciousness and power, for those who possess perceptual technologies have access to ways of configuring and manipulating their worlds that those who lack them simply do not. As the information elite become increasingly wired technologically and, in turn, psychologically, the way they/we perceive the world and their/our relationship to it will become increasingly different from those who are not acculturated into advanced technoculture. To lack the visual technology of perspective is to lack perspective metaphorically, just as to lack emerging perceptual technologies inhibits participation in new forms of consciousness, subjectivity, and politics.

Art, Technology, and the Transformation of Consciousness: The Work of Miroslaw Rogala and Roy Ascott

Perhaps what I've said so far may not strike you as particularly new. But somewhere in between the well-worn discourses of media studies, critical theory, and art history, and the equally fatigued rhetoric of techno-utopianism, there is place where artists use technology to make art. In this regard, I shall situate some recent approaches to interactive multi-media and networked communications by Miroslaw Rogala and Roy Ascott within a genealogy of artistic approaches to transforming perceptual forms. At the same time, I would like to examine the phenomenology of these new media. If they do not fulfill the hyperbolic idealism of Silicon Valley marketers, what more precisely do they do? Can their theoretical or semiological underpinnings be more subtly articulated? What is it like to actually experience them? Finally, in what ways do these artist's technological transformations of visual form alter the form of perception and reconfigure the terms of being?

Miroslaw Rogala

In ordering our world we order ourselves In ordering ourselves we order a world alone and together we mirror ourselves into the world to find ourselves there our personal space is the site of our selfhood our bodies the intimacy of desire, need and fear the world shaped by and shaping what we were who we are what we will be

– Miroslaw Rogala, in collaboration with Joe MacGregory, 1994



Miroslaw Rogala: World Wide Web hompage, showing the artist in his interactive multi-media installation,Lovers Leap, 1994.

Miroslaw Rogala's interactive multi-media installation Lovers Leap premiered at the ZKM's (Zentrum für Kunst und Medientechnologie) Multimediale 4, in Karlsruhe, Germany in May, 1995. There is also a CD-ROM version.50 When I first began conceiving this paper, Lovers Leap immediately leapt to mind because it is not only a technological conquest that manipulates perspective with breathtaking virtuosity, but is also a strikingly beautiful and provocative work of art that transforms the role of the viewer and the status of the image.51

The installation space is flanked by 4 x 6 meter video screens on either end A wireless headset enables the system to track the position and motion of its wearer, and to trigger video sequences stored on a laser disc. In general, as you move towards either of the screens, black and white images (of people walking across a bridge in downtown Chicago, surrounded by skyscrapers) appear to zoom in with you, as you walk away, the image zooms out. These images are complemented by audio sequences of people discussing, among other things, someone dying of cancer. Walking from one edge of the screen towards the other, the image seems to scroll around with you as though this were not a single image, but a distorted video. Standing in the center of the piece, you'll see what Charlie White has referred to as an "eerie fish-eye image that looks like a ball with buildings growing out of it "52 Remain stationary and the image begins to modulate You feel like you're being sucked out of a wormhole and compressed through an 8 mm fisheye lens as the skyscrapers fade off, leaving you in hyperspace. Then you come plummeting down to earth, twisting and reeling below.

Sometimes, however, you leap out of Chicago altogher, and end up in Jamaica, where the hustle and bustle of the city gives way to more sensual pleasures of music, dancing, working with your hands, and doing a flip into the ocean. The atheistic skepticism of the cold, urban technopolis is contrasted with the leap of faith inherent in the imagined spirituality of island life. But all is not reggae sunsplash in Ja's land Without warning, I was confronted with a large military radar dish in the middle of my Caribbean vacation. The geographic leap from Chicago to Jamaica is reinforced by the cultural disparity between the military technology of surveillance and control and the colonial view of the island inhabitants' primitive simplicity.

In retrospect, I have reconsidered my own relationship to the imagery. I was the one with the wireless headphones on, the one controlling the images with the latest interactive multi-media gadgetry, virtually jetting off to Jamaica as a QuickTime voyeur to watch a half-naked black man dance for me. Unlike the impoverished locals, I didn't have to stay there My white skin and access to technologies afforded me mobility I could come or go as I pleased. Perhaps this issue is particularly compelling for Rogala himself, a native of Poland, whose parents sold a cow to buy their son an accordion, and whose own mobility behind the iron curtain was severely restricted until 1979. Indeed, his own personal geographic, cultural, and technological leaps have been dramatic. By presenting such provocative contrasts, Lovers Leap invokes reflection on the intertextual weaving of imagistic narratives and the viewer's personal relationship to them. If we can leap into the perspective of another person, perhaps we can see not only ourselves with fresh eyes, but can develop more empathy for others

This complexity of narrative perspective is paralleled by the state-of-the-art computer imaging technology that enables the virtual navigation of a two dimensional image as though it were exploded into three dimensional space In order to do this, Rogala and his collaborators, Oxaal, and Hovestad, took two fish-eve photographs, each comprising an opposing 180 degree view. I think it helps to conceive of each of these photographs as taking a 3-dimensional hemisphere of information and collapsing it on a 2-dimensional circular plane, that is the photograph itself. Now imagine placing the circular photographs face-to-face, kissing each other Then sew them together around their circumference. If we puff it up in the middle, we've created a virtual sphere. Next imagine yourself in the center of the sphere, which is the point from where the camera registered the scene The images along the inside of the spherical surface have been optically restored to obey the rules of perspective.

But Rogala and his collaborators have taken things a few steps further They have made a virtual model, not just of the surface of a sphere, but of a spherical volume. In Lovers Leap, we are able to see not just any point on the surface of the sphere from a fixed location in the center of it (where the camera was) but are able to move around in the sphere and theoretically see any point within it, from the perspective of any point within it.

This last part is especially significant. Whereas the point of view from which a two-dimensional, photographic image is fixed by the location of the camera, in Lover's Leap, the point of view is indeterminate and variable, and is triggered by the changing location of the viewer within the installation space. The formal qualities of the medium thus resist the idea of an authorized, originary point of view. Each point is the locus of a distinct universe of visual information as perceived from the parameters of its coordinates. Because neighboring positions within the installation access similar sequences, there is no starting point nor ending point, but rather a continuous, fluid flow of perspectival possibilities. Moreover, depending on a viewer's movements, the people represented in the image can appear to be walking along the bridge, turning their heads to look at the viewer. Since the visual information is stored as digital data, focal length can be altered virtually in order to give the impression of zooming in or out. Images can also be subjected to anamorphic perspectival schemes ranging from normal to 360 degrees This flexibility has enabled Rogala to create abstract, perceptually and viscerally challenging sequences such as the "ball with buildings growing out of it," that blasts off into the sky, pulling your eyes up with it, while leaving your guts behind, like a glass perspective elevator on speed.

The ethos of interactive art is that the behavior of the viewer/participant contributes to, or alters, the state of the work. A unique aspect of the interactivity of Lovers Leap is that the viewer's behavior alters the virtual perspective from which the image is generated, defying the monadism of single-point perspective and affording multiple points of view that transform the image and the viewer's relationship to it As you experiment with Lovers Leap, you become aware of the flatness and limited purview of your own perspective – both optically, and well as metaphorically. Because, as I have maintained, seeing is being, this expanded visual awareness has important ramifications for an expanded sense of self and one's place in the world. As Timothy Druckrey has written,

"[A]s a consequence of the reconfiguration of the experience of perspective as interactive... Lovers Leap posits the image as a challenge to the objective history of linear projective geometry as it considers the encounter with the random and subjective juxtapositions of experience... A new understanding [of] form becomes necessary, one that is both generative and analytical. A new understanding of subjectivity is necessary as well, one that accounts for the reflexivity of both the image and the behavior it initiates."53

Part of that new understanding of subjectivity has to do with coming to terms with the limits of one's ability to control events. Just as Lovers Leap makes clear the tunnel vision of single-point perspective, so it also makes clear that human agents have at best only partial control of their environments (and the technologies they have created as tools to facilitate that control, but which often have a mind of their own.) Indeed, the behavior of the piece is not precisely predictable, and it takes some practice to become accustomed to it. There is, moreover, a challenging balance of interactive influence and uncontrollable technological determination, of frus-

trating disorientation and the empowerment of learning how to exert influence on one's environment.

As I mentioned in the interview, I felt like a Jamaican child set down in the middle of Chicago, who had to learn a whole new way of navigating through the world. Perhaps there is some virtue in that. The more I struggled with figuring out how the virtual environment worked, the more my own perceptual awareness of multiple perspectival possibilities grew, and the more I was able to accept and enjoy not being able to claim an authoritative perspective, not being completely in control. But that does not mean I was without power. I became increasingly interested in seeing from other points of view, and in allowing myself to make associative leaps - visual and narrative - that I had not considered before. Such leaps allow for the transcendence of limited perceptual schemes In relinquishing a certain kind of control, I gained another existential technique, another way of being in the world. To refer back to an earlier analogy, it permitted insights into how, for example, one might construct cubes out of pyramids. As I have maintained throughout, to transform visual form is to alter the form of vision, and in this respect, to empower it

Roy Ascott



Roy Ascott, Change Painting (two different states), 1962.

I would now like to turn attention to contemporary British artist, theorist, and teacher, Roy Ascott, whose pioneering work in telematic art has utilized computer-telecommunications as an artistic medium for transforming consciousness and creating meaning.54 Before powerful computers were readily available to artists, but deeply influenced by the science of cybernetics, Ascott experimented with interactive constructions. His Change Paintings (1962), for example, the composition of which were variable and could be changed by the viewer, explored the idea of transforming the viewer into an active participator, and the work of art into a systematic process that incorporated the artist, the object, and the audience. Ascott had begun writing about the relationship between art and technology in 1964, and in his 1966 essay, "Behaviourist Art and the Cybernetic Vision," he envisioned some of the possible changes afforded by networked communication:

> Instant person to person contact [that] would support specialised creative work... An artist could be brought right into the working studio of other artists ... however far apart in the world...they may separately be located By means of holography or a visual telex, instant transmission of facsimiles of their artwork could be effected... [D]istinguished minds in all fields of art and science could be contacted and linked.55 Ascott's aspiration preceded the creation of the earliest internet by several years ARPANET, an acronym for the Pentagon's Advanced Research Projects Agency which funded it, came online in 1969, but its use



was tightly regulated for scientific and security purposes Finally gaining access to French astrophysicist and UFOlogist Jacques Vallee's Infomedia Notepad System, in 1980 Ascott organized Terminal Art, the first artist's computer networking project He "mail[ed] portable terminals to a group of artists in California, New York and Wales, who participated in collectively generating ideas from their own studios," producing the simultaneous, transatlantic creation and experience of the work.56

Shortly after Terminal Art, Ascott commented on his first artist-networking experience while participating in The Saturn Encounter, an inter-disciplinary networked conference organized by Vallee later in 1980.

For the artist, computer conferencing is both a perfect metaphor of interconnectedness and a new and exciting tool for the realization of many aspirations of twentieth century art: it is a medium which is essentially participatory; it promotes associative thought and the development of richer and more deeply layered language: it is integrative of cultures, disciplines and the great diversity of ways of being and seeing. In short, I am very optimistic about the potential for art of networking media...57

While in telematic art discrete texts and images may be distributed and manipulated by participators, it is the spontaneous process of networked exchange that Ascott conceives of as the work. In this process of mutual co-creation which Ascott now refers to as "distributed authorship" distinctions between artist, audience, and artwork become blurred. Form, content, and context merge in multiple ways as well. Similarly, Ascott fuses "seeing" and "being" into the new perceptual paradigm of "cyberception" – a new vocabulary for a new sense of community where power and consciousness are shared through technology.58

In scores of articles reflecting on his telematic praxis, Ascott has theorized that the activity of distributed authorship enables the network to attain a form of collaborative consciousness, a fusion of individual consciousnesses into an integrated whole which exceeds the capacity of any particular node. Such work cannot be experienced except by participating in it, a process which demands that one conjoin one's consciousness with those of others. Telematic art de-emphasizes the node, the subjective point of view that is essential to both geometric and metaphorical perspective, and emphasizes the network, the collective construction of a group awareness that is greater than the sum of its parts. By dissolving traditional aesthetic categories and by affording the experience of an expanded form of consciousness, like the formal invention of guadratura, Ascott's work is politically subversive. True to his 1964 proclamation on art and technology, he has utilized telematics to perform his stated artistic responsibility to "shape and create his world" by presenting forms and "qualities of experience and modes of perception which radically alter our conception of it."59

At the same time, if an Internet connection is a prerequisite to participate, one might wonder how wide Ascott's telematic embrace will ever be, and how much love it might offer if and when the medium attains ubiquity. For even if everyone in the world were connected, would the technologically adept have patience with, or interest in, the neophytes? (When was the last time you paused to help a disoriented newcomer find his/her way through a MUD?) Adepts are struggling to retain or improve their class status and the privileges that go along with it. In many ways, cyberspace is no less hierarchical than any other space. Along with the benefits of telematic connectivity, political surveillance and control are enhanced. Moreover, online rape, pornography, terrorism, and viruses are part of the economy and structure of the global village.

Cyberspace reproduces the physical world, simultaneously intensifying and dematerializing it. Along with exacerbating problems in new and unprecedented ways, so telematic interaction also offers potential benefits that are available nowhere else. On the constructive side of this double–edge sword, Ascott's artistic experiments, beginning in 1960's with interactive art systems, and since the 1980s, on the emergent behavior of telematic art networks, can be seen as high–end, aesthetic R&D. His early collaborative networking experiments heralded a new paradigm for human interaction which is still in its infancy, and the ramifications of which are as yet uncertain.

The disembodied sensation of traveling and communicating telematically is open to the gamut of human emotions. For example, in Paul Sermon's Telematic Vision (1994), I felt myself personally rejected by a person at a remote location who sat next to me virtually on the sofa. A few minutes later, another person wanted to be a bit more intimate than what I had in mind, and I felt violated to some degree by a phantom image. This is a difficult experience to explain to the uninitiated When I described this at an Art History conference a couple years ago, a professor told me that I was crazy.

I realize, though, that even amongst the cognoscente in the field of art and technology, the jury is still out on Telematic Art. Simon Penny, in "Consumer Culture and the Technological Imperative" (1995) wrote disparagingly of an "awesomely unsuccessful project in which students in Sydney exchanged and reworked faxes with students in Vienna."60 Now while Penny has made important contributions to the field of electronic art and robotics, on this point he missed some of the subtleties of telematics. He claimed that what became apparent was "a series of cultural discontinuities." But it seems that what were perceived as "cultural nonsequitors" in Sydney might have offered a brilliant opportunity for expanding the terms of artistic understanding of the Australian students.

According to Penny, however, his students were incapable of conceiving of their "electronic pen-pals" as anything other than "just like themselves," or, worse yet, as "conform[ing] to some ill-conceived Australian notion of the Austrian national character." That the telematic project was unable to relieve these prejudices suggests to me only that the students and teachers failed to see anything beyond their fixed, monadic perspective. That's not the fault of telematics. But it is a good reason why they need more of it!

What the telematic project successfully accomplished was to bring them into contact with a visual culture of which they had little prior experience, and about which they had not been sufficiently educated. Even if the Australian students could make neither hide nor hare of the Austrian contributions, I would find it very difficult and disconcerting to believe that they did not learn something simply from confronting the fact that their expectations were so utterly misconceived. Moreover, the telematic project enabled a cultural exchange in a medium with which the students, Australian and Austrian alike, may have been unfamiliar, a medium whose protocols and etiquette are themselves still a work–in–progress.

I think that one of the misunderstandings about telematics arises from the expectation that it correspond with either an object- or process-oriented approach to art. While certainly the process of interactive, collaborative artistic exchange and the files created as a result of networking constitute key components of it, there is also a conceptual component to the medium which, though it rarely goes unnoticed, infrequently is recognized as fundamental to the work. Consider the proposition that telematic art is a form of conceptual art. What I mean by that is that the work is embodied in its own idea.61 It was, in fact Penny's article that helped call my attention to it. He missed this point because he disapproves of the "techno-utopian rhetoric" of telematic art. But what he refers to as "rhetoric" is a basic material of the medium. That is, the conceptual idea of telematic art (that electronic telecommunications technology either do, or have the potential to, contribute to the creation of a networked consciousness that is greater than the sum of its parts) is an integral part of the work

As an analogy, the concept of telematic art may be likened to the idea of painting a pretty picture. A particular canvas aspiring to that goal may not succeed. But the idea that a painting could be pretty, and that there is value in trying to paint a pretty picture, will persist. Now one is entitled to the opinion that the picture is so ugly that it does a disservice to the very idea of beauty embodied in it. But with regard to telematic art, judging from the rapid increase in the number and quality of such projects, it appears that far from frightening away potential participants, the medium is succeeding – not only conceptually, and in terms of its process, but also in making headway towards realizing its ideals.62

With regard to form and process, the challenges of telematic art are not unlike that of Rogala's Lovers Leap They both demand the participator to navigate unfamiliar territory, to consider alternative perspectives, and to adapt to other points of view. To do so is to expand one's perceptual ability. The result of that is to expand one's capacity to be in the world. And that is, at its most fundamental level, a source of empowerment

Perspective mediates human consciousness epistemologically and ontologically, in the privacy of one's home, in the public sphere, and in cyberspace For those who possess and are possessed by it, this technology of the mind shapes how they configure their worlds. Perspective is so subtly and literally incorporated into the body that its functioning is, for the most part, invisible. It is, in the words of Kierkegaard, "so close that it is within it " Many people, like the outraged professor who told me I was crazy, find the idea that mind and machine are co-extensive is deeply threatening, a threat that leads to the presumption that technology has invaded the mind. There is a certain sanctity of the body, the mind, and especially the subjective consciousness that this embodied sense of perspective transgresses The technical mediation of consciousness is neither a new thing, nor something to be alarmed by. Symbolic forms of verbal and visual languages are technologies so deeply embedded in consciousness that it is difficult to think of thinking or envision seeing without them. I hope to have elucidated some significant ways in which seeing, being, technology, and power are inextricably related. In this context, perspective may be seen as a pervasive technological paradigm that has organized aesthetics, politics, and social conscience for some 500 years, a paradigm whose foundations and point of view are being challenged and restructured by such artists as Rogala and Ascott, who are remaking vision through a technology of interaction that shifts consciousness from fixed, single points to simultaneous and multiple perceptual matrices.

References

1 This paper was presented at the annual conference of the International Society for Electronic Art (ISEA)in Rotterdam, September, 1996 An earlier version was presented at the Duke University Graduate Art History Symposium, April, 1996, I would like to dedicate this paper to my wife, Kristine Stiles, whose critical acumen is surpassed only by her loving kindness

2 See Marshall McLuhan, The Gutenberg Galaxy. The Making of Typographic Man Toronto University of Toronto Press, 1992, c 1962. McLuhan has been duly criticized for the technological determinism in his work. By attributing to technology the quality of an autonomous agent influencing the course of human events, McLuhan, his critics argue, fails to recognize the ongoing process of cultural negotiation by

which a given technology comes into being, gains semiological significance, and is subject to change. I agree that it is overstating the case (but also misreading McLuhan) to suggest that technology exists in a vacuum, or that it alone can determine anything. But neither is technology simply an effect that does not effect The critique of technological determinism is useful for its insight into moderating the extent of one's claims for the direct influence of technology They are lacking, however, in their inability to reckon with the material reality of technologies, the persistence of their forms, and their historically embedded ethos. Indeed, I claim that it is by virtue of its very inseparability from human events, that technology exerts its most pervasive and insidious influence. It is also important to note that much scholarship has been done to theorize how the shifts from oral literary traditions to print culture, and to electronic media have transformed consciousness By contrast, relatively little research has theorized how the use of emerging technologies in the visual language of art has transformed consciousness

3 artintact 2 Karlsruhe ZKM/Zentrum für Kunst und Medientechnologie, 1995 Volker Kugelmeister designed the CD-ROM interface

4 For more information on Lovers Leap and Rogala's work in general, visit the artist's web site at http://www.mcs.net/~rogala/home.html

5 Charlie White, "Project Profile When Two Worlds Collide Rogala's Lovers Leap" Digital Video, March, 1996 Online journal at http://www.liveDV.com

6 Timothy Druckrey, "Lovers Leap - Taking the Plunge Points of Entry Points of Departure" in artintact 2 (catalog accompanying Artists' interactive CD-ROM magazine) Karlsruhe ZKM/Zentrum fur Kunst und Medientechnologie, Cantz Verlag, 1995 73-74

7 For more information on Ascott's work, including several online publications, please visit the artist's website at http://caiiamind.nsad.gwent.ac.uk/roya.html

8 Roy Ascott, "Art and the Cyberbetic Vision" CYBERNETICA Review of the International Association for Cybernetics, Vol. IX, No. 4, 1966, Vol. X, No. 1, 1967

9 Roy Ascott, "Art and Telematics Towards a Network Consciousness" in Heidi Grundmann, Ed., Art + Telecommunication, Vienna, Shakespeare Co., 1984, p. 27.

10 Saturn Encounter Transcript of an International Computer Conference on Future Technology San Bruno InfoMedia Corporation, 1980 My emphasis

11 For more on the idea of cyberception, see Roy Ascott, The Architecture of Cyberception (online publication) http://caiiamind.nsad.gwent.ac.uk/cyberception.html (1994)

12 "Technology is not only changing our world, it is presenting us with qualities of experience and modes of perception which radically alter our conception of it The artist's moral responsibility demands that he should attempt to understand these changes. The artist functions socially on a symbolic level [and] stakes everything on finding the unfamiliar, the unpredictable His intellectual audacity is matched only by the vital originality of the forms and structures he creates Symbolically he takes on responsibility for absolute power and freedom, to shape and create his world " Roy Ascott, "The Construction of Change," Cambridge Opinion Cambridge 1964 37-42

13 Simon Penny, "Consumer Culture and the Technological Imperative," in Simon Penny, Ed. Critical Issues in Electronic Media (Albany State University of New York Press), 1995–47-69 All the following quotes from Penny are from this article

14 For more on Conceptual Art see Kristine Stiles and Peter Selz, (Eds.) Theories and Documents of Contemporary Art, Berkeley University of California Press, 1996-804-895

15 Still, it must be recognized that electronic art in general still has a great uphill climb in order to gain acceptance and recognition as aesthetically on a par with works of art produced in more conventional media. Eleanor Heartney's negative review in Art in America, September, 1996, of



the ZKM-organized media art exhibition at the Guggenheim Soho bears that out. Her suggestion that interactive media art is all bells and whistles with little content, reveals her failure to recognize the potency of the medium's message, and the inseparability of form and content. The problem is not that media art is not quite ready for prime time, but that Art in America is not quite ready for the formal challenges that media art demands of its viewers.

SHORT PAPERS

invaders@elnet.uni-c.dk

Jørgen Callesen

(.dk)

planner – theoretical studies (M. A.)Space Invaders – Multimedia design education, Copenhagen

INTO THE BLACK BOX

relations between artistic expression and formal descriptions in computer based fiction and art

black box: any unit that forms part of an electronic circuit and that has its function, but not its components specified

Webster's Encyclopaedic Unabridged Dictionary of the English language

a technical invention can never resolve a problem in art; it can only state it, so that it can be resolved by a second, properly aesthetic, invention. This is the well-known dialectic of longterm progress and short-term regression Étienne Souriau

Summary:

In this paper I will describe formal descriptions as a material for interactive and nonlinear artistic expression. The relation between formal structures and traditional means of expression in 4 Danish experimental works are outlined to give concrete examples.

Keywords: non-linearity, interactivity, formal descriptions, artistic expression.

Formal descriptions and artistic expression

Digital media confront the author and artist with a new material for artistic expression. In principle every single sample in the soundtrack or pixel in the image is generated or manipulated after certain rules and descriptions expressed in a programming language, which can happen automatically or through interactive response from the reader/viewer. My point of departure is the thesis that formal descriptions of the used representational material is an integrated part of the fiction or artwork, if it includes interactive and non-linear means of expression. Even though the concept of interaction and non-linearity in many ways challenges our understanding of traditional fiction and art, some of its basic characteristics are quite easy to define in semiotic terms. If you see the artwork or the fiction as expressions interpreted by a reader, interactivity gives the reader the ability to influence the expressions physically and non-linearity describe the change of their order and nature.

In the process of interpretation the reader assigns content to the expressions, which in this case is the used material e.g. tactile feedback, video, graphics and sound, the readers actions and the changes performed by computation. In computer science the terms recipe and ingredients are often used to describe algorithms and the data they process. Using the recipe as an analogy to the programme script, the artist or author will have to write recipes ensuring that the ingredients are manipulated and combined in a way that is artistically acceptable involving both content and expression. Not many artists working with traditional linear media believe this is possible, because the idea that you can create explicit descriptions of artistic expression is believed to be absurd. The further the artist dives into the world of the programmer the more nuanced and complex the non-linear structures and the interactivity can be The main problem in this process is that it involves a level of abstraction that removes the focus from the material presented to the reader. An example is complex non-linear works, where the programme script can generate more readings than the author or artist will be able to experience.

For the same reason many works of interactive fiction and art that have caught the attention of critics dealing with traditional media are often classified as gimmicks, simplistic or just lacking general appeal. Books, films and paintings normally speak for themselves, whilst descriptions of their content and nature are made by their audiences, critics and academics. The artistic genius is often described as the person working mainly from intuition and talent combined with technical skills and analytical distance to the work

I stress the point that the new challenge is the creation of explicit descriptions, since they define the non-linear and interactive effects actualised on the computer. But this does not mean that we will have to give up judging the traditional means of expression actualised in each linear reading from the criteria developed within traditional media, e.g. graphics, video art, film, animation, drama, or comics. Many works suffer from the fact that the focus is on the complex formal descriptions controlling the expressions, which often makes the outcome conceptually interesting, but poor compared to traditional media. On the other hand works that do posses artistic qualities in traditional terms often do not succeed in integrating interactive or non-linear means of expression as a vital part of the work.

To do so the formal descriptions and the actual audio-visual manifestation must be seen as interdependent and unique to each work. If the quality of interactive fiction and art has to match the high standard seen in traditional linear media, artists will have to invest the same attention to the creation of formal descriptions for programme scripts that they pay to the traditional material they master.

The structure behind 4 Danish experimental works

From a practical point of view the focus must be on the way the elements of the work can be manipulated and what function the manipulation has in the artwork or narrative. In the following this relation is illustrated by 4 experimental works.

The Cliche generator

The cliché generator is a self-transforming animated collage created by the Danish computer artists Jacob Schmidt and Jacob Tekiela in 1992. They used the facilities in MacroMind Director 3.0 to integrate and manipulate sound effects, digitised graphical material and simple texts about modern life. The script executing the transformations is built on a principle of symbolic juxtaposition of the elements in a sequence of varying duration. The elements, grouped in 4 general themes, are selected and manipulated by a controlled degree of random. The collage merges slowly through the different themes starting out with basic values (food, sex and family) to organic matters (the body and nature) to consumer culture (tourism, media and advertisement) to technology ending up with war and death. The elements are manipulated automatically in several ways inspired by the change in the seasons through change of the order, the palets, the sound, the movements and the speed.

Two stills from a sequence The texts say (mother, easy) and (well fed, natural).

The unpredictable interplay between the textual and the graphical clichés about modern life create series of collages with a content spanning from humouristic to serious statements. The quality of the collages is secured by developing a graphical style in the process of pre-editing the integrated material, making it suitable for manipulation by the script as backgrounds, animations, pictures and texts. In this way the integrated elements and the script are created on the basis of a formal description of compositional rules and signifying elements in traditional collage.

Lailah

Lailah was created in 1992 by Stine Schou and me with the main aim to create a poetic interactive experience and to introduce the notion of responsibility in interactive art. Lailah is a room installation presented at ISEA 1994 with a manipulable projected image and 3-channel sound that can be manipulated. It includes photography, simple animations, background music and recited poetry. The structure behind Lailah resembles the cliché generator in that it is a collage where the elements are manipulated by controlled random selection. But here the focus is on creating formal descriptions of the interplay between the spectators actions and the audio-visual feedback on an emotional level. The spectator can touch the image of a naked womans torso with a transparent coloured dot and change the colours of the flower petals covering the body. The response consists of recited poetry and single words arranged in positive and negative paradigms based on common connotations to the actual colours used - blue, red, green and yellow. Other features are animated flies or a spider introduced among the flower petals if the user response is too instrumental or vulgar. This is registered and executed by a script analysing the speed of the spectators movements, the places clicked and time spent in different areas. In other words the script contains formal descriptions of our interpretation of how the the readers' actions reflect his or her interpretation of the work.

The feedback to these actions is based on a formal description of how an atmosphere of serenity, moodiness or horror is created.

The Improviser

The improviser is the result of an experiment carried out by dramaturgist Jørn Buch and me in 1993. The idea was to create a montage-technique and formal descriptions for non-linear videomontage that will establish contact between randomly chosen videosequences of two actors improvising individually. Based on studies of gestures and facial mimic 160 video sequences (60 with each actor) were organised in groups according to the direction of the actors attention. Each individual sequence was analysed according to the actors' activity based on the 3 different forms: observation, evaluation and reaction. Then they were indexed by timecodes, which enabled the script to distinguish between the different forms of action. In the playback two randomly picked sequences are played at 9 different possible locations on the screen, ordered after two main principles. The first principle is that the actors always direct their attention toward each other via gaze or gesture. The second principle is that when one actor is reacting the other is observing or evaluating.

The structure behind the Improviser is an example of how detailed formal descriptions of facial mimic, gesture and actions in drama improvisation can form a basis for non-linear videomontage. The performance generated by the programme script is not comparable to real drama improvisation filmed on video. This particular technique is developed for further experiments with interactive fiction and videomontage inspired by

the aesthetics of collage, experimental film and art video.

SimExistence

SimExistence is a sketch for an interactive comic created by Space Invader Yvonne Meyer in 1995.

SimExistence can be described as a conventional comic that adds animations, background music and simple interactive choices to the conventional graphic repertoire. The interactive choices and non-linear sequences are written in a style known from adventure games, where simple choices determine the storyline. The difference here though is, that the story is narrated and drawn by a comic author knowing how to express the results of the choices in a dramatic and exciting way. Furthermore the interactive choices are skilfully integrated with the detailed graphical world of the comic, which makes the different situations in the narrative worth experiencing more than once. This problem is also solved by giving the reader a randomly chosen personality inserted randomly in time and space in the narrative each time the work is experienced.

SimExistence is a work-in-progress, and the task of the author is to draw characters and settings that match the storylines and interactive narrative choices generated by the script in a way that the quality of the outcome is comparable to that of her linear work.

Conclusion

Non-linear fiction and art can only become an art form in its own right, if the new means of expression are used to create meaning and experiences with a point of departure in traditions established within traditional media. Since a substantial part of the representational material is based on audio-visual material known from traditional medial - images and sound the artist must be able to handle both traditional media and the new means of expression in combination. This means that the artist or author as part of the creative process has to enter the black box, getting to know its components and specify its functions on their own terms - both in the world of the reader and in the world of the programmer. This is an necessary step in creating art and fiction that manifest an aesthetics and a poetics unique to interactive and non-linear works.

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diaz@uiah.fi

Lily Díaz, 1996

Artist/Researcher Media Laboratory University of Art and Design Helsinki/UIAH

(.fi)

CROSS-CULTURAL ANALYSIS OF THE ART OF MEMORY: ARS MEMORIA, ITOLOCA AND XIUHÁMATL

Summary

The paper is a cross-cultural comparison of two models of human memory, namely the Art of Memory practiced by the ancient Greeks, and Itoloca and Xiuhámatl, the memory systems of the Nahua / Aztec people of Pre-columbian Mesoamerica.

Keywords: Augmentation, codices, communication exchange, images, imagination, loci, memory, mimesis, myth, orality, perception, private, public, rethoric, scenarios, soul.

Introduction

Neither physical, nor situated at any specific location, memory is somehow intimately associated with our ability to learn and to, therefore, process and understand reality. A selective filter, memory has also been co-participant in our march through the ages. As we advanced from the pre-history, our tools no longer limited to survival utensils, we fashioned technologies such as writing Although external to ourselves, these technologies supplemented, and extended our internal brain memory system.[1]

The concept of memory as a tool with techniques that can be learned and skillfully deployed to carve mental and ideological spaces, has a long history. In her seminal book, The Art of Memory, Frances Yates describes how the Greeks invented a memory system, based on the technique of impressing 'places' and 'images' on the mind.[2] Similarly, in Los Antiguos Mexicanos a través de sus Crónicas y Pinturas, the noted americanist Miguel León-Portilla cites an early colonial text that describes how the ability of the Indians to quickly memorize many things was directly related to their methods of painting.[3]

That this history is one that cuts across cultural borders is the scope of this essay, for in it I will present, and compare, historical descriptions pertaining to two ancient, and radically different, models of human memory. The memory models that will be discussed are the ancient Greek art of memory, Ars Memoria, and the memory system of the Nahua/Aztec [4] Indians of Mesoamerica, the Itoloca and Xiuhámatl.

The sources

Most of the knowledge that exists regarding these memory models comes from secondary sources. They are in the form of descriptions found in works whose main topic of discussion is not the practice of memory augmentation itself. For example, the main source of information about the practice of Ars Memoria is Ad Herenium, an anonymous text compiled by a teacher of rhetoric in Rome circa 86-82 BC.5 In addition, both Cicero's De Oratore and Quintilian's Instituto Oratoria contain passages that describe the practice within the context of its role in the discipline of rhetoric.[6]

In a similar manner, primary sources of the early colonial period include descriptions of how memory augmentation techniques were used among the Aztec Indians in Mesoamerica. These accounts, however, do not make reference to the activity itself, but rather, how it was used in the religious practices of the indigenous population. The Historia Natural de las Cosas de la Nueva España, an illustrated chronicle narrated by native informants during the second half of the 16th Century, is one source of information about how the system was used by the Aztec priestly caste to ensure that people correctly learned the divine songs. Collected between 1532 and 1597, the Manuscrito de la Biblioteca (also known as Cantares Méxicanos) is yet another source that illustrates how the Xiuhámati and Itoloca was practiced among the Aztecs.[7]

Ars Memoria, or the Art of Memory

Historical Background

Although probably derived from an earlier oral tradition, the invention of the art of memory is generally attributed to Simonides of Ceos, a pre-Socratic poet who lived circa 556-468 BC. The earliest description of the art, according to Yates, is a tiny section of a text dating back to 400 BC. In this fragment, which is known as the Dialexeis, images are deposited in memory upon images from the gods and ordinary men. For Yates, this use of archaically simple human figures to represent 'things' is an indication of how the art may have developed. That is, from the more simple mnemonic techniques into a practice that utilized complex concepts such as imagines agentes (or active images).

Yates further asserts that for Cicero, the invention rested 'on Simonides discovery of the superiority of the sense of sight over the other senses."[8] Of added significance, is the fact that the comparison of poetry with painting is also fathered on Simonides.

The idea of an interconnection between poetry and painting has connotations that run throughout the history of philosophy and ideas in the classical world. Although a thorough analysis of the evolution of this concept is beyond the scope of this essay, I will attempt to provide a brief synopsis of how Yates approaches this subject.

In Yates view, Aristotle proposes that images are the material of intellectual faculty and that it is even impossible "to think without a mental picture."[9] Like the imagination, memory is part of the soul: it is a collection of mental images not of things present, but rather, of things past.

Memory... belongs to the same part of the soul as the imagination; it is a collection of mental pictures from sense impression but with a time element added, for the mental images of memory are not from perception of things present but of things past.[10]

Although Plato also sees knowledge as derived from sense impressions, true knowledge, comes from fitting the imprints of these impressions on to the mold of a higher reality that anteceeds our existence. The Platonic memory is organized in relation to this reality.[11] (One could almost say that it is defined by its functionality, or for what it is used.) Operating from this Platonist frame of reference, according to Yates, Cicero uses elements of rhetoric, memory, and inventio to prove the divinity of the soul.

The soul's remarkable power of remembering things and words is a proof of its divinity; so also is its power of invention, not now in the sense of inventing the arguments or things in a speech, but in the general sense of discovery. The things over which Cicero ranges as inventions represent a history of human civilization from the most primitive to the most highly developed.[12]

The development of the art is thus seen as parallel to the development of more highly organized society.

Description of Ars Memoria

"Very singular is the art of this invisible art of memory."[13] According to Ad Herenium, there are two fundamental kinds of memory. Engrafted in our minds, natural memory, is born with our thoughts. The other kind, artificial memory, is strengthened and confirmed by training. All the classical sources that describe art of memory, stress the primacy of images.[14]

The artificial memory is established from places and images (Constat igitur artificiosa memoris ex locis et imaginibus), the stock definition to be forever repeated down the ages.[15]

In order to make use of the artificial memory, the orator (or the student of rhetoric) would assemble a collection of a large number of places, or loci. Arranged to form a series, this visual, mental structure, would also have to be remembered in order, since this would facilitate movement backwards and forwards from any of the locus, or places Into these receptacles, images (or simulacra) of what was to be remembered, would be placed.[16]

Because it could be used again and again, the formation of the loci, was considered to be of prime importance. Images placed in loci that were no longer used, would fade. However, the same loci could be used again to store new things. For loci were like "wax tablets which remain when what is written on them has been effaced and are ready to be written again "[17]

Detailed instructions advised on the best ways to go about creating a loci. Deserted and solitary places were favored, as "crowds of passing people tend to weaken the impressions." [18] Thus, a student intent on developing precise, and well defined loci, would select a solitary spot in which to memorize places. To avoid confusion, it was recommended that the memory loci, should not resemble each other too much.

They should be of moderate size, not too large for this renders the images placed on them vague, and not too small for then an arrangement of images will be overcrowded. They must not be too brightly lit for then images placed on them will glitter and dazzle; nor must they be too dark or the shadows will obscure the images.[19]

To facilitate recalling the order of the loci, a certain set of these could be punctuated with a distinguishing mark. The fifth locus in a series, for example, could be marked by a golden hand followed by the image of an acquaintance whose name was Decimus, on the tenth.

Two kinds of images were used in Ars Memoria, 'one for 'things' (res), the other for 'words' (verba)."[20] Similarly, there were two kinds of artificial memory. Memoria rerum was used when the need was to recall every single word in the right order. However, when the objective was to remember the order of the motions and arguments (or 'things') in a speech, Memoria verborum was the preferred method.

In other words, 'things' could be regarded as the topic of the speech being memorized, but 'words' represented the language used to present the subject matter. Since the ideal (as defined by Cicero) was "a firm perception in the soul of both things and words", can we infer thereby that the existence of

this typology is somehow related to the application of the art in the discipline of rhetoric? [21] Also, given the importance of visual representation, how did one go about deciding what images to use? The reasons offered by the anonymous author of Ad Herenium make this one of the most curious aspects in the study of the art. These reasons provide evidence of an awareness of the psychological impact of images, the role these play in the arousal of emotions, and how this can be manipulated to create memorable imprints.

When we see in every day life things that are petty, ordinary and banal, we generally fail to remember them, because the mind is not being stirred by anything novel or marvelous. We ought, then, to set up images of a kind that can adhere longest in memory. And we shall do so if we establish similitudes as striking as possible; if we set up images that are not many or vague but active...[22]

According to this passage, sensory perception, and specifically the sense of sight, could be harnessed. This was done through the use of visual representations of extremes that are easily remembered, and similitudes, or analogies, fashioned from as striking a nature as possible. These representations would then be methodically applied in the creation of mental scenarios. These scenarios served the purpose of adding an element of narrative to the mental structure created.

Because of the personal (and private) nature of the narrative, it is possible that these assemblages also created a cognitive associations that also had an emotional component. This aspect not only reinforced the associative links created, but also, may have provided an efficient mechanism for their retrieval.

Places are chosen and marked with the utmost possible variety, as a spacious house divided into a number of rooms... Then what has been written down, or thought of, is noted by a sign to remind of it... These signs are then arranged as follows. The first notion is placed, as it were, in the forecourt; the second let us say in the atrium; the remainder are placed in order all around the impluvium, and committed not only to bedrooms and parlours, but even to statues and the like This done, when it is required to revive the memory, one begins from the first place, to run through all... [23]

One could argue that in Ars Memoria, memory was not seen as a passive repository, but rather, as an active, perceptionoriented process. Encrypted messages, these scenarios were restrained in a fluid, linear-like, mental structure. Like malleable wax tablets whose contents are softly effaced with the stroke of the stylus, they existed solely in the mind's eye and could only be deciphered by their author.

Itoloca and Xiuhamatl: The Art of Memory among the Aztecs

Historical Background

Because of the destruction of a large part of the cultural heritage, the sources that can inform us about the nature of this system and how it was used, are few. A large part of the data comes to us in the form of descriptions by native informants. These accounts were compiled by religious personnel in the aftermath of the fall of Tenochtitlán-México. As such they are tinted by a European perspective. In spite of these limitations, the sources that are extant can provide us with highlights of how this system may have developed and operated.

It was the tlamatinime (or wise men) who implanted in the educational centers a system whose purpose was to fixate in the memory of the students a whole series of texts and commentaries. In this system, oral tradition in the form of songs was used to reinforce a historical narrative that was also inscribed in painted codices. (According to 16th Century chronists, in the Calmécacs, as the centers were called, the sons of the Aztec nobility were literally taught "to sing their paintings."24) Furthermore, the responsibility of the accurate transmission and teaching of the songs, not only to students but to the population at large, was the task of a special category of priests. They were called tlapizcatzin, which literally means 'conservator.'[25]

These teachings were reinforced through their use in rituals. Many of these rituals were ceremonies. These periodically punctuated the individual's development within a society that was devoted to the enactment of collective, and theatrical, representations of a religious nature. Sometimes recalling past events, at other times to honor a deity, the hymns and songs were a significant component of these celebrations. Often though, they were also performed just to pass time and, therefore, played an important role in everyday life.

> The conservator took care of the songs of the gods... So that nobody erred, he took care of teaching the people in all the neighborhoods the divine songs.[26]

Where are the origins of these narratives? Also of particular interest is their use of the oral narrative in combination with material of a graphic nature. Factual information about how the Aztecs developed a way to transfer information through the use of oral transmission is not abundant and much of the knowledge that has reached us is shrouded in the veil of mythology. There are, however, sources that can be historically corroborated.

In these historical sources there exists, according to León-Portilla, a double orientation. That is to say, there are the texts that extoll the value of the traditions and institutions of antiquity as rooted in a Toltec past. Then there are the texts of the historians of Mexico-Tenochtitlan, who intent on suppressing the history of other groups in the area, burned the old codices and made use of the Itoloca and Xiuhhámatl to produce a new historical conscience.

This new version of history was instituted in the year 1426 AD, during the reign of Itzcoatl, the fourth tlatoani (or ruler) of the Aztec nation. According to the sources, the idea was conceived and implemented by Tlacaélel, a historical personage who became the special advisor to three of the Aztec rulers.[27]

Proclaimed and transmitted through the painted books and poems learned in the education centers, this philosophy was strengthened until it became the root of Mexico/Tenochtitlan.[28]

This strategy served the function, according to León-Portilla, of legitimizing the rule of the Aztecs over the other groups in the area and introduced the idea of the Aztec nation as the people of the sun, with the supreme mission of war. It also served to promote a re-interpretation of the mythology. In the resulting new version the existence of the present world was explained as one that followed a series of succesive Ages that had all come to a catastrophic end. Within this worldview, the present Age, or Fifth Sun, would also come to an end. The only ones who could prevent this from happening were, of course, the Aztecs.

Description of Itoloca and Xiuhamatl

As opposed to the private, individual activity of Ars Memoria,

the art of memory, as practiced by the Aztecs, was a collective and public-oriented endeavor. If Ars Memoria was a solitary, mental practice that placed emphasis on the mimetic ability of sight to purvey true knowledge, the Aztec art of memory involved a process of communication exchange that did not recognize a separation between word and image.[29]

In the memory system of the Aztecs, two components were utilized simultaneously. The first, which was also the oldest technique, was Itoloca, or what is said about someone or something.[30] It consisted of the systematic use of oral narratives, that were repeated, not only in the educational centers and religious institutions, but also at home, in everyday life, and on special occasions.

The content of these oral narratives included myths, descriptions of ancient lands, of long pilgrimages, and of the way of life of extraordinary beings. The myth of Tamoanchan, that tells the story of the arrival and departure of the wise ones who brought with them the knowledge of the codices, the arts and music, is an example of Itoloca. [31]

Complementary to Itoloca, was Xiuhámatl or 'record of the years.' This technique made use of diverse modes of graphic representation to preserve a knowledge-base that corresponded to the materials contained in the oral narratives. The information was recorded in 'codices' or 'painted books', that were crafted in the manner of folded screens made of amate paper. Unscrolling one of these devices would reveal pictorial material designed to operate at diverse cognitive levels. Since the act of reciting also concurred with that one of unfolding the codice, a vocabulary of gestures may have also been available to the reader. Through the use of these techniques it was possible to produce an experience that "vaulted a barrier that European senses are normally unable to cross." [32] As is better expressed by a cuicapicqui (or Nahua poet) himself

I sing the paintings from the book As I am unfolding it I am a flowery papagallo, I make the codices speak, in the interior of the house of paintings.[33]

Since the content of the recitation corresponded to the one inscribed in the painted books, it could be argued that the graphic representations of the codices reflected and were an extension of the minds of their creators.[34] Although a self-reflective quality may have been present (as we have already noted the Aztecs did possess the notion of a historical consciousnes), there was no sense of estrangement in the act of recording by the painters.[35] This is because for the Aztecs, an "image rendered visible the very essence of things because it was an extension of that essence." [36]

A glance through the types of glyphs used as recording devices in the Xiuhámatls, reveals the complexity of the system of representation employed. There were five basic types: Numeral glyphs to indicate quantity; calendrical to depict time; pictographic to represent objects; ideographic to synthesize ideas and concepts; and phonetic to replay sounds and syllables that were usually associated to places and people.

In the context of this essay, the use of the calendrical glyphs is of particular interest. Initially their role may have been strictly pictographic. However, through their implementation in the tonalpohualli (or divinatory calendar system) we can aproximate a knowledge of how their function evolved to include complex ideographic aspects.[37] For example, each day was associated with particular concepts that bestowed on it a special meaning, and also distinguished it from any other. In addition, four of the twenty glyphs that were used to represent days, were also employed to depict the four thirteen-year groups that made up a fifty-two year cycle of collective and ritual significance to Aztec cosmology.[38] Symbolically, these four glyphs, were also associated to the four cardinal points.

That there existed an intricate correspondence between the system of representation and the system of time keeping can be discerned from the fact that similar structural arrangements were used in the design of the Xiuhámatls where the chronicles and historical events are encoded.[39] An example that illustrates this is the so-called Codex Cruz. This codice *explains the history of three cycles (of fifty two years each) as was customary in that land.*[40]

The relationship between the diverse devices utilized, however, was not linear and should not be misconstrued as being a type of illustration-as-support to narrative characteristic of Western artifacts.

Page layout, the scale of the symbols, the position they occupy in relation to one another, and the way that they are grouped together... determine both the direction in which the codex is to be read and its ultimate meaning. In addition, the colors filling the spaces, delineated by the thick regular strokes... constituted chromatic variations that influenced meaning.[41]

As already mentioned, representation for the Aztecs, was not of a mimetic nature. Whether pictographic or ideographics, the glyphs were not produced as imitations, or representations, of something.[42] Endowed with a profound symbolism, they were meant to be the actual thing. The use of color, by the tlaculos, for example, had distinct connotations: Yellow used in a human figure indicated the femenine sex; blue used in vestments denoted the South and pointed to a relationship with aspects of the god Quetzalcoatl; black and red represented writing and knowledge.[43]

It could be argued that through the simultaneous use of Itoloca and Xiuhámatl the Aztecs developed a memory system that cannot be explained as based purely on inscription techniques, or painting, or oral transmission. It used all of these elements Much like Ars Memoria, it relied heavily on the use of the senses.

Decoding the paintings originally required a two-fold operation; while the eye scanned the images, the reader uttered words inspired by the oral tradition. Sound and image apparently complemented one another, without the one being a version of the other. Paintings were thus 'made' to speak and, in turn, 'paintings reinforced and refreshed oral memory.[44]

That these methods represented something more than the mere use of oral tradition may be evident in their appropriation and subsequent use by the Spanish clergy seeking to indoctrinate the native population.[45] Quoting Fray Jerónimo Mendieta, León-Portilla reports how the missionaries "used a way of preaching very convenient to the Indians, as it was similar to the system that they had of dealing with everything through painting." [46]

The memory system of the Aztecs was a collective perfomance that occured within the space of the public sphere. Its continuous enactment was reinforced and ensured through preservation via a particular system of codification that utilized graphics. As a whole, the system made use of the spoken word, bodily gestures, and the paintbrush of the artist who recorded the narratives on the paper surface for preservation.

With a mythological narrative that had been modified to produce a specific interpretation, the practice of Itoloca and Xiuhámatl relied on the interaction of specialized sectors and highly skilled craftmen in the society. Like the folded screen that, upon loosing its mechanisms of support collapses, with the onslaught of the invasion the memory system of the Aztecs suffered the same fate of the society who created it.

Conclusion

Throughout this essay, I have attempted to show how two different pre-industrial cultures fashioned distinct methodologies to create conceptual spaces and transmission mechanisms that allowed them to preserve their intellectual and cultural heritage

The Aztec system of Itoloca and Xiuhámatl involved an interaction between oral transmission and information coded in a pictorial manner. Its conceptual configuration was very much dependent on collective, ritual, re-enactments (or performances). These were regulated by the state through the education system controlled by a priestly caste.

Ars Memoria, as practiced in the discipline of rhetoric, was a solitary and private activity. It used a methodology that relied on the use of visual representations of mimetic nature, and its importance declined as writing became the preferred way to preserve the knowledge of the past. It may be of interest to explore whether its diverse aspects have been sublimated into Western culture

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1 Rose, Steven, The Making of Memory From Molecules to Mind, p. 60

2. Yates, Frances, The Art of Memory, p 11

3. León-Portilla, Miguel, Los Antiguos Mexicanos a través de sus Crónicas y Cantares , p. 69

4. The Aztecs were a Nahua tribe Their name refers to their origins in Axtatlan (north of the lake Yuriria) In the year 1111 AD they migrated into the valley of Mexico. By 1275 AD they had infiltrated and situated themselves in Chapultepec Guided by their leader Tenoch, in 1345 AD, they founded the city of Tenochtitlan Morales-Padrón, Francisco, Atlas Histórico y Cultural de América, Vol. 1, p. 38

1010000,	raido rilocorido y durandi do
5.	Yates, Frances, p. 20.
6.	lbid p. 19
7.	León-Portilla, Miguel, p 71
8.	Yates, Frances, p. 43
9.	Yates, Frances, p 47
10	Yates, Frances, p. 33.
11	Ibid, p. 51.
12	lbid, p. 59.
13	lbid, p 32.
14	lbid, p 19.
15	Yates, Frances, p. 22
16.	Ibid. pp. 22-23.
17.	Ibid p 23
18.	Ibid
19	Ibid
20	Yates, p. 24
21	lbid

- 22 lbid, p 25
- 23 Yates, Frances, pp 37-38

24. León-Portilla, Miguel, p. 66 This information is confirmed by as the Anales de Cuauhtitlán other, purely indigenous sources, such

- 25 lbid p 70. 26
 - loid p 71 León-Portilla, Miguel, pp 92-97
- 27. 28 lbid p. 95

29 The Platonic definition of mimesis refers to the representation of something on the assumption that the latter is similar to the true The artist creates neither by seeing the Idea, nor from a more precise substantive knowledge of the object. The artist produces nothing but phenomena. These can be produced easily and quickly, on the basis of no substantive knowledge, by someone holding a mirror In Gerbauer Gunter and Christopher Wulf, Mimesis Culture, Art and Society,

pp. 31-44. 30

León-Portilla, Miguel, p 54

31 Ibid., pp 51-53 The myth of Tamoanchan, narrates the story of how, after the gods had left, four old and wise men rediscovered the way to preserve the past. This included the count of destiny, the record of the years, the book of dreams and the red and black ink of the codices Grunzinski, Serge, Painting the Conquest The Mexican Indians 32 and the European Renaissance,

p 14

33 Ms. Cantares Mexicanos, in León-Portilla Los Antiguos Mexicanos., p. 66

It has been said "writing is a way of knowing your own mind, as 34 externalized on the page * In you see manifestations of your mind Bolter, Jay David, Writing Space , p 213

35 A similar situation may have existed in relation to the sacrificial f the Aztecs, so that what appeared to the Europeans as a practices of the Aztecs, so that simple human sacrifice was nothing other than the death of a god that had fragmented itself prior to becoming whole * Grunzinski, Serge, p 77.

36. Gruzinski, Serge, p. 14

The Nahua system of representation evolved from a pictograp-37. hic stage, to one that used ideographic alvohs to represent symbolic concepts. They possesed adequate ideograms to represent concepts such as god, movement, life metaphysical In León-Portilla, Miguel, p. 61

The fifty two year cycle (also called Bundle of Years) had deep 38 significance in Aztec society. It served as enclosure for simultaneous round of the two calendar systems utilized, served as enclosure for a complete, and namelv the Tonalpohualli, and the Xiuhpohualli, or solar calendar. This event coincipassage of the Pleiades It was also related to the ded with the length of the migration of the Aztecs to the city of Tenochtitlan Clendinnen, Inga, The Aztecs, An Interpretation, p.24

León-Portilla, Miguel, p. 59 39

- 40 lbıd
- 41. Grusinski, Serge, p 15.
- 42. Gebauer, Gunter and Wulf, Christopher, p. 34
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carol@cgrg.ohio-state.edu

Carol Gigliotti, Ph.D

Assistant Professor Department of Art Education and the Advanced Computing Center for the Arts and Design (ACCAD) Ohio State University

BRIDGE TO, BRIDGE FROM: THE ARTS, TECHNOLOGY, AND EDUCATION

Summary

This essay investigates theories and practices, sometimes very much at odds, of contemporary educational involvements in the arts and technology. It is based, in part, on my ongoing involvement with and research on various communities' efforts to use education as just such a bridge.

The idea that education might serve as a bridge between technology and the arts is based on a metaphor, one connoting connection, and at the same time, separation Following the physical logic of the metaphor, we locate technology on one side of the span, the arts on the other. Each is perceived, in contemporary Western culture, as the antithesis of the other The implied purpose of the bridge, a piece of technology itself, is to provide a ground upon which ideas from each of these areas of endeavor may travel to the other A bridge's purpose is to connect. It may also serve, however, to solidify separation. Far from being a stable, fixed entity, education is a highly contested area where the perceived and actual stakes, the forming of the future, are high. Education's purposes and practices may encourage, discourage, or redirect the flow of ideas from one area to another. As individuals, communities, and the ideas they bring with them from either the arts or technology or their vast connected territories, are filtered through the institutional bridges of education, they may be reshaped, thwarted or advanced. What is certain is that some form of mitigation takes place.

This essay investigates theories and practices, sometimes very much at odds, of contemporary educational involvements in the arts and technology. It is based, in part, on my ongoing involvement with and research on various communities' efforts to use education as just such a bridge What has constituted success or failure in these endeavors, and on what characteristics have various participants based these judgments? How have issues such as gender, ethnicity, class, and race fared in these activities? And most importantly, how have the recipients of these efforts, the students, characterized their involvement?

What must first be recognized, however, is that the metaphor of education as the bridge between art and technology, is one that, like most metaphors, only persists from a particular perspective. One may just as well have envisioned art as the bridge between education and technology, or technology as the bridge between art and education In this case, the viewpoint I have taken sees education as central and essential to any combined activities of art and technology, indeed, to many areas of practice Deciding on this viewpoint, then, demands a more thorough explication of what one means when invoking the term "education," for it is a term that is often taken for granted. I have stated above, however, and will demonstrate for purposes germane to this essay the highly contested nature of education. I will confine my remarks to the situation and concerns of the United States because that is where

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my experience lies My hope is that the following discussion, utilizing the United States' current problems as an example, may prove helpful to similar situations elsewhere

The authors of the GOALS 2000: Educate America Act signed into law by President Clinton March 31,1994, define this educational reform act as:

... America's blueprint for prosperity and world leadership, and our children's guide to lives filled with productivity and the special rewards that only a quality education can provide. (H.R. 1804, 1994)

This description of the ambitions of Goals 2000 relies heavily on the implementation of setting in place national standards. Admittedly the Goals 2000 Act emphasizes the development of these standards voluntarily and at the local level. The clearly stated goals of these standards, nevertheless, are primarily economic:

> Through the development of broadly defined skill standards, the U S. will be able to set goals for skill achievement, competencies, and performance that will help create a lifelong learning system for all Americans and will drive our nation's economic growth into the next century and beyond (H.R. 1804, 1994)

Given this institutionalized description for American educational reform, is it any wonder that American theories and practices incorporating the concept of education have become engaged in contentious and what appear as fundamentally irreconcilable battles?

The social and political environment current in the United States today, has led to the formulation and signing of the Goals2000 Act and has also instigated numerous debates by educational theorists concerning issues that have existed for centuries in discussion about educational philosophy. From Plato's discourse on justice in The Republic to John Dewey's intricate investigations of the importance of education to democracy in Democracy and Education , the question of what counts as education and how education can be distinguished from indoctrination or training emerge repeatedly. These questions popular among the last generation of analytic philosophers (Feinberg, 1995) have necessarily sprouted again in reaction to this program.

One of the best known philosophers of American education and one of the most vocal critics of Goals 2000 is Michael W. Apple, Professor of Curriculum and Instruction and Educational Policy Studies at the University of Wisconsin, Madison. In his review of National Standards in American Education, a book funded by the Brookings Institution, a conservative think tank in Washington, DC., he predicts the outcomes of implementing the reforms outlined in Goals 2000. These predictions are instructive for understanding the current American educational climate in which any art and technology collaborations take place:

> National Standards in American Education could perform a valuable service if it was read as a set of arguments about what to be very cautious of not doing in our drive to "reform" education. There are valuable issues raised in it. However, I predict it will be put to exactly the opposite use. It will add support to those neo-conservatives who wish to centralize control over "official knowledge" or by neo-liberals who want to

reindustrialize the school by making schools into places whose primary (only?) function is to meet the needs of the economy and who see students not as persons but only as future employees. And this will occur at the very same time as major corporations are shedding thousands upon thousands of workers, most of whom did quite well in school, thank you very much. It will be used once again to export the blame for our economic and social tragedies onto schools, without providing sufficient support to do anything serious about these tragedies And, finally, it will be used to justify curricula, pedagogic relations, and mechanism of evaluation that will be even less lively and more alienating than those that are in place now (Apple, 1996)

The neo-conservative agenda of a "common culture" is most tellingly epitomized by Newt Gingrich. His tenure as the Speaker of the House, has encompassed an impassioned embrace of virtualized politics, and characterizes these technologies as a force which "decentralizes and transforms all power" (Gringrich, 1995, p.6). Left unstated, though, is exactly what cultural identity will emerge from this decentralization. That the rhetoric involves values that seem to have already been determined not just for the United States, but for the entire human race, prior to the widespread distribution of these technologies is a clue that he and his supporters are extremely conscious of the subterfuge this rhetoric allows It hides the possibility of other choices, as the rhetoric of Goals 2000's emphasis on national standards of "skill achievement, competencies, and performance" hides the possibility of educational success based on something other than the proliferation of the American market economy.

The idea of a common culture veils the neo-conservative program of "official knowledge," one set into motion, as Apple points out, by putting in place national standards and then national performance testing. This neo-conservative agenda is linked to the neo-liberal agenda of reindustrializing education by delineating its function as primarily economic and seeing students as future employees. What I see, as does Apple, as the outcome of these agendas is the continuing harm it will inflict on those segments of the American population already suffering from little if any links to economic, social or cultural power. Additionally, I see these agendas contributing to a future for America that is devoid of purposes and goals that are based on anything but the requirements of life in a market culture.

Arts organizations and schools of art, two principal environments consistently involved in American arts education, and I might add, two of the only institutionalized arts environments in the heavily anti-arts environment of the United States, both at the K-12 and university levels, have become examples of the influences of the neo-conservative and neo-liberal agendas Apple refers to above. Certainly not exempt from the exigencies of the economic and political climate current in the United States and struggling with a not unrealistic anxiety concerning their own future, both groups have become involved increasingly in the last ten years in partnerships developed ostensibly for the expansion of educational goals. These partnerships, usually involving corporate funding of some kind, have offered to the beleaguered arts organizations, including museums of art, and schools and departments of art, the possibility of financial wherewithal to become involved in projects involving computer technology.

At face value this scenario, partnerships between business, the arts, education, and computer technology, seems ideal. It

is a scenario that I myself do not, in principle, see as negative. In fact, I have written extensively on the necessity of becoming involved in these partnerships and the importance of collaborative activity across disciplines. My reasons for advocating this course of action, however, have been based on my belief that as artists and art educators, we have a responsibility to become involved in the development of computer technology. This responsibility is central to the ongoing evolution of an emerging aesthetic of interactivity that links ethical and aesthetic goals from the perspective of care both for the contextualized individual and the larger economic, political, ecological, social, and spiritual circumstances which define those contexts. Additionally, this aesthetic encourages participants to take responsibility for their actions and their world. (Gigliotti, 1996, in press, 1995a, 1995b).

No one, least of all me, ever thought of this as an easy undertaking. In fact, much of the impetus behind the construction of the theoretical framework of this aesthetic was overwhelming evidence for the absolute necessity of subverting, transforming, redirecting, and creating methods for the development of computer technologies supporting the goals of this aesthetic. I expected and have encountered enormous resistance towards this emerging aesthetic from within the art world. Both arts administrators and curators, as well as members of the academic art world, have voiced strong negative reactions to this aesthetic. I did not clearly foresee, however, the particular ways in which these reactions would reinforce the combination of current political and economic factors in the United States to build an attitude so resistant to the goals of this aesthetic.

Much of the resistance of the art world towards this aesthetic centers on the continuing insistence on the importance and autonomy of the individual artist. This idea lingers from modernist aesthetics where it began as a reaction to the dearth of spiritual values in both capitalist and totalitarian societies of the 1920's and 30's (Gablick, 1984), but continues to find favor for reasons that have to do with the marketability of name artists. True, the canon of white, male artists has become somewhat abridged by artists of "other" genders and colors, but even these artists must in some way produce products controlled or contained within the monetarily defined art world system.

In terms of technologically mediated art, this has meant most museums, galleries and curators have chosen to view these developments as a means to continuing the established hierarchy of the art world, a hierarchy based on marketable products. Rather than opening doors to artists whose work is integrally involved in the development of an interactive aesthetic, one that encourages the participation of the viewer in the process of creation, most curators have preferred to commission already well-known artists whose work is proven to be profitable, to develop, most for the first time, what might pass as an interactive work.

Additionally, World Wide Web sites, though written into museum educational grants as an opportunity for public education, appear on-line as offering little if any educational material. They provide a one way access to information about the programs, exhibits, and sales opportunities available to the public on-site. Some truly entrepreneurial museums, like the Metropolitan Museum of Art, offer the viewer on-line purchase power, which, for most visitors to museum WWW sites, as well as many actual sites, is the only interactive opportunity.

During these times of decreasing public funding for the arts, the temptation on the part of museums and art centers to increase visibility through the use of the WWW and, perhaps because of that visibility, increase the number and amount of funding sources, is understandable. But will these short term objectives concerning the WWW support or erode the long term stated goals of museums and art centers. What are those goals? Are they simply about passing on official art knowledge in order to generate more art consumers?

Not asking these guestions plays straight into the neo-conservative agenda of "official knowledge." The neo-liberal agenda of the reindustrialization of schools, which in its original configuration grew out of the perceived and actual need for educational methods meaningful to the vast majority of working class and impoverished population of the United States, has worked to support the "official knowledge" of the market. Schools and departments of art, desperately attempting to support the growing demand for computer hardware and software have partnered with arts organizations, corporations, industry, and the government, often under the umbrella of an educational goal, in order to fill these needs. Often, students and faculty have emerged from these involvements either feeling taken advantage of, or that the unstated educational goal of their involvement with these projects has been to prepare them for future employment in "officially sanctioned," ie. market-driven, computer technological production.

Again, these partnerships are not in themselves negative, and they are necessary if we are committed to change, but they ultimately will be a mixed blessing, and perhaps a very negative one (Faust comes to mind here) unless we have a clear vision of what education means to us and in what ways we can best practice that vision.

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ReaderSchool of Art & Design, BCHE, Bath UK

DRAWING ON THE BRAIN, AN ART-SCIENCE COLLABORATION

Summary

Some results from and reflections on a PET study into art-student volunteers performing drawing tasks, presented in the form of a talk illustrated with an interactive visual display.

Keywords

Brain, Imaging, Perception, Drawing, Interactive, Positron Emmission Tomography (PET)

I would like to present some results and reflections on an artscience collaboration which I think fits quite well with the conference theme "Education as a Bridge between Art & Science" This collaboration took the form of a Positron Emission Tomography (PET) study of six right-handed male artstudent volunteers engaged in simple drawing tasks.

I helped Professor Chris Frith, of the Institute of Neurology, London University, a little in the design of the experiment, procured the volunteers, and have produced a visual account of the events in the form of a director movie, designed to complement the scientific papers. The experiment was carried out by Dr Gabriella Bottini at the Cyclotron Unit of Hammersmith Hospital in London.

Some background

Gabriella is a research scientist from Milan. One of her areas of expertise is 'Neglect' (Anosognosia) which in severe cases results in complete neglect of a side of the body & of the perceived world - including denial of hand & arm ownership & inability to process half a scene in front of them.

Chris is a research scientist who has conducted numerous PET studies, on both volunteers - including me, and on patients, these being related to his principal area of expertise schizophrenia. He now works at Queen Square in London at the Fuctional Brain Imaging Laboratory funded by the Wellcome Trust He is studying brain activity associated with memory, imagery, will, and other of the 'higher cognitive functions' associated with consciousness.

As seems typical of constructivist artists, I have long been fascinated by science & technology, and try to bring this combination of interests to my teaching in UK art-schools, where my interests in the psychology of perception (spurred by writers such as Gregory, Gibson, Valyus, & Dennett, have influenced my attempts to teach, among other things, drawing, and lately computer modelling, at various stages of my teaching career.

I've made & shown constructed work since 1967 & since 1980 I've been using simple electronics to make works incorporating light sources. Recently I've managed to obtain some usable 3D modelling software, Vidi's Presenter Professional package, & now supplement workshop models for projects with computer generated versions. This development allowed me to produce good quality images from models for a catalogue prior to a recent show in Berlin.

Now once an artist gets interested in perception, s/he may

become interested not only in the visual depth cues & their employment in illusion-making, but in the eye itself, in the optic pathways, in the visual processing areas of the brain. In the '70s I remember being intrigued by accounts of the splitbrain studies by Sperry, Gazzaniga & others in America. These studies were of some eight people, crippled by severe & regular epilepsy, reverberating between the hemispheres, who had been promised a new lease of life by an operation to separate the brain hemispheres by cutting the corpus collosum, (a commissurotomy) effectively leaving them with two brains, which by clever experimental presentation could be addressed separately. for example a patient was asked (to his right hemishere)to pick up an object from under a cloth and replied that he did not understand the question while performing the task correctly!

The information from the split-brain studies gave greater clarity to models of the brain which have became part of popular culture, giving we amateurs of the brain a convenient model in which quite different functions occur in each hemisphere, the left (right-side controlling) hemisphere specialising in language & calculation and the right (left-side controlling) hemisphere dealing with images & spacial information. (Leonardo vol 29 #3 this year, has a piece by the psychologist Petrov with an variation of this, tidily locating logic in the left hemisphere & emotion in the right) An aim of this paper is to show that this simple '2 buckets' model needs a little revision.

Imagine this bit of video of me in position in the PET camera, and you will appreciate the limitations imposed by the apparatus, where the volunteer, flat on his back, is stuffed into what looks like a giant washing machine, with one arm attached to a water line, and has to remain still, without moving his head for two and a half hours. To the physical limitations must be added the experimental constraints, for the tasks must be performable as near identically as possible, by 6 different volunteers.

Little wonder that, as the reality of the experimental situation pressed upon our initial ambitions, the proposed tasks became ever simpler. The volunteer, is aked to imagine a cube, arms length in size, and to trace simple figures on the faces.

In task 1 (The shapes task) he traces his choice of square, triangle, ellipse or infinity sign on a given face of the cube. In task 2 (the planes task) he traces a given shape on his choice of surface while in the control task he is told what to draw & where to draw it.

What are the conclusions of this experiment? we see from the following that form generation indeed occurs in the left hemisphere but that spacial processing takes place in both hemispheres, I'll quote CF

> "By comparison of the pattern of brain activity associated with each of these tasks we hoped to be able to distinguish the areas involved when the hand is used to generate forms from those involved when the hand explores different positions in space. Comparison of the two experimental tasks has revealed very interesting results. We have identified one area concerned with generating forms (left middle temporal lobe) and a different area concerned with generating position in space (bilateral parietal lobe). The areas we have identified are essentially the same as those previously shown to be associated with the perception of form and position in space when no movements are made and the volunteer simply looks at objects. This intimate asso-



ciation between perception and production has interesting implications for brain function in general and conceivably might have relevance for the teaching of drawing skills ...It is clear that even the simplest drawing depends on a complex interaction between many brain systems. Far from demystifying it, brain imaging studies of the underlying physiological processes enhance our appreciation of what a truly remarkable skill drawing is."

For me this experiment gave an opportunity to see investigative science in action and to tackle the problem of presenting the experiment so that we could understand some of the results & get a flavour of the ongoing struggle to understand the mysterious "plate of porridge" (Richard Gregory's phrase) between our ears.

Bill Viola is reported to have said recently "it is not neccessary that the 20thC artist draws well but that he thinks well" If one thinks of drawing as not simply a craft skill but also as a means of externalising ones well-thought thoughts then Einstein's "My pencil & I are cleverer than I am" is much more compelling

London September 1996

If you would like to see some of the visual material mentioned above please visit :-

http://www.mondrian.demon.co.uk

David McDowell

(.au)

Artist, Lecturer (part-time), Tasmanian School of Art, University of Tasmania

SCENOGRAPHY AND SYNESTHETICS: NEW MEDIA AND AESTHETIC EXPERIENCE

Summary

To work effectively with new media, artists need appropriate principles to understand the nature of the space and the nature of the experience their work is to present to its audience. I will suggest two notions which may be useful when thinking about new art forms: firstly, scenography, as a way dealing with how aesthetic space is created and organised through the use of new technologies; and, secondly, synesthetics, as a means of considering the aesthetic experience offered by synthetic qualities of new media

I am not sure how grateful we should be to William Gibson for coining the term 'Cyberspace'. As a neologism, the term itself is, of course, cleverly catchy. Gibson's phantasmagorical visualisation of Cyberspace leads, however, to a confusing presumption that what Cyberspace describes is a homogeneous dimensionality which can be entered and which will contain everything that can be represented and stored as digital data. Hollywood contributes to the confusion by making its representation of Cyberspace seem, as a result of this imaginative simplification, to be indistinguishable. The appealing vision of Cyberspace as a navigable 3D domain wherein everything will conform to an illusionistic, perspectival model confuses the truely complex nature of this space. Computer technologies and networks enable different informational and representational modalities to actively interpenetrate one another and to exist co-extensively. Cyberspace, if it is to be thought of as a space at all, designates the locus of this complex interpenetration and co-extension. But Cyberspace is not a space one can actually or even virtually be in, for Cyberspace is a space of telepresence: connectivity rather than dimensionality is its essence. Telepresence is only possible at points of connection, not within an imagined space between these points; when I speak to someone on the other side of the world by phone, communicationally there is no space between us. Likewise, there is no communicational space between individual terminals and servers when they are connected through the Cyberspace that is the World Wide Web: there are only communicational lags or delays as pages or sites download. Waiting, rather than moving, is the experience associated with navigating the Web.

Through the communicational and informational nexus which actually corresponds to Gibson's Cyberspace, I can experience the perspectival dimensionality of VRML sites and 3D worlds, interact socially, play out fantasies and receive sounds, music, as well as photographic and video images Through Cyberspace, and by means of the computer generally, I am presented with a complex of representational modes. While I can respond to each of these modes individually, it is the complex itself that is far more interesting. This complex reaches beyond the screen and into the realm of my experiences

In this paper I would like to offer a two-way approach to negotiate the artistic and aesthetic complexities that computerbased technologies are spawning. I will suggest, firstly, in the Western context, the value of connecting digital art with the vast corpus of Western art and aesthetics; and secondly, the importance of conceptualising the unique and radical aesthetic implications of computer-based technologies. To undertake this two way approach, I will propose two notions: scenography and synesthetics.

Computer-based art works will need to generate rich and complex experiences in order to take full advantage of what the computer can offer. The physicality of the actions/reactions that a 3D first-person point-of-view game like DOOM stimulates, would be an extreme if simplistic example of the potent experience a digital interface can generate. Often a player's entire body moves in response to the urgent kill-or-be-killed reactions that screen events require, yet only movements directed to the mouse, joystick or keyboard have any effect on what happens on screen. The kinaesthetic aspect of such games is very much a part both of the player's experience and of the way the game itself engrosses the player. Even though the kinaesthetic element need not be so exaggerated with other computer-based experiences, it can nevertheless be considered as one component of an overall organisation of the experience offered a player or participant.

But how are artists to contemplate the overall organisation of an art work employing an array of media to create a dynamic experience? A key for answering this question is to consider to what end the art work is directed. And a way to do this is to think of the work as a scene intended to involve a viewer or an audience through the impressions it makes and the experiences it induces. Here, though, 'scene' and is not to be understood in pictorial or theatrical terms. The scene is better thought of as an occasion for experience - the occasion for the perceptual, cognitive and affective experience of the viewer rather than as just the setting of the representational components of the work itself A concept dealing with scenic organisation of interdisciplinary art work has existed in Western thought since Classical antiquity. It is the concept of scenography. Scenography, even at its origin, related to the conjunction of different spatial orders associated with architecture, theatre and painting. The Renaissance formulation of artifical perspective re-established the scenographic nexus of architecture, painting and theatre. The delinious elaboration upon perspectival principles and the exaggerated emphasis on theatricality in art, which became paramount during the Baroque, can be regarded as scenography run rampant but always in control of the effects it unleashes.

The concept of scenography can accommodate the scenic organisation of art made using new technologies and media, just as well as art based on traditional media. The organisation of an art work which scenically addresses all levels of experience can draw a viewer into the thinking behind the work. Even DOOM offers a simple example: The most striking impression this game made upon me was seeing on one level of DOOM II the endlessly twitching body of a guard impaled lengthways upon a spike. All other sprites in the game, I could turn to mangled gore. Shooting this skewered sprite to put it out of its misery did nothing; its spasms only continued This experience intimated to me the existence of an active principle of cruelty inhabiting the game independent of my own relation to it. Undoubtedly, this detail stood out against the all the manic action/reaction which is almost exclusively the experience the game offers: I could not act in relation to the spiked guard, only react And in terms of my reaction, this insignificant detail would have as much scenic potential as the game as a whole: the transfixed sprite's spasms perversely mimicking my kinaesthetic reactions in front of the screen.

While a navigable illusionistic space provides the setting for the gameplay of DOOM and its like, scenography is not at all predicated upon spatial illusion. A navigable 3D space may offer an immersive experience, but immersion need not be thought of in literally spatial terms. Every particular interface encountered in normal computer-based communication word processing, electronic mail, Web browsing, video conferencing - can be utilised scenographically to create the impression that the user's computer itself, with its data storage and network capacities, is the illusionistic framework of a game or an art work. The analogy between computers and theatre has already been proposed. Scenography offers more than an analogy. While the theatrical analogy may be useful for the thinking of software engineers, for artists it is more important to appreciate what a computer is and does than to proceed simply according to analogy.

The computational power of computers and the mathematical algorithms they perform provide highly sophisticated means of generating and manipulating perceptual and representational material. Of course, an artist must understand the technical principles upon which a representational model is based, however, art will always exceed these principles as an artists elaborate upon them. Making sense through making things apparent to the senses: this is the essence of art. No Renaissance artist produced a painting using perspective alone, and no artist using digital technologies to create complex integrations of sound, image, and text is doing so solely by computation. Scenography configures all such elements toward the end experiences an art work is intended to produce on its audience. But new media offer new aesthetic experiences, so to be most effective, scenography would be well complemented by a means of dealing conceptually with the aesthetic experiences latent to new media.

Even with still digital imagery, the possibility of capturing and manipulating a diverse range of material can result in representational complexes which draw the viewer from one mode of representation to another by blurring any discernible distinction between them. The 'death of photography' pronouncement which reached a crescendo several years ago, failed to recognise that, though losing its privileged representational role, photography, with its indexical and iconic capabilities, would henceforth service a more sophisticated, representational complex.

Artists are currently enjoying the opportunity to digitally tamper with photographic images, particularly those of the body. Unlike photographic retouching, digital manipulation allows for the cloning of photographic material itself to achieve, in a single image, a photorealistic simulation and dissimulation of the body: the result is an unstable co-presence of evidently different but no longer distinct modes of representation. Even in the specific case of digital photography we can begin to recognise one of the most powerful developments in the field of representation that the computer makes possible: the digital image can both simulate and dissimulate, both show what it is like and show what it is not like. The image of a body with a key bodily feature removed or multiplied does such an image continue to just simulate the human body? - not entirely: and where it ceases to simulate the human body, it simulates only itself. It is beyond this representational point an index and an icon only of itself. This power, which new media offer, to simulate and dissimulate, I wish to consider under the notion of the synthetic.

World wide webs, virtual realities, designer drugs, plastic surgery, neural networks, biogenetics. everything in the world becomes malleable, plastic, protean, no longer do distinctions between the natural and the artificial, the organic and the inorganic provide clear reference for the way in which the world seems to us. Cyborgs and biochips have displaced robots and electronic brains in popular imagination. The synthetic blurs the distinction between natural and artificial. The natural and the artificial exist in a relation of simulation. The synthetic, however, need not be like anything, need imitate nothing. It is most powerful when it models itself.

The computer offers an enormous capacity of synthesis, of bringing together elements from disparate media. In addition, the computer can be used to synthesise elements from scratch, out of nothing but the operator's skill and imagination, and in this way contributes to the increasingly synthetic character of the world in general. Artistic engagement with the synthetic nature of new media is hardly surprising, for art has always involved synthesis - of materials, ideas, representations and meanings. Now, however, we are no langer thinking of just an art of synthesis, an art synthesising various elements into a singular composition, when new media are employed we must think of an art of the synthetic: an art of synthesis, of simulation and of dissimulation.

Through recognising the role of the synthetic in its own creation, art produced using new media participates in a reconception of our relation to the world, a reconception stimulated by the effect of new technologies. Perhaps the most startling example of the synthetic power of technologies to simulate and dissimulate would be a biogenetically engineered organism: not simply a hybrid which would bear traits of the organisms which provided its genetic stock, but an organism whose genetic code is constructed at the genetic level. This organism would live naturally enough, yet its existence would be unnatural: its genetic make-up artificial, the result of artifice. Here would be a most astonishing manifestation of the synthetic: synthetic life; life which both simulates and dissimulates life as it occurs naturally

If there is to be an art of the synthetic, an art which can harness its power, there needs to be an aesthetics which can grasp both simulation and dissimulation: an aesthetics of the synthetic. To designate this aesthetics, it seems appropriate to collapse that word - 'aesthetics' - and the word 'synthetic' into one word. Synesthetics.

Synesthetics designates an active engagement with the synthetic qualities of new technologies and composed of new materials and media: - the rich optical effects of ravtraced 3D models; a digital photorealism that is not entirely photographic; independent behaviours of sub-programs written in objectoriented languages - in short, an acrtive engagement with complex qualities which can no longer be measured primarily by how well they simulate reality. Synesthetics does not involve the sensory confusion association with the condition known as synaesthesia; instead of confusion, synesthetics embraces complexity. As the aesthetic experience offered by synthetic art works becomes sufficiently rich in its own right, no longer need such art conform to laws of imitation or simulation The very unlikeness of this new art - the extent to which what it presents exceeds both imitation and simulation will become an essence of its aesthetic appeal.

The notion of Cyberspace may represent in popular imagination the globalising synthesis that computers and computer networks are bringing about. The notion of Cyberspace, however, aligns synthesis with confusion. Confusion combines all its elements into one undifferentiated mixture; synesthetics entails complication and complexity, not confusion Synesthetics offers a way of aesthetically engaging with the complexities of new media and complexities of the experience of art created with these media; scenography serves as a procedure of organising them for experience through art. I propose the notions of scenography and synesthetics in relation to new media art, not as fully developed concepts, but as means of designating for consideration both the scenic and synthetic capacities of these media, and through them exciting complexities these media constitute.

Eric Singer, Athomas Goldberg, (.us) Ken Perlin, Clilly Castiglia, Sabrina Liao

Media Research Laboratory New York University

IMPROV: INTERACTIVE IMPROVISATIONAL ANIMATION AND MUSIC

Introduction

Improv is a system for the creation of real-time behavior-based animated ac tors. There have been several recent efforts to build network distributed a utonomous agents, but in general, these efforts do not focus on the author 's view. To create rich interac tive worlds inhabited by believable animated actors, authors need the prope r tools. Improv provides tools to create actors that respond to users and t o each other in real-time with personalities and moods consistent with the author's goals and intentions.

The character animation system in Improv consists of two subsystems. The first is an Animation Engine that uses procedural techniques to enable author s to create layered, continuous, non-repetitive motions and smooth transiti ons between them. The second is a Behavior Engine that enables authors to create sophisticated rules gove rning how actors communicate, change and make decisions. The combined system provides an integrated set of tools for authoring the 'minds' and ' bodies' of interactive actors.

Recent development has added audio and musical features to the Improv system. Known as Improv Musique, this development work focuses on two areas. Interactive Virtual Musicians and Dancers; and Audio Support for Virtual Environments Features include actor speech, voice recognition, controllable music, environmental sound and user input from external devices and video cameras.

This paper begins with an overview of the Improv animation and authoring system, followed by the music and audio features, and concluding with a description of recent demonstrations and installations created with Improv.

Authoring Animation in Improv

As an authoring system, Improv must provide creative experts with tools for constructing the various aspects of an interactive application. These must be intuitive to use, allow for the creation of rich, compelling content an d produce behavior at run-time which is consistent with the author's vision and intentions. Animated ac tors must be able to respond to a wide variety of user interactions, in way s that are both appropriate and non-repetitive. This is complicated by the fact that in applications involv ing several characters, these actors must be able to work together while fa ithfully carrying out the author's intentions. The author needs to control I the choices an actor makes and how the actors move their bodies.

Architecture

The model used by Improv consists of an Animation Engine which utilizes des criptions of atomic animated actions (such as Walk or Wave) to manipulate 3 D models, and a Behavior Engine which is responsible for higher-level capab ilities (such as going to the store or engaging another actor in a conversation) and decisions about which animations to trigger In addition, the Behavior Engine maintains the int ernal model of the actor, representing various aspects of an actor's mood s, goals


and personality In a s ense, the Animation Engine represents the 'body' of the actor while the Behavior Engine constitutes its 'mind'.

Animation Engine

The Animation Engine provides tools for generating and interactively blending realistic gestures and motions. Actors are able to move from one animated motion to another in a smooth and natural fashion in real time. Motions can be layered and blended to convey different moods and personalities.

The author defines an action simply as a list of joint rotations together with a range and a time varying expression for each. Most actions are constructed by varying a few of these over time via combinations of sine, cosine and coherent noise (controlled randomness). For example, sine and cosine signals are used together within actions to impart elliptical rotations. Using coherent noise in limb movements allows authors to give the impression of naturalistic motions without needing to incorporate complex simulation models. The author can also import keyframed animation from commercial modeling systems such as Alias or SoftImage. The Improv system internally converts these into actions that specify time varying values for various joint rotations or deformations. To the restof the system, these imported actions look identical to any other action Behavior Engine

Because the user is a variable in the run-time system, Improv authors cannot create deterministic scenarios. The user's responses are always implicitly presenting the actor with a choice of what to do next. Because of this variability, the user's experience of an actor's personality and mood must be conveyed largely by that actor's probability of selecting one choice over another. The behavior engine provides several authoring tools for guiding an actor 's behavioral choices. The most basic tool is a simple parallel scripting system in which individual scripts, like actions, are organized into group s of mutually exclusive behavior. However, unlike actions, when a script within a group is selected, any othe r script that was running in the same group immediately stops. In any group at any given moment, exactly one script is running. Generally speaking, at any given moment an actor will be executing a number of scripts in parallel. In each of these scripts, the most common operation is to select one item from a list of items. These, items are usually other scripts or actions for the actor (or for some other actor) to perform.

The author must assume that the user will be making unexpected responses. F or this reason, it is not sufficient to provide the author with a tool for scripting long linear sequences. Rather, the author must be able to create layers of choices D0 from more global and slowly changing plans to more localized and rapidly changing act ivities D0 that take into account the continuously changing state of the a ctor's environment and the unexpected behavior of the human participant.

Individual Scripts

A script is organized as a sequence of clauses. At run-time, the system run s these clauses sequentially for the selected script in each group. At any update cycle, the system may run the same clause that it ran on the previou s cycle, or it may move on to the next clause. The author is provided with tools to 'hold' clauses in response to events or timeouts.

The simplest thing an author can do within a script clause is trigger a spe cific action or script, which is useful when the author has a specific sequ ence of activities (s)he wants the actor to perform. In addition to command s that explicitly trigger spec ific actions and scripts, Improv provides a number of tools for generating the more non-deterministic behavior required for interactive non-linear app lications.

In Improv, authors can create decision rules which take information about a n actor and its environment and use this to determine the actor's tendenc ies toward certain choices over others. The author specifies what information is relevant to the decision and how this information influences the weight associated with each choice. As this information changes, the actor's tendency to make certain choices over others will change as well.

Coordination Of Multiple Actors

An author can coordinate a group of actors as if they were a single actor. We do this by enabling actors to trigger each other's scripts and actions with the same freedom with which an actor can trigger its own. If one actor tells a joke, the author may w ant the other actors to respond, favorably or not, to the punchline. By hav ing the joke teller cue the others actors to respond, proper timing is main tained even if the individual actors make their own decisions about how exa ctly to react. In this way, an actor can give the impression of always knowing what other actors are doin g and responding immediately and appropriately in ways that fulfill the aut hor's goals.

User Interaction and Multi-Level Control Of Actor State

One important feature of Improv is the ability for the user to interact with the system at different levels. This means that the author can give the u ser the right kind of control for every situation. If the user requires a v ery fine control over actors' motor skills, then the author can provide direct access to the action level. On the other hand, if the user is involved in a conversation, the author might let the user specify a set of gestures for the actor to use and have the actor decide on the specif ic gestures from moment to moment.

At an even higher level, the author may want to have the user directing lar ge groups of actors, such as an acting company or an army, in which case (s) he might have the user give directions to the entire group and leave it to the individual actors to carr y out those instructions. Since any level of the actor's behavior can be made accessible to the user, the author is free to vary the level of contro I as necessary at any point in the application.

Improv Musique

Over the past year, we have been adding music, audio and user-input feature s to Improv. As a result, Improv now provides facilities for adding actor s peech with lip synching, voice recognition, ambient background sound and effects, controllable music sequ ence playback, singing synthesis and user input from external devices and video.

Implementation

Improv Musique is made up of several components. Features are implemented on both Macintosh and UNIX machines which communicate across a local area ne twork. Much of the audio system is implemented in OpcodeAA MAX, a visual programming environment for the Macintosh used primarily for MIDI applications. In the Musique system, we use MAX for receiving and filtering data from input devices; playing and proc essing MIDI and digital audio files; interfacing with Macintosh voice recog nition facilities; and network communication with actors.

MAX programs (called 'patches') are the central input, output and contr ol point for Musique features. Custom MAX external objects, written in C, e nable digital audio playback, MIDI file



Masaki Fujihata



Beyond Pages



Sideview of full installation.

Room size is width=3600 depth=3600 height=2800 m/m

Table size is width=1700 depth=750 height=730 m/m



Beyond Pages

This installation tries to realize a virtual book. It's aim has been set togo beyond the book; to add interactivity.

In this installation, an image of a book is projected from the ceiling on awhite table using a LCD-projector in a dim lit room. The book can bemanipulated interactively

according to the participants' action with awireless digitizer pen. The image of the book is totally controlled by a

Macintosh computer using MacroMedia Director. The book is designed for arranging the objects into class and each object reacts interactively. For example, an apple on the page will be bitten when one flips the pages. On

the other part of this book, there is a stone on the page that will runaway when touched. Infinite objects can be included into this virtual bookwith infinite pages.

It's a new style of archive for an interaction or categorization of the relationship between objects, humans and the world. The function of a book is to describe the world. "Beyond Pages" is also the world which will be describing as the active model of the world.

Naoko Tosa



"MUSE" is a goddess. She is very expressive, has refined manners, is feminine, sensual, and erotic.MUSE's emotions are generated by a musical grammar. For example (joy ---rising musical scale, anger--- vigoroso, sadness --- volante, disgust--- discord, teasing--- scherzando, fear--- pesante) People can communicate with MUSE in an improvisational manner by means of a musical installation.

Yasuhiro Ohtani



musicians, and I have organised projects. My project "Invisible Objects", utilizing two Macintosh Powerbooks, is a challenge to myself Macintosh Powerbooks, is a challenge to myself info create real-time sound, play improvised music, in real-time interaction with the compu-

> ter, pushing the use of technology in a live situation to the limit. All composition, performance and restructure is by myself. Other projects in which I have been involved are the "Realtime conducting system" which I created and developed, using Macintosh Ethertalk and Internet, and "OTOMO Yoshihide", working together with Sampling Virus.

84 JAPANØISEA96

Erina Kashihara

Gold Prominence

Expressions of Existance

I use new materials and new techniques for making forms of unchangeable beauty. It symbolizes humans have something that are changeable and something that are not in time. Materials and techniques may become old, but I hope these forms will be understood in time. And together, I suggest to the audience how people may or may not choose to express themselves.

My work doesn't belong to art nor fashion. I think my work belongs between them. My work expresses anyone's existence, who wears my work. This idea is different from art, which expresses the artist. And it is different from fashion, because fashion changes from with the stream of age. And these wearable sculptures, which display various patterns in response to anyone's delicate motion, are creating another time flow and another space between anyone who wears it. This is how my idea is different from others.



Colin Piepgras: Doppelganger



Alan Sutt: Grin And Ignore It



Arleen Schloss: Detail



Anna Ursyn: Lake City

ealms a digression...

the Roof

Realms is a narrative of urban life, a journey through a co organism, a metaphor for different levels of consciousnes



I started with a vision of images accompanied by short

Annette Weint Ked, the Parrative phrases. As I wor-Realms

and the balance of the piece began to shift to become a narrative with images. I was struck by the power of text on the web, and felt the extraordinary intimacy between artist and audience. I began to develop what writers call "a voice", and to design the piece as a very direct juxtaposition of deceptively simple, short texts paired with a background image.

playback, voice recognition and vid eo input features. UNIX programs p rovide network message routing as well as sound file analysis for lip synch ing

Network communication plays an important part in the integrated audio and v isual environment of Improv Messages sent via telnet between actors and the Musique components allow actors to request services, such as speech playb ack; inform the Musique system about changes in the environment (e.g. user location in a virtual space); and receive information about audio and music (e.g. sound volume or song te mpo). The author has the ability to define message types and formats as req uired, relating to the various. Musique features, and direct them to different actors.

Custom MAX Objects

Integral to the Musique system are several custom external objects for MAX . These include SeqPlayer, AiffPlayer, Reco, SoundMap and VideoIn

SeqPlayer is a Standard MIDI File (SMF) player. It allows a MIDI sequence to be played back beat by beat, enabling one to conduct and control the tempo of a computer band or orchestra similar to the way a conductor would cond uct a real orchestra For exam ple, each beat received by SeqPlayer could be used to output one quarter no te's worth of music from a score file. SeqPlayer also provides other essential features such as bar and beat reporting, jumping and looping. MIDI da ta from SeqPlayer can be process ed in various ways before output, thereby enabling a musical score to be pl ayed back and modified in real time under control of a human user or an Imp rov actor

AiffPlayer plays Audio Interchange Format File (AIFF) digital audio files. Files play directly from hard disk, allowing sounds of any length to be played. Several files can be played simultaneously with independent control of volume and panning. AiffPlaye r is used in Improv for speech file playback as well as ambient audio and s ound effects

Reco provides an interface to the Macintosh speaker-independent speech recognition system. It allows the author to create groups of words and phrases to be recognized as valid responses. When a user speaks, Reco reports which word or phrase was spoken or a special message for an unrecognized utterance. It supports filtering out of optional words and spurious sounds ('um's and er's')

SoundMap controls ambient sound and sound effects for a virtual environment . It stores the location and attributes of sounds within a virtual space an d controls playback based on a user's position within the space. Sound pl ayback from both MIDI and digita I audio is supported.

VideoIn receives live input from a video source, typically a video camera. It performs motion detection by comparing each frame to the previous one. It outputs this information as motion occorring in user-definable zones.

Actor Speech

Actors have the ability to speak a variety of pre-recorded phrases which they select in a similar way to choosing physical actions. Phrases are record ed and stored as AIFF files on the Macintosh. Upon selecting a phrase, an a ctor sends a message to initia te playback by AiffPlayer of the corresponding sound file. The system also tracks the location of the user in the virtual space relative to the speaking actor and adjusts volume and panning accordingly

To enable lip synching, sound files are first analyzed using a

Linear Predictive Coding (LPC) program called 'Ipanal' (part of MIT's Csound pack age). Output from 'Ipanal' is further analyzed to determine the locations of vowels and consonants or simply mouth opening based on loudness information. This second-stage analysis creat es and saves an animation code file which translates this timing information into facial animations. When the actor speaks a particular phrase, the corresponding animation code is executed simultaneously

Voice Recognition

Actors initialize the Reco object by sending a list of response sets to MAX. Each response set contains a list of expected responses from the user for a given situation. For example, when asked a 'yes or no' question, the user might respond 'yes,' 'no,' ' maybe,' 'I don't know,' etc. Sets are defined using a flexible synt ax which allows for a large number of responses to be specified succinctly

When expecting a response, the actor sends a message to enable a particular set. When the user speaks, the Macintosh attempts to analyze the utterance and match it to an item from the response set. Reco then returns a message to the actor with the name of the recognized phrase or an 'unreco' message to indicate an unrecogn ized utterance.

Environmental Sound

Using a visual interface patch in MAX, a sound designer can place sounds th roughout an aerial map of a virtual space. By setting attributes such as rainge, volume and panning curves, the designer can tune the spatial character istics of each sound (for exam ple, making a sound more directional or more ambient). This information is stored by SoundMap and used to control the audio of the environment.

During operation, Improv continually reports the user's location and orie ntation in the virtual space. Based on this information, SoundMap turns sou nds on and off and adjusts volume and panning individually for each sound b ased on the user's relative posi tion and orientation.

User Input

Using MAX, the system can acquire input from video camera, serial devices (such as a magnetic tracker) or MIDI instruments (such as electronic keyboar ds or drums) Input data can be analyzed and filtered in MAX and used to control music and sound or to pr ovide information to actors

For example, motion detection from VideoIn can inform an actor about how 'lively' the user is. A performance on a MIDI instrument can be analyzed to provide volume and timing information to an actor. A magnetic tracking device can be used as an electronic baton to drive a musical performance (as outlined below).

Improv In Practice

Botanica Virtual

'Walking through the fog, you cross over a bridge and into the bayou. At a fork in the road, you meet Papa Legba, a huddled old man playing the har monica. He looks up at you and says, 'At the crossroads, anything can happen.'

At SIGGRAPH '96, we presented The Botanica Virtual, an immersive VR exper ience in which a participant enters a bayou swamp environment and meets a number of characters, each representing a Voodoo archetype. The Improv chara cters respond to the participant 's actions in the space as well

as engaging the participant in conversati on through speech recognition and generation.

Dancing Gregor

'Inside the Juke Joint, we hear the sounds of the bar clientele along with music blaring from the jukebox. The bartender turns down the jukebox and the virtual band begins their set. Gregor, a virtual actor, hears the band break into a blues shuffle and b egins to dance.'

The virtual band is an audio entity controlled by a user playing an electro nic drum. The user functions as the conductor, controlling the tempo and volume of the band. Beats from the drum are received by MAX and used to drive the SeqPlayer object which ou tputs the MIDI score file. The output is processed so that the velocity of the drum beats controls the band's volume.

Gregor 'listens' to the band by means of messages which indicate the be at, tempo and volume, sent via the MAX's 'telnet' object. He synchr onizes his step to the beat and chooses his dance style based on the tempo and volume. For example, when the music is slow and loud, Gregor will tend to dance in a 'limbo' style.

Aria

'The conductor steps up to the podium, picks up the baton and commands the virtual orchestra to play. Gigio, a virtual opera singer, nods to the con ductor and surveys the audience. He begins to sing and act out the Aria in the tradition of great tenors past.'

In the Aria installation, Also presented at SIGGRAPH '96, a user conducts the opera singer and orchestra using an electronic baton. The baton contains a magnetic tracking device used to sense its position. Data from the sen sor is read in MAX and analyzed to derive a beat from each down stroke, as well as the amplitude of the stroke and the horizontal position. Beats from the baton drive the SeqPlayer o bject, thereby controlling the tempo. Amplitude of the baton stroke control s the volume of the orchestra and vocals, and horizontal position controls the vowel sound of the vocalis t, who sings with an 'a, e, i, o or u' sound

Gigio's vocal part is generated on an SGI using MIT Csound, a real-time s oftware synthesis program. In Csound, we use the FOF algorithm to create vo cal synthesis of a male tenor singing in vowel sounds.

The MIDI score file output from SeqPlayer contains both the orchestra and vocal part. The orchestral part is output to a MIDI synthesizer, while the vocal part is formatted into a Csound command and sent by MAX via tellnet to the machine running Csound.

Gigio is sent messages for the notes and the location in the score. He sync hronizes his facial expression to the vowel sound and chooses his actions based on the score location. For example, he knows when to make his entrance, where the climax of the music is and when to take his bow.

Credits

Improv is a project of the New York University Media Research Laboratory and Center for Advanced Technology in conjunction with the Laboratorio de S istemas Integraváis of University of Sao Paulo, Brazil. Special thanks to Ruggero Ruscioni for his directi on on the Aria project. For further information, see http://cat.nyu.edu/pro_jects

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Brett Terry, Burnett Group (.us)

SOUND/ACTION PARADIGMS IN MULTIMEDIA

Summary

A basic set of terms and models are developed to describe a range of possible sound-action models. Mention is made of how existing technologies could serve to implement these models.

This paper present some ideas for thinking about paradigms of sound in multimedia. I will begin by defining a few of the terms that I am going to use so their meanings won't be equivocal...

I like to differentiate between local and networked multimedia. For example, CD-ROMs and kiosks are local multimedia, meaning they run on a single computer, in contrast to the world wide web, which comprises distributed information, and is subject to a more stringent set of constraints in how it can look and sound. Networked multimedia is typically characterized by a client/server model - the viewer is usually in the role of a client making requests for information from servers connected to the network. Although streaming data technologies are beginning to emulate what is possible with local multimedia, the predominant experience is still based on a transactional model.

I will also be using the term agent, a term borrowed from artificial intelligence, in order to represent some kind of software program that is trying to act within the confines of a some limited form of intelligence, by which I mean it, at a minimum, has some basic mnemonic and decision-making abilities.

I will treat the agent as a black box, the innards of which will be left deliberately vague, although I will make some suggestions about how implementations might be made using existing technology.

I will also be differentiating between primary/secondary, and simple/complex, in the context of controllable aural parameters. I take a primary sonic or aural parameter to mean a parameter that controls something about a sound directly--its pitch, amplitude, etc...-and a secondary parameter to mean a parameter that affects an abstraction or representation of a sound such as style or density. By a simple sound-action, I mean changing one parameter at a time versus a complex soundaction that changes more than one parameter simultaneously.

This paper is really about interactive sound/action paradigms, and concentrates mostly on networked multimedia, where the challenges are more significant, at present, than in local multimedia.

There will always be many uses for non-interactive sound paradigms in multimedia. Using a background soundtrack, delivering information by voice are all effective ways to set a mood or convey essential information. What is less clear is what the possibilities for interactive sound/action paradigms might include, and what perceptual ramifications might ensue.

I begin by extending the most obvious and naive interactive sound paradigm - what might be called "response feedback", simple a direct mapping between some kind of action (whether triggered by a user or an internal process within the

computer) and a sound:

This might be represented, more generally as a set-based model. By set-based, I mean that it regards sounds as atomic objects, rather than as a continuous stream, although this distinction is not as mutually exclusive as it might appear.

So, more generally we have what really amounts to a mapping of two sets:

Notice that each action is mapped to exactly one sound, and a sound can be mapped to any number of actions. Sounds in this model might be extremely simple and functional such as sounds that get the user's attention, or to indicate success or failure.

Some things to note about this model are that the amount of information conveyed by an action is very small - usually just a message such as "I'm a button and I was clicked" or "I'm a process who is done".

This model also makes use of a single perceptual phenomena - reinforcement. For simple purposes, reinforcement is useful in extending the dissemination of information to the auditory sense. For complex purposes, in which there are repeated actions or excessively many actions or sounds, the brain quickly finds a repeated association banal and repetitious. In the case of too many actions and sounds, one has difficulty remembering which sound meant what.

Certainly, more complex and more musical extensions of this model are not always warranted to improve the quality of a presentation. However, there are cases in which a presentation might benefit from a more musical treatment of sounds or might make use of highly complex information, aspects of which might be apprehended by an aural representation of data. This aural representation might convey patterns or structures in a different way than purely visual information.

Sonfication is the name given to rendering data aurally (often in conjunction with a visual representation). NCSA-the National Center for Supercomputing Applications, for example, has employed sonification in weather representations 3-d sound and other complex parametrization of sound is increasing employed by researchers in large-scale virtual reality environments such as the Cave, and in situations such as piloting or medicine where presenting rapid and useful feedback aurally is useful because the visual sense is presumably preoccupied.

What I propose to do at this point is to add one little piece, an agent, to this basic model (and its stream-based equivalent) and develop a basic set of oppositions that can characterize these models, albeit in a non-hierarchical way. For each of the models I will present, I will comment briefly on how they might be implemented, using the technologies which seems to be changing substantially month to month.

The insertion of an agent into the picture amounts to making the more relationship between a single action and a single sound less overt. A repeated action might trigger different sounds, a sequence of actions in a certain context might lead to a unique result. Of course, this scheme might easily result in aural confusion, but what we are looking at is what happens when a successful case emerges.

That is, assuming it is possible to construct a suitable agent, what might this model have to offer above and beyond the naive model?

The data structure or message format of an "action" forms the basis for what the agent has to work with. At present, most

short papers 91

real-time actions in multimedia contain very little information. Hypertext links, for example, which form the basis of world wide web navigation, only offer one piece of information, a destination page. In another paper, entitled Beyond Hypertext, I explore this subject in more detail. For the purposes of this paper, I will mention a few examples of some information that actions might include.

One example is categorical information hierarchies - if my basic message was "Fred" I might include the categories Fred belongs too - race, gender, income. If actions communicate information about categories, the agent can derive more general inferences about what someone is interested in, or try to develop connections and patterns.

Another example is temporal and historical information - if my action is a mouseUp message on a word in the midst of a tract on 18th century French economics, it might also be useful to know how long the page was being viewed, how fast, what the sequence of pages the user followed to get to this point, or how many times the viewer has chosen to look at this page.

In addition to discrete information, actions can also send a continuous stream of information - the most common example is the position of the cursor or other input devices.

It seems inevitable that actions will grow more complex as multimedia technology evolves - if only driven by corporate and marketing interests to glean as much information as possible. The interactive paradigms of music right now are primitive and although they certainly might remain so, it seems likely that people will explore and attempt to develop more complex paradigms. Should the right outstanding examples and channels of dissemination combine, some kind of Kuhnsian paradigm shift in this area might feasibly occur.

It is worth noting that certain technologies can often impose a stream-based or set-based way of thinking.

For example, Quicktime 2.5 can play MIDI information (which is essentially stream-based) but it imposes the set-based idea of a movie - hence each sound must be loaded as a set. Shockwave's audio capabilities are similar. Most streaming audio currently available (such as RealAudio and LiveWire) relies on the server first loading a complete sound file and then sending it, little provision is made for modifying what is being sent. Thus, the server side of most networked client/server models imposes a set-based methodology even when the client is stream-based.

A purely stream-based server/client model would most likely utilize MIDI. Part of the difficulty, of course, is that clients are usually freely available whereas server technologies are most often proprietary and expensive. When stream-based servers for MIDI or other sound abstractions are developed, their widespread acceptance is always predicated, to an extent, on their marketing niche

Having a MIDI stream-based server (in which data is created rather than read from a file), makes it easy to change many music parameters about the music being transmitted. Depending on the client, the sound itself (that is, the timbre) can be changed Many computer music research centers such as CNMAT in Berkeley and the Audio Development Group of NCSA have working client/server models in which the client directly synthesizes sound using FM synthesis or some other simple and fast synthesis method. In these cases, the message format uses some proprietary format. Ideally, one might conceive of a synthesis engine that runs on a computer that can produce a musically diverse and comprehensive set of timbres and controllable parameters while, at the same time, accommodating some degree of standardization

The trade-off in the above dilemma is that, while is not complicated to extend the computer's ability to generate a wide range of electronic sound within the context of networked multimedia, the ability to play real-world sounds remains difficult. It remains an obvious milestone to shoot for, driven by the urge to have networked multimedia match the quality of local multimedia. This does contribute to thinking about how close we could be to having reasonable synthesized sound Although there are certainly moments in which vocal and sampled sound are desirable, the tools of synthesized sound are not even available to a widespread public. The release of QuickTime 2.5 with its built-in synthesized instruments is one of the first such tools, another is the Crescendo Netscape plug-in. Both of these use MIDI, probably because it is public, free, and standardized.

A major issue that conditions the whole notion of the server loading a sound file and sending it is that it does not seem possible for a server to send sampled data in such a way that the server is actively modifying, resynthesizing, mixing the sounds (here local multimedia has made some significant improvements in the last few years- just look at the sound manipulations taking place in the You Don't Know Jack CD-ROM).

Sending raw high-quality sound would require about 170 k/sec, or compressed with a 8.1 ratio 22k/sec, whereas the 28.8 modem or the 56-128 fractional-T1 users that comprise a large portion of the audience for the next few years average between 3 and 7k/sec. It remains to be seen just how tolerable compression ratios above 16:1 will be, and if some hardware sound decoding device, such as MPEG2, will become a standard.

To cite another possible example, one might construct a client sampling instrument (either in JAVA or as a browser plug-in) to which a short sample could be sent followed by instructions to loop, change pitch, change the envelope, reverse the sample, much in the same way that hardware samplers work. This approach could be developed to allow some musical treatment of sampled sounds with a reasonable amount of transmitted information - one large burst, followed by much smaller messages.

Having a server actively operate on sounds prior to sending anything is as much a conceptual hurdle as a technical one– this becomes a form of composition and, consequently, will take time for people to develop musically successful ways of having what amounts to an agent make some basic musical decisions.

It is worth mentioning JAVA in this regard as well, since JAVA remains one of the great white hopes of raising the level of programming in networked multimedia to the standards set by local multimedia. Its promise is clearly its ability to be hardware-independent, as well as the fact that its design seeks to make it easy to incorporate graphical and networking functions by encapsulating them in standardized libraries At present, however, JAVA still looks and acts primitive. History has shown it often takes the weight of substantial commercial software development to produce proprietary interface and window toolkit elements (such as those developed by Microsoft and Adobe) that raise the ante for what software should look like.

JAVA at the moment has only the ability for a server to load and send a sound file to a client. What it promises, however, is the flexibility to design the behavior of clients to which information can be sent as well as the structure of the information to be sent. One important strength of JAVA that could prove to be very relevant in the evolution of sound-action paradigms is its multithreaded nature. A thread can be thought of as a sub-program that runs concurrently in its own space, once it has been spawned by another program. A server could use threads, for example, to create a program that might process some sounds or sound abstractions in the background, while continuing to listen for client requests and whatever else it is doing. In essence, this style encourages parallel thinking where different programs handle different things - in a client/server environment, for example, there could be several server threads each of which is relating to a client thread. This flexibility means it would be possible to create the idea of an orchestra of different threads each contributing to the overall soundscape.

Some other models to consider include the relationship between sonic and visual objects. For example, what if sound and visual objects are considered as aspects of one unified object? A transition from one visual object to another might entail a corresponding transition from one related sonic identity to another.

The issue I am interested in stressing here is that models like this have yet to be explored. Conceptualizing these models as abstractions permits us to make a comprehensive survey as to what possible models might be, prior to considering their implementations. Once the range of models has been established, it remains to be seen what the perceptual efficacy of the models might be.

Conceiving of a unified visual and sonic identity opens up a wide range of analogical possibilities. The challenge is to find suitable relationships between primary types of evolutionary behavior for visual objects (such as scaling, rotation, color, illumination, translation, topological distortion) and primary (e.g. pitch, amplitude, stereo placement) and secondary (e.g. style, density, momentum) musical parameters. It also remains to be seen what alternatives there could be to transitions based on proportional relationships between visual and musical or sonic parameters.

Another possibility in the realm of unified visual and sonic identity concerns the interaction of two such objects:

In this case, the relationship between visual and sonic parameters is harder to imagine, governed by modes of interactive behavior rather than a discrete logic of perceptible transition. Behaviors—such as personality development, conflict, cooperation, and imitation—which are at times opaque when represented musically, are readily apprehensible visually Psychological studies show that people are quick to associate personality and psychological archetypes with even simple visual shapes engaging in basic behavior patterns. Music would most often been seen as an ancillary foil to this visual behavior, a role which it could choose to accept or challenge.

Implementing this behavior is possible in both local and networked multimedia using JAVA or Director-related software JAVA makes it straight forward to create a unified visual-sonic object as a single class. Typically, interaction would be monitored by a separate Manager class that watches to see when interaction occurs and determines how to define the interaction. Unlike Director, JAVA makes it easier to conceive of different objects as separate programs running concurrently in parallel

In closing, I should like to make a few comments about the distinction between the models I have just presented and the naive basic model of response feedback. One way of viewing this distinction is to view the naive model as essentially deterministic - that is, there is little or no ambiguity about the relationship between action and aural response.

ty to this situation increases the level of ambiguity, which is an important musical construct that needs to be handled musically. For example, Leonard Meyer in his work Music, The Arts, and Ideas argues that ambiguity is most often used in the initial presentation of a musical idea to extend the horizon of potential futural options. Ambiguity is then diminished as definite choices are made, their latent ramifications realized or confronted. At certain moments, when a certain choice would seem blatantly predictable, ambiguity might be reintroduced to rekindle tension, establish contrast, or begin a source point for a new musical direction.

I have outlined a basic set of five oppositions:

sound/unified sound-video
primary/secondary
simple/complex
stream-based/set-based
atomic/interrelated

I hope that these might serve a useful taxonomic and/or descriptive purpose. One could describe a sound-action example as having a certain set of these qualities—such as interrelated, unified, primary, simple, set-based—which would at least provide a clear implementation-independent description of what that sound/action model does. It is my hope that some of these models might inspire people to develop models of their own and to extend the language with which they can be described.



Japan as the Sub-Empire of Signs

The word Japanimation is neologism that is made by two words, Japan+animation. Now, Japanimation is seen in whole world. And people outside Japan are inter ested in the Japanese subculture including Manga and Japanimation, etc. If pe ople once asked "What is ZEN?", then now people asks "What is Otaku?". But I' m very skeptical about this condition. This phenomena is absolutly the effect of globalization, information capitalism. Under the Fordist economic system of the past, globalization meant nothing mo re than "Americanization," and media and entertainment were supplied by Disney animations However, we must now consider seriously the fact that the post-F ordist social environment of globalization will include Japanimation and ponde r its meaning. In other words, the strategy of this cultural movement is the effect of the Subimperialism. According to Kuan-Hsing Chen, the sub-empire is secondary depen dent empire which has hegemony much more in culture and economy than military system. And this new verson of imperialism uses sub-culture in general. By ana lysing a Japanimation film, I would like to illustrate and critcize Japan as the sub-emipire of signs.

The "GHOST IN THE SHELL"

The film "GHOST IN THE SHELL" is set in the world of A'029 . This near futur e is not so information-based that nations or ethnicities have vanished , alth ough networks of many enterprises have covered the planet, electrons or light running through them. In this world , East Asia is a huge corporate zone domi ated by multinational economic and information operations. In this world, the lives of human beings are intertwined with advanced technol ogies. It is a world of cybernetics and sophsticated electronic information ne tworks , where the border between people and machines sometimes becomes blurr ed or invisible. For some people, reality is only virtual. Many humans in this world become cyborgs, a comlex of man and machine. Except for the kernel of their brain , some people in this age already have substituted a cyberne tic, prosthetic body for their own body. The main character of the film ,a woman named. Motoko Kusanagi , is the leader of the "Shell Squad" ,Section 9 of the Department of the Interior, which has been formed by the government to combat cyber crimes and political terrorisms in the information society. Through the net, crimes have become more sophisti cated and more violent. The story of the film is about a conflict and conspira cy among some departments and agents in the government The events are concern ed with a strange hacker who has the code name 'Puppet Master'. This unidentified super hacker started out as a computer virus manufactured by the Foreign M inistry. The "Puppet Master" can take over human beings to further his own pur poses by using what is called "ghost hackng". Even though a human in this world may almost have changed its own body into a machine, it still can remain human in so far as it has its own "ghost". Ghost is a sort of spirit, not mind in general. It is indeed unconclousness it self, but is also memory, which can help found people's identities. "Puppet M aster" says " memory can not be defined , but it defines mankind." As if it were the water in cup, the identity of a human needs a form or shell at the sam e time that it needs "ghost". We can't distinguish between shell and ghost in human beings. But the problem isn't about the traditioal philosophical dicho tomy between mind and body. Rather we come face with the very basic

question in SF : Is cyborg the human or the machine? What is self or identity for cy borg ma(chi)n(e)? The "Shell Squad" team as an organization tries to chase and catch the "Puppet Master" while Major Motoko Kusanagi tries personally to respond to that basic question . For sometimes Motoko is skeptical about her I dentity and whether she has "ghost". Because her body is almost a machine, she is caught in a paranoia according to which she was made as an android and provided with a virtual self and an artificial "ghost" In fact, some peop le arrested by the "Shell Squad" as the"Puppet Master" have turned out to be just only agents who were given fictitious personality by cyber brain hacking. They were "puppets without ghost" and they have only illusional image and me mory and self identity. These problems are closely concerned with the micro politics of identity inclu ding opposition and segmentation between class, gender, ethnicity and "race". It is can be said that human and cyborg belong to different tribes and "race"e ach other. This context recalls the problematic of "cyborg politics" presented by Donna Harawey. Broadly speaking, the question here, is the self a mind or a spirit or does the self consist of a suit, a shell, prosthetic technologies ? Does the vested shell or suit incorporate the body and become the self itself, or doesn't it? So as audience of this film , we share the same question with Maj or Motoko' the problem of the "shellfishness of selfishness" and the question of "Who am I ?" The "Puppet Master" has appeared to the "Shell Squad" and It(or perhaps he) s peaks through a cyber body without ghost. It seems that he allows himsel f to be caught He affirms, "I'm not an AI. I'm a living, thinking entity who was created in the sea of information." It is easy to see here the problem of Artificial Life (AL). For natural life DNA is nothing more than a program des igned to preserve itself. And then life, when organized into species, relies on genes to be its memory system. Conversely the computer and cyber technolog ies are the extension (explosion) of human memory. Some programs can function independently from human will and so gain autonomy. If these processes becom e more complicated and sophisticated, then certain programs or algorithms ar e going to become more similar to life itself. Of course it is very different from the life in nature, but at least we can see and define some information p rogram as Artificial Life(AL). In this sense, the "Puppet Master" as AL uses "meme" and cultural genes to control many humans and systems. It has "ghost".

Informational capitalism and Techno-Orientalism

Manuel De Landa has already remarked that interest in AL came out of reflexion on the failure of the AI paradigm. He has always stressed the shift from a top down aproach to a bottom up aproach, for the latter depends upon emerge nt and autonomous processes in information science. In general, Artficial Life experiments include the design of a simple copy of an individual animal, wh ich must have the equivalent of a set of genetic instruction that are used to create its offspring as well as being transmitted to that offspring. Delanda says...

"This transmission must also be "imperfect", so that variation can be generate d.—The exercise will be considerd successful if novel properties, unimagin ed by the designer, emerge spontaneously."——— "Virtual Enviroments and the emergence of synthetic reason"If AL truly were more than a simple program and could become life, it would send some information to its own offspring by "imperfect transmission". The behavior and intention of the "Puppet Master" in this film is based on this logic. Thus in the end of this film , the

"Puppet Master" proposes to Motoko to merge with each other. By this unification he would able to get death , as in real life , while Motoko could generate varied offspring into the net. One probably could say that we have already known "Puppett Master" in our ordi nary lives. In fact it is possible to find invisible manipulators in the mar ket and the financial system. The market and capital increasingly are becoming dependent on emergent processes and non-linear logic "Emergence" here means the sudden change of some states in any system or a haphazard phenomenan rely ing on a radical contingency. In the paradigm of AL, this emergence and bot tom up decision making in a system are very important. This is why we can consider the work of huge capitalist corporations and the complicated virtua I financial system from the point of view of Artificial Life (or Artificial Market) There is nothing like the "invisible hand of God", but there are some I nvisible hands of "Puppet Masters". Of course this is just an anonymous proces s, but at least one can say that the "Puppet Master" is an allegory of infor mation capitalism. De landa presents a similar point of view about the market.("Markets and Antim arkets in the world economy", in Tecno Science and Cyber Culture, Routledge 19 96) Any replicating system that produces variable copies of itself, in orde r to get new evolving forms, has to need * the divergent manifestation of the antimarket" The market for capitalism has always already consisted of self-org anized, decentralized structures And it has always also been an "antimarket". The antimarket is an aspect of the non-linear process of the market itself.

To analyse this film further, I would go back to the issue of "Japanimation" I tself. Why is this kind of animation so highly developed in Japan? I think that one reason has to do with the gaze of Western people toward Japanese culture. And the problem is also about Orientalism. For example in 70's when the German techno-pop band "Kraftwerk" used android machine-like gestures in their live shows, they took the gestures of Japanese buisiness men in Europe as their model. It shouldn't be surpriseing that they were interested in robot like bowing and expressionless laughter. David Mor ley and Kevin Rovins have argued, in their influential book The Space of Ident ity, that "Western stereotypes of the Japanese hold them to be sub-human, as if they have no feeling, no emotion, no humanity"("Techo-Orientalism.Japan Panic", in The Space of Identity, Routledge, 1995). These impressions come from the high development of Japanese technologies They are a phenomenon of "Techno-Orientalism". The basis of Orientalsim and xenophobia is the subordination of others in various areas of the world through a sort of "mirror of cultural conceit". A host of stereotypes appeared when binary oppositions----culture and savage, modern and pre-modern, and so on ----were projected on to the geographic positions of Western and non-Western. The Orient exsists in so far as the West nee ds it, because it brings the project of the West into focus. Naoki Sakai says on this point :

The Orient does not connote any internal commonality among the names subsumed under it , it ranges from region in the Middle East to those in the Far East. One

can hardly find anything religious, Inguistic or cultural that is commo n among these varied areas. The Orient is neither a cultural , religious or 1 inguistic unity. The principle of its identity lies outside itself⁻ what endow s it with some vague sense of unity is thaOrient is that which is excluded and objectified by the West, in the service of its historical progress. From the outset the orient is a shadow of the West."

If the Orient was invented by the West, then the Techno-Orient also was invented by the world of information capitalism. In "Techno-Orientalism", Japan not only is located geographically, but also is projected chronologically. Jean Ba udrillard once called Japan a satellite in orbit. Now Japan has been located in the future of technology. Morley and Rovins say,

> "If the future is technological, and if technology has become 'Japanised', then the syllogism would suggest that the future is now Japanese too. The postmod ern era will be the Pacific era. Japan is the future, and it is a future that seems to be transcendining and displacing Western modernity."

Japanimation is defined by the stereotype of Japan as such an image of the fulture. The West is seduced and attracted by the model on the one hand, while on the other hand the model of Japan is looked down upon rather than envied by the West. Furthermore this complex about Japan seems to contain a psycho-mech anism similar to anti-semitism. As is will known, Japanese capitalism is highly developed and has become very powerful in many areas such as the US, the EU and Asia. Techno-Orientalism works there as a manipulator of the complex about Japan, in which Japan is the object of transference of the envy and con tempt from other cultures and nations. So now, a role resembling that of the Jew is being played more and more by the Japanese. Of course it is vain to lin k the Jew and the Japanese actually and essentially Rather The Jews and the Japanese function as the effective figures of the information captalism

The Japanoid Automaton

I think that the stereotype of the Japanese ,which I would like to call "Japan oid" for not actually Japanese, exists neither inside nor outside Japan. This image functions as the surface or rather the interface controling the relation between Japan and the other Techno-Orientalism is a kind of mirror stage or an image machine whose effect infulences Japanese as well as other people . This mirror in fact is a semi-transparent or two way mirror. It is through this mirror stage and its cultural apparatus that Western or other people mis understand and fail to recognize an always, illusory Japanese culture, but it also is the mechanism through which Japanese misunderstand themselves. Differ ent from the Lacanian mirror stage, a complete solution for this structure of disavowal, through which a "real" Japan could be properly recognized, is impossible. It is interesting that in the film " GHOST IN THE SHELL", the metaphor of the mirror is very used often in a particular way. In particular, the Puppet Mast er" has whispered a passage to from the Bible to Motoko when he has tried to approach her through cyber hacking. In the end of the film , the "Puppet Mast er" says to Motoko---"We resemble each other's essence, mirror images of one another's psyche." And after she merges with the "Pappet Master", Motoko cite s the Bible as bellows-

"What we see now is like a dim image in a

mirror-. Then we shall see face to face When I was child, my speech, feelings and thinking were all those of a child. Now that I am a man, I have no more use for childish ways."

There are two mirror stages in this context of Techno-Orientalism. One is about the encounter between the human and the machine, the human and the net. And another is about the relation between Japan and others{Western, other Asian, etc.). These two mirror images constitute the "Japanoid" as object of envy and hate. I have already mentioned that the Japanese have often been laughed at b ecause of their "automatic" robot-like gesture. Of course as Freud has observe d there is very close relationship between automatic action and humor and laug hing. But here one should be think about why androids or robots are indicule d and why the person laughed at becomes like an android. Rey Chow has an inte resting analysis of this point.

> "In Chaplin's assemmbly line worker, visuality works toward an automatization of an oppressed figure whose bodily movements become excessive and comical. Be ing "automatized" means being subjected to social exploitation whose origins a re beyond one's individual grasp, but it also means becoming a spectacle whose 'aesthetic' power increases with one's increasing awkwardness and helplessne ss " "Postmodern Automatons" in Writing Diaspora ,Rey Chow, Indiana University Press, 1993

To affirm the culture and the industry of the modern world is to summon the "automated other" by introducing the rhythm of technology and machine of each age into ordinary life. As far as workers, women, the ethnic other experience a radical change in work conditions because of high technology, the image of the automated doll is imposed on them. This image also is imposed on the nation people who overadapt to the mutation of technological conditions. Needless to say the Japanese is being seen as the "automated other". Japanimation, which organises the image of automatization and animation(giving it a life form), constructs and presents a "Japan" as an "automaton culture" and as the "Japanoid" in "Postmodern Times". It is worth returning to the "Puppet Master" in this film , because the "Puppe t Master " reminds us of the control of the "automaton". The one controled do esn't think he is a puppet, but in fact he behaves as a puppet controled by a master. It is the same with the relation of an ideology in general to humanbei ng. Motoko, as a woman cyborg, thinks of herself as an "animated automaton". In order to supplement her void (as cyborg, as woman, as minority....etc), she agrees to the proposal to merge with the "Puppet Master". She as a minority would abandon her "ghost" to a huge system and net. In turn the "Puppet Master " as system would get death and a so called life cycle. Rey Chow has already defined the strategy of the cyborg feminist as rejecting the binary opposition of masculine-human-subject-versus-feminised-automaton. Chow argues that, this strategy " retains the notion of the automaton----the mechanical doll-----but changes its fate by giving it life with another look. This is the look of the feminist critic. Does her power of animation take us black to the language of God, a superior being who bestows life upon an inferior ?" Chow asks. This is the task of the cyborg as half machine, half animal and transgressive being. Conversely, when a subject takes up that tactics of trans gression, it becomes like a cyborg unconsciously. So for the cyborg feminist , this strategy should be extended further than "animating the oppressed minor ity" Cyborg feminists have to make the automatized and animated situation of their

own voices the conscious point of departure in their intervention. By a bandoning and sacrificing her own identity and ghost to the "Puppet Master", Motoko takes up the strategy of cyborg feminism. The "Japanoid Automaton" could be rejected in this way, but this rejection and resistance has always broken down in Japanese subculture. The anational(non-national) culture of Japan and Japanese (Japanoid) are "animated and automatize d" as being non Western and non Asian. In this cultural climate, a Japan im aginarily separated from both West and East is reproduced again and again in the political unconscious of Japanimation (subculture). Though Japanimation has often emphasized the landscape of Asia and Japan in te near-future, it is the operation of forgetting and conceal the real situation of Asia and Japan In certain sense, Japanimation is an ideological apparatus at the same time that it is also----virtually?----- a armament of criticism. Why do Asian landsapes excites the cyberpunk imagination? Certainly it would be possible to reduce the problem to the influence of the film "Blade Runner" . But it should be considered that Japanimation has illustrated the mutation of global capitalism itself by appropriating the illusion of Asia or Japan By choosing Hong-Kong as the settiing of this film, and trying to visualize the information net and capitalism , the director of this film, Oshii Mamoru , unc onsciously tried to criticize the sub-imperialism of Japan (and other Asian nations).

Japanimation is traveling through the cultural diaspora into the world, and is translated, communicated, and misunderstood. It should be cited the passage f rom Donna Haraway's "A Cyborg Manifesto". "There is no way to read the following list from a standpoint of "identificati on", of a unitary self. The issue is dispersion. The task is to survive in the diaspora." If the image of shell and suit in cyborg has been moving, it is not vain to di scover the "automated other" in various expressions and in global information capitalism itself. It is another way to "animate" the other and the minority.

sphinx@inch.com

Adrianne Wortzel

(.us)

MEDIEVAL CARTOGRAPHY AND THE IDEOLO-GICAL MAPPING OF CYBERSPACE Part II, section A ARE YOU SURE IT'S REALLY ROUND?

What we consider the territories of cyberspace, with their capabilities for collaboration, information storage and transfer, communication, enterprise, reportage, education and expression, are places of virtual reality, and, to an increasing degree, virtual real estate. Within cyberspace we can discern trade routes appearing, political factions emerging, creative arts blossoming, religious groups proliferating, educators conducting long-distance learning sessions, minstrels performing, and town criers disseminating information. These mirror images of travel, traffic, and communication form "scripts" and/or "maps" are employed to find order in what is considered, at this writing, a predominantly anarchical and chameleon-like space.

For artists, the space of telecommunications offers a new opportunity for territorial mapping; one which could redeem imagination and even propaganda from the negative connotations deposited upon them by our culture.

This paradigm of navigation in new media, and the role imagination plays in the delineation and shaping of space is analogous to the way the 13th century Western European makers of maps displayed their world. Medieval cartographers leaned towards an ideological mapping of the world at the time when classical tradition had been swept aside and the annals of cartography had been predominantly dominated for centuries by theology. The medieval cartographer was shaped an individuated interior (mind)space while simultaneously shaping an external stereotypical (world) space which would comfort and reassure the curious, holding heresy at bay and glorifying the feudal hierarchy and God Just as an image of the earth as a moveable sphere was heretical in the 13th century; the idea of an information or educative space that is, and remains individuated or unindexed, is tantamount to heresy in our time.

Imagination and Propaganda Become Devalued Drawing the curtain on the 13th century, we see that some depicted the world as a flat, circular disc, finite, and with a definite edge. The center of the disc was occupied by heavenly phenomena radiating out into manifestations of earthly existence. As one proceeded farther out to the edge of the world the nature of things declined and became faulty and cumbersome, this was purgatory. Hell resided outside the edge. The idea of the "inside" and "outside" has a parallel in the creation of illuminated manuscripts - where monks would freely inject puns, anagrams, and notes in the margins and illustrations of their manuscripts which had more to do with their personal longings and everyday complaints, than the subject of the text itself.

Long before the 13th century Herodotus had put forth that the world was a sphere. This chunk of knowledge became buried under the theological deluge that swamped cartography in Western Europe in the Middle Ages. It was not until the great explorations of the 15th century that mapping could become a science there. It was also at that time that Ptolemy's work was translated for use - and translated from his words, not his images, since none of the maps themselves had survived So Western Europeans refuted that the earth was round in their depiction of it. To those who took literally the biblical phrase: "four corners of the earth", the earth was depicted as a square or rectangle. It was illustrated in an oval or circular form by those who considered it heresy not to put Jersuallem in a space that enabled it to be centered and equidistant from all the world's edges. [Exek. v. 5 "This is Jerusalem" I have set it in the midst of the nations round about her."] The earth as a sphere would mean that nothing on its surface could be central to anything else, an extremely heretical proposition At the same time in history, in an effort to ensure the safety of their trade routes, Arabic cartographers sought real knowledge of the terrestrial world, and were even using astronomy to chart territory in an empirical way.

In her article "The Medieval Consolations of Cyberspace", Margaret Wertheim discusses on Roger Bacon's 13th century argument that religious art make use of 3-dimensional illusion to delude the viewer into thinking they were participating in the pictured theological event - and thus turn from "viewer" into "believer. This parallels the literal interpretations of the Bible used to constitute geography. This phenomenon of "belief" initiates for us the first holy holodeck

Seeing the world ideologically; without an interest at large in maps as charts of the real geographical, topographical world, provides a clue to seeking out paradigms of making works of art in cyberspace.

There are differences of course, between then and now. In the course of all the time mankind has been walking on earth it is only in the past generation or two that anyone has really seen the earth - that is, - left the earth and gone far enough to turn around and look back at it. This phenomenon in most 13th century minds would be inconceivable except as a metaphor or an allegorical idea, and one that was definitively heretical. One of the things our culture may have in company with medieval times is that nothing was considerd without dwelling on its significance -- its function as a metaphor and allegory. "Allegory was the guiding concept Every incident in the Old Testament was considered to pre-figure in allegory what was to come in the New." The Calamitous 14th Century, Barbara W. Tuchman.

Theology and Technology – Windows to the World Can artists of today cloak their relatedness to the technology in the same way that the ancients could cloak their fiction in the "facts" of the geography of their time? Was the point not that Herodotus and Homer might be liars, but storytellers using the fictive mode buttressed by some absolute givens – ie., geography as far as it was known.



The Mappa Mundi, Hereford Cathedral, Great Britain

The Hereford Mappa Mundi, located in at the Hereford Cathedral in Great Britain is a prime example of this. Made and signed by one author, Richard de Haldingham in 1289 in England, it measures 5 feet 2 inches high and 4 feet 4 inches wide. The map is a history of the telling of many stories. In Armenia, Noah's ark has come to a stop after the deluge on a mountaintop. The Garden of Eden, where we see Adam and Eve being expelled, forms the apex of the meeting of four rivers including the Tigris and the Euphrates, and is repeated elsewhere in the map, another key to the nonliteral interpretation of geography in this map.

The path of the Exodus is the most fully illustrated part of the bible on the map. It starts from the treasure city of Ramses and crosses the Red Sea to Mt. Sinai, where Moses receives the ten comandments. It then continues to be traced, including a literal depiction of the parting of the Red Sea, all the way to Jericho.

The map is peopled by idiosyncratic creatures, some handed down from Pliny in the second century



From Exodus, Lot's Wife turned to salt, Sodom and Gomorrah The Hereford Mappa Mundi, Hereford Cathedral

Entities

The disembodied presence we have in cyberspace allows for appearances as "actors," i.e., the taking on of assumed characters and identities. It is common practice in virtual on-line communities for participants to adopt extremely idiosyncratic, sometimes phantasmagorical characteristics, similar to those of the medieval cartographer. The tensions between various notions of "reality" in this space open up verdant territories for artists.



In the annals of Solinus, there were the inhabitants of Strabo, who wore only their oversize ears as clothing, the dogheaded men in Africa who barked when they talked and had a dog for a king, the coastal tribe there whose citizens had four eyes apiece, the race whose eyes and mouths were in their chest, etc.

s examples, below are descriptions self-set by individual characters inhabiting a virtual community, or, in the vernacular: a moo (Object Oriented MUD - a textual environment programable by the inhabitants), on the internet:



Dampire: a succulent green mold covers his body bearded at both ends the fangs might lead one to imagine a desperate heart but he hails you with a silent voice that evaporates your resistance.

Wombat: A pet: a rodent adorned in a slightly-too-large

blue robe. It screams in a warbling, monotonous drone.

Calcium Enriched Toad Stool: A slight & desiccated fungus. It appears to have been mainlining milk, but it is not any stronger. You notice a malodorous emanation from the underside of the toadstool. Secretes charm. Cybernauts are rushing headlong into creating a world full of creatures as phantasmagorical as the biological monstrosities of Solinus produced as nonsensical interpolations of Pliny's Natural History which dominated cartography from Solinus' time in the 3rd century A D. through the 17th century.



Disembodiment is what makes it possible for everyone to safely be imperfect and monstrous - "safe" in certain respects, to be anything one wants to be - virtually. In cyberspace there is as equal a flux to hell as there is to heaven because it functions as a performance space that sets its stage solely in our minds.

So if forms hypermedia and virtual reality, i.e., experiential forms of art and expression, have been around for many centuries, then what does the new technology have to offer that is special?

I think it is a more literal and experiential venue for the exercise of imagination and discourse, particularly by artists. It supplies us with infinite possibilities for pluralistic narratives, and for presenting ourselves as disembodied in an environment with no borders except for the arbitrary ones we impose on it. It also provides a real-time time vehicle for experiential work and restores art to process and discourse and not only the making of objects.

Our world is now recreating itself via new technologies. At a time when sensor and satellite technology have the potential to report the location of any particular creature in the world at any time, it will be quite an adventure to see the form that emerges from a scramble for bearings in a rapidly changing technology.

The coded cosmologies of hypermedia create a need for new re-encryptions of mapping models derived from an imaginary structure, rather than mimetic reproduction; centerless carto-graphies that would have been heretical in the Middle Ages.

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POSTER SESSIONS

(.cz)

bielicky@earn.cvut.cz

Michael Bielicky

EXODUS

EXODUS Exodus was a virtual tele-performance whose starting point lied in the Israeli desert of Negev. I spent the five days of Ars Electronica 1995 (June 20-25) in the desert, and each day I followed the biblical trail of the prophet Moses. Included in my equipment I had a portable GPS (Global Positioning System) which was linked to a modem and a cellular phone. This equipment made it possible for World Wide Web users to follow my movements in real time The GPS picked up data from several navigational satellites and sent it to the nearest Internet server via cellular phone. Many digital desert landscapes were stored in the Internet server and can still be accessed through the WWW When Moses led his people out of slavery, nobody sensed what a radical effect this event would have on the development of human history. Man with his new consciousness was transformed into a new species both through his experience of liberation and through his acceptance of the Ten Commandments. I want to use this important event in mankind's history as a metaphor for the newly developing man at the end of the twentieth century. Mankind's emigration into the virtual net and the liberation from time and space associated therewith changes our consciousness just like the experience of presence in absence. The new ubiquity, not only passive but also active, creates the "Information Man". The philosopher Vilem Flusser said in relation to this that materialized terms like "soul", "spirit", identity" "I", or "self" would have to be reconsidered. My desert experience put me in a new relationship with reality both through my isolation from the "flow of information" and through the awareness that the outside world was ever-present through the Net and could register my isolation. Maybe the "omnipresence of God" is nothing other than the experience of the individual with the more highly developed consciousness of society. The novelist Stanislav Lem, in his theo-fiction novel Solaris, described this as the Oceanic Consciousness. So it seems that the technology of the Net helps man to develop a new impression of reality that will have both sociological as well as political consequences.

kunstradio@thing.ov.at

Heidi Grundman (.at) Producer of ORF (Austrian Radio and TV's) KUNSTRADIO, Vienna

RADIO THE NE(X)T CENTURY

SUMMARY

There is a variety of artists' projects dealing with and reflecting the process and actual state of the current convergence between massmedia, telecommunications technologies and the computer. Many of these projects take place in the public space of the radio medium and the Internet and are very difficult to grasp inside the traditional venues of (even media-) art. The examples in this presentation all come from the experience of the KUNSTRADIO - an on air and on line radio-and telecommunications-art-site based at the Austrian National Radio, Vienna). http://www.ping.at/thing/orfkunstradio/ RADIO THE NE(X)T CENTURY is the title of an art-project by Bruno Beusch and Tina Cassani. In this project (and others before) the two Swiss artists explore the medium radio (and our culture) as they are changing under the impact of digitalisation. In RADIO THE NE(X)T CENTURY the two artists use the fictitious webcrash of a fictitious on line cult- radio as the starting point for an ongoing radio-(hi)story in actual radioprograms and in the World Wide Web. They appropriate the format and styles of popular radio together with well known presenters, with producers, sound engineers, scientists, theoreticians, curators of technical museums, etc. They seduce listeners to phone in, users to contribute material to a Cyber Memorial, they turn technicians into resourceful actors etc etc

In a very playful way they deal with serious issues - like the redefinition of concepts like authorship, originality etc. or the practical and theoretical development of new production strategies for the new multimedia environment we are and will be living in. But RADIO THE NE(X)T CENTURY is only one of several art-projects using the traditional radio-medium and the World Wide Web in very different ways and styles.

In some of these projects radio-stations- and artists - from all over the world link efforts, e.g. HORIZONTAL RADIO, 1995, or RIVERS&BRIDGES, 1996, two world wide radio- and Internetprojects with performances, concerts, installations at many nodes in three continents.

Projects like these are very difficult to grasp in their entirety only aspects render themselves to the experience of each participating individual. A passive observer could be left encountering a surface that does not tell anything about the project itself, unless decoded as one of many participatory entrance points into the space/time of an everchanging field of energy created simultaneously - in a prenegotiated time-span - by many artists and non-artists ... The projects do not only change shape constantly their local/temporal manifestations may be very fugitive and very different as the projects as a whole are open and uncurated.. They have no center...They at the same time include, challenge and redefine a wide spectrum of concepts of art from the very not traditional ones to the ones that do not believe in the possibilities of control for the authors etc.

In other radio- and Internet-projects interdisciplinary teams of writers, visual artists and composers join forces, e.g. in FAMI-LIE AUER, a SitCom for Radio and Internet. This project has been running since the beginning of 1996: teams of authors with different backgrounds produce a weekly 5 minute episode for the radio. Each of these episodes is a piece of acoustic art. Style and form vary to a high degree, only the voices of the actors representing Gustl and Hansi Auer (the parents), Michi and René Auer (the two teenage kids), the neighbours (an elderly couple) and their dog stay the same. On line the FAMILIE AUER can be accessed all the time. There are possibilities to play games with them, to make contact with them, to become a member of a FAMILIE AUER fanclub etc. The on line episodes which are not necessarily related to the radio episodes use Real Audio. During the summer of 1996 the FAMILIE AUER was also present in a weekly print-magazine. FAMILIE AUER can also be reached via telephone. A first audio CD with a selection of the radio-pieces has just been published. Over 70 people are so far involved in the project, that - again in a playful way - tries to develop interdisciplinary production strategies for a project unfolding in different media and multimedia. The project is also intended to further the transfer of computer literacy from artists and technicians who already have a lot of experience in the new media to those who just enter the field.

More and more individual artists devise projects using tradi-

tional radio and the quite different possibilities of the Internet. To realize these projects they usually again have to find the cooperation of other artists and/or technicians. An example for this type of project is DARB-I-FETIH by Rupert Huber. DARB-I-FETIH is an on line composition that unfolded over months linking the image of the score with more and more visual and Real audio data. Twice in this period DARB-I-FETIH came alive also as radio-compositions and several times material from the on line and radio-versions became part of an installation and performances in different contexts from a gallery to a computer fair...

The artists, composers, writers etc. working on this type of project realize that radio (together with other traditional media) is in the process of becoming a secondary medium - the place of the primary medium is taken over by the computer. This of course means that new cultural techniques have to be mastered, stories have to be told in a different way, art production and distribution become one and the same, the relationship between authors and recipients is changing drastically to the point where the recipients become authors themselves. Artworks loose their special aura and -after a very brief moment of fugitive suspension turn into zapping-, sampling- or collaging material...etc.

While the irreversible process of the convergence of massmedia, telecommunications and the computer is going on rapidly, hopes for new possibilities to make money are flying high hiding questions like access, content and cultural change. In this situation artists, technicians, media-activists inside and outside of non-commercial and independent cultural and media institutions are forming new alliances for an alternative use of the emerging megamedium.



In the last ten years, we have focussed much of our energy into making art which integrates digital technology with our existing interest in the natural world, and our expressive experiences as gardeners and printmakers experiences which are both physical and messy. Combining the "denizens of the compost heap" with the "works of man" - the computer - has proved quite challenging.

Unheard of not so many years ago, the '1wire frame," Fractal Geometry, seamless digital collages, and 3-D rendering have all become a part of a new visual vocabulary. Much of the contemporary digital experience seems headed towards the virtual. We ourselves are not interested in creating hyper-real images, which seem driven by the paradigms of commerce and the entertainment industry. Just as a garden is cultivated, our digital prints must be built with a physical and tactile involvement, as well as exploiting the new technology and new visual vocabulary available to us.

To illustrate this challenge, here are some examples our other collaborative art work with a more pungent physical manifestation than one associates with computer art. This piece, "Citrus Tattoo," is comprised of hand-tattooed grapefruits. As the piece began to decompose, that random process began to change the piece in unexpected ways. All the tattooed words were (if equal importance at first. As Nature intervened, "Memory" was the first Lo go, but "Cynicism" remained intact to the end

Another piece, Blood Potato," made from gold-leafed potaces in honor of the 150th anniversary of the potato famine, actually and unexpectedly began to bleed as the potatoes first sprouted and then rotted in the warm museum air. The fullbandwidth experience of scale, image, touch, and in this case, smell, is hard to replicate with computers. Computers are just counting machines; how could we inject some of the liveliness of nature into the "cold" medium of computer art?

One way we have found to infuse our digital art with this liveliness of nature was to approach our computer with an attitude of openness. We are not interested in simply replicating the image created and displayed on the monitor Let machines do what machines do best. We are much more interested in constructing a print.

To this end, we have developed ways to approach digital hardcopy which remain inventive and physical, based on our experience as printmakers. This large piece, "Madonna of the Swarm," is printed on many long scrolls, and combines computer images and printing, with woodcut and other media. The large falling figure was digitized, printed and then projected onto the scrolls. Jts silhouette was painstakingly reproduced with a swarm of rubber stamps,

This next piece uses stencilling to create large areas of printed digital material. This method makes virtues of the limitations of affordable or out-moded technology a dot-matrix printer won't print a wide sheet of paper, but it can print an infinitely long one, and will allow a layering of paper that makes stencilling possible

This series of slides illustrates the stencilling process as well as a pastel transfer process. This transfer process uses the impact of the printer head to imbed the paper with bright modulated colors instead of black ink from a ribbon.

Another method of inventive output is this laser-print transfer, which allows one to roll ink on a laser print and then print it on just about any other surface. This transforms tightly-controlled laser-printed hardcopy with the exciting random acts of process which we love so much.

Another process we have developed which takes advantage of laser technology is what we call "toner drawing." We discovered this process as a result of a delightful year spent on a teaching exchange in Maastricht. We lived in a dormitory setting, with no studio but access to a scanner, computer, laser printer and photocopy machine. The images are a combination of scanned and manipulated material printed on a laser printer and then photocopied on larger paper. Each sheet of paper was photocopied many times, and after each copying, we developed the image by scratching away or "drawing in reverse" at areas of toner. The final prints are a composite of many layerings and much removal of toner. The images are combinations of whatever was immediately at hand: our baby's bottom, daffodil and tulp bulbs, stuffed toys and illustrations from various books.

A promising area of exploration that we have been working with recently is the use of different colored toner in our laser printer. We often begin with "found" paper, such as sheets from old books. This series of slides shows the progression of the layering, first with scanned images and typography, laser-printed in black and blue toner over the text and illustrations from an old astronomy text book. The pages are then printed in bright colors using lithography. In this particular piece, "Joyce Astronomia," we combine the accidental information from the textbook with Stephen Dedalus' journal-entry epiphanies from the last paragraphs of "Portrait of the Artist," along with our own scanned images and drawings This combines a scientific view of the universe with artistic reflections



on cosmology and spirituality.

As with our scrolls, we often combine the small separate sheets of paper to form larger artworks. At close viewings they reveal interesting layers of images and printing techniques. The detail of the astronomer illustrates the way in which the digital images lithographic printing combine in compelling and tactile ways.

This detail from "Welcome, 0 life" also illustrates our open attitude about digital input. We are inspired by the 3-dimensional forms created within the computer, and want to combine that with information from 3-dimensional forms created outside the computer. This little character was created by digitizing and manipulating a battered and much-loved toy Lane had as a child.

We have also begun to build our own 3-dimensional models to digitize, inspired by the delightful organic discoveries in our compost heap. Some are made directly from our garden materials, such as this grape-vine cage and chicken wire trap. Others are fabricated from more traditional, yet humble art materials, such as carved wood, and this ball of rope, duct tape and wire. The digitization and printing processes transform these humble materials into mysterious objects. They have a great deal of personality and character. Neither the objects themselves nor computer-generated forms have this sort of individuality.

You can see the documentation of this transformative process, first with this grapevine cage, which has been digitized and manipulated in various ways for printing. You can see this as well in the progression of an asparagus root.,

Each of the prints in our "Woodland Goiter Series" is individually cultivated, crafted in the way one builds a garden. C The computer is one of the many tools we use. We view art as a process of transformation. ideas and materials are changed as they come in contact with each other. The computer helps inform our ideas and transform our materials., It is not itself the art.

Just as we have sought ways to get interesting images out of the computer, we have begun to think about keeping those interesting images inside the computer, too. The Web offers exciting possibilities for the dissemination of artwork to a mass audience.

The challenge, in our view, is to get a sense of thephysical into the experience: a sense of place, of object, of context. Many of our hardcopy experiments have found their way back to life, on screen, in the "Gallery of Decay."

As our presentation comes to an end, we want to step back from the focussed discussion of our work. As we have become more and more involved in technology, other challenges present themselves This image of a satellite-tv hut in Central Africa sums up for us some of these issues. Technology is an active part of a daily intrusion In, our lives. We choose to integrate it into our art. We have the privilege of pushing the limits of out-moded machines, and of aspiring to experiment with new expensive devices. But how does the intrusion of technology effect people with less easy and available access? What impact does it have on the "web of life," the connection between us and our planet?

m.jones@mdx.ac.uk

Matthew Jones

Interaction Design CentreSchool of Computing Science, Middlesex University, London

(.uk

CONVENTIONAL ART AS WEB EXHIBITS: A NEW ELECTRONIC ART FORM

SUMMARY

A new art form is emerging, almost without being noticed. All around the world, major art institutions are representing their conventional collections digitally on the World-Wide-Web. This paper reviews the way institutions are building these extensions to their galleries. We show how the potential of such galleries is being limited. The problem lies in the way the Web is being treated as a sophisticated publishing channel; just another way of reproducing a gallerie's physical reality. We argue that engaging, effective virtual galleries can be produced if fundamental computer qualities are understood and exploited. The use of computer power to organise information, facilitate communication and process data is illustrated with reference to initial work we have carried out with the Royal Academy of Arts, London. Introduction

Walk into any real art gallery, one with physical walls and floors. Art works hang on the walls or stand on the floors Usually, they are placed not arbitrarily, or by chance but through a careful process of planning and thought by the exhibition curator. The curator will take account of the physical context of the "story" they want to tell. Which room would be best for a particular painting; what about the light for that sculpture? The characteristics of the space directly affect the design of the show.

Many art institutions, from the Louvre to the New York Met, are beginning to use the World Wide Web (Web) to show their collections. Those who are not yet wired are enthusiastically planning to be ... soon. It appears, though, that there is much less thought about how to use this electronic space to display conventional art. Great opportunities will be missed if art galleries, artists, and technologists fail to think about what new possibilities are opened by the technology.

The Interaction Design Centre at Middlesex University has been working with several major institutions, providing expertise on Web design and mangement.

One of these is the Royal Academy of Arts, London (RA), the oldest Fine Arts institution in Great Britain, founded in 1768 by George III. During the past year, the RA has been considering the possibilities of using the Web. We have assisted in these early stages of planning by developing prototype ideas. The prototypes used exhibit resources (text and images) from the successful exhibition, Africa: the Art of a Continent.

Through these studies, we have started to explore ways of using the power of networked art information and in this paper we describe some of our initial ideas and prototypes. Although our approach is driven by computing science, we do not present detailed technical arguments. The discussion, here, is at a higher level, our purpose is to explore what can be achieved by 'hanging' art exhibits in a web gallery.

Current Web Galleries

To help us develop ideas for the RA we looked at the use of the Web by other art institutions. We used the popular and comprehensive Web index, Alta Vista [1] [AEB1]to locate art gallery web pages. Search terms included generic ones like 'art gallery' and 'exhibitions' and institution specific phrases such as 'National Gallery' and 'Warhol Museum'.

There is a vast number of Web documents that contain such phrases - 90,000 for example, contain 'art gallery'. However, we were only concerned with pages produced by major, public art institutions. Our review did not take account of the private galleries which use the Web to present details of their artists and sales. Individuals with interests in particular galleries have also created web pages with major gallery information. These were ignored too. We wanted to see how the institutions and the people who were actually involved with the real, physical collections, represented themselves. The search also identified several 'virtual' galleries like the WebMusuem [2]. These sites bring together eclectically art from many institutions. Again, these were not considered. The remit of our work is not to suggest alternatives for art galleries [3] but to discuss how the Web can extend their reach and contribution.

After filtering the search lists, we looked at ten Web sites relating to institutions such as the Warhol museum [4], the Louvre [5] and the Metropolitan, New York [6]. In reviewing these sites, we were interested in how the collections had been presented; how they could be accessed and engaged with

Most of the institutions reviewed, simply reproduced the physical arrangement of their collections in the Web pages. Typically, Web site visitors are presented with a map or text listing showing how the collection is organised in the actual gallery. They are then able to select sections of the collection they want to view. For each area of the collection, the usual approach is to display sample images and some accompanying text; no site contained extensive information on their collections. This reproduction of the physical layout of the collection is a simple and effective way to give the visitor an idea of the scope and content of the collection and insight into the nature and purpose of the institution.

Some of the institutions had Web offerings which were not structured to reproduce the physical galleries. These sites included a limited description of the collections along with some images. The type of information on these pages were much like that one would find in conventional, paper-based, exhibition brochures and tri-folds and brochures.

None of the Web galleries used any advanced techniques such as virtual reality imaging to display their collections. However, we expect that tools like QuickTime VR™ and Virtual Reality Mark up Language which can be used to present 3-D representations will be widely used in such sites in the near future.

As well as mirroring the physical arrangement of the gallery on the Web, institutions have also reproduced, perhaps unintentionally, their physical environment . In physical art spaces, people pass by the work, unable to engage with other visitors, unable to ask questions of the scholars, with the collection being passively presented to them. Similarly, in the Web galleries we reviewed, visitors enter a silent, still world. A hightech, clean, mausoleum of art.

The Hidden Computer

Many human-computer applications suffer because the computer is neglected [7]. The result is poorer systems Witness to this is the deluge of disappointing interactive multimedia and, more recently, Web sites.

Much effort seems to be channeled into using the computer's power to generate

surface level aspects: digital sound and smooth animations seep off the screen. All of these features make the products wonderfully marketable but cloak the lack of real interaction design. Art gallery Web site developers appear to be wandering into the same wood as other interactive system designers. They are neglecting the computer.

There is an urgent need for developers to resist these surface level seductions. We need to shift our focus to fundamental computer qualities. If this does not happen, such interactive systems are going to be no better (and in fact probably worse) than their non-digital siblings.

Computers are good at are organising information, facilitating communication, and data processing. These qualities are discussed, below, along with ways of exploiting them to make gallery Web sites more than what they are today. These applications are only examples of what can be done: we look forward to all those with a stake in web galleries taking the discussion further.

Organisation

Flexibility

In a physical gallery, and a Web site that reproduces that physical structure, exhibits can only be presented in one order. The single arrangement is not adequate even in the real gallery. Visitors deviate easily from the curated sequence, their detours prompted by their own interests (or whims) Sometimes, institutions provide alternative tours tailored to particular needs. In the RA Africa exhibition, for example, the Education Department produced resources for different school subject areas highlighting relevant objects and visit sequences. Following these alternative tours can require lots of movement between galleries. In the Africa exhibition, comparing the art of North-East Africa with that of the North-West meant several journeys through the six or seven rooms that separated the exhibits of those regions. A computer-based presentation of a collection should not be so limiting (or tiring).

In business computing, the ability to present multiple views of the same set of data has long been taken for granted. The logical content of the data is separated into a database. This database can then be used to serve many needs. This form of principled design is not apparent in Web site developments. On the whole, Web production is approached as a publication process; the Web used as just another communication medium. The hyperlinks joining the web pages together are embedded within the content of the page - there is no separation of content and structure. This makes changes and reorganisations difficult to do and prone to errors

At the Interaction Design Centre, Thimbleby has produced a web development tool, Gentl [8]. This separates out navigational and structural aspects from the actual web content. The tool can automatically generate different presentations of the same material. For example, two versions of the Royal Society of Arts web site has produced [9]. With the sort of separation that Gentl enables, it is possible to present multiple orders of web exhibits with little overhead.

Directing visits

It is rare to find an exhibition whose exhibits are displayed in a random order. Usually, the order presented to the public is designed to present themes, to make statements. However, it is usually impossible for an institution to ensure that visitors follow this curated sequence.

In a Web gallery, though, within the multiple organisations, discussed above, such directed visits are possible. For the RA prototype, we took one of the gallery-guide brochures and produced a set of Web pages showing the exhibits in the order given in the guide. Within these pages, users can only move forwards and backwards in the sequence. There are no hyperlinks on these pages; no opportunities to wander off the path

Communication

When people visit an art gallery, inter-person communication is effectively blocked Visitors are unable to share their thoughts and feelings, to ask questions or respond to fellow visitors. People do not interact extensively because of social inhibitions and because they do not want to disturb others. Furthermore, unless on a specialist prearranged tour, visitors are unable to get access to any of the experts - curators, lecturers, artists associated with the exhibition.

A Web art gallery should not be such a silent, inhibited place. The RA prototype demonstrates communication-freeing possibilities. Users are invited to 'attach' comments, questions or responses to exhibits. These notes can be organised in several ways including topic and source (expert, visitor etc.). This form of communication is asynchronous. users can submit and respond to comments independently of others. So, for example, exhibition experts can contribute to the discussion in their own time, without being distracted from their other, 'real' gallery duties.

A further development, not in the present prototype, would be to allow 'live' discussion pages. Visitors could contribute directly with other visitors who were visiting the site at the same time.

Computation

Computers are about computation. They can process data, responding and manipulating input to generate output. The Web is not just a sophisticated publishing medium; it is an information processing system.

Active learning

In a section of the RA prototype, users are invited to respond to exhibit related questions by selecting an answer from a set of choices on screen or from a pull down menu of alternatives. After making their selection, the prototype illustrates how the input could be processed by an associated program to provide appropriate feedback.

Capturing experience

When visitors interact with a Web site it is possible to record the page-to-page selections they make. These traces of movements through the collection can be processed to provide some useful information.

A simple way to use the information is to discover what are popular and unpopular sections of the collection. With this information, the site can be enhanced. For example, the reason why one part of the site is less visited than another may be because the access paths to that part are less direct or the 'signposts' to it less clear. If this is the case, more direct routes or better directions can be added to the site

It may also be possible to use the traces from many visitors to discover popular routes through the collection. Giving access to these information would allow new users to see how others have made use of collection and enable them to take advantage of the implicit knowledge those paths contain.

But these electronic memories should not just be used to improve the Web site but to also enhance the real, physical gallery. Where, today, galleries model their Web sites on the actual gallery; in the future, the physical exhibition could be prototyped on the Web. Analysis of the use of alternative arrangements could influence the final physical gallery arrangement.

Conclusions

A new form of electronic art is emerging with many major art institutions beginning to present their exhibits on the World-Wide-Web. However, the power of these virtual collections seems to be fettered by two problems. Existing web offerings suffer from being too much concerned with reproducing the physical arrangement of collections in the real art galleries. In addition, the Web is being viewed only as a sophisticated publishing channel. Institutions need to free themselves from these limitation to produce Web sites that provide experiences that no visit to a real art gallery can provide. To do this, developers should use the real power of the computer to organise information, facilitate communication and process interactions

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michael@nscac.ns.ca ajwol@concoir.edu.ca

Michael LeBlanc & Andrea Wollensack (.ca)

THE MC LUHAN PROBES

SUMMARY

(Keywords: McLuhan Marshall Design Probes Media Communication NSCAD Connecticut College)

> The McLuhan Probes is a web site (http://www.mcluhan ca) presenting an ongoing series of visually-organized and hyper-linked documents, made by students at Nova Scotia College of Art and Design in Halifax, Canada and Connecticut College in New London, USA. The Herbert Marshall McLuhan Foundation's goal in supporting

this project is to introduce McLuhan ideologies (through design projects and readings) to young designers. The authors invite the international art and design community to participate in the making of a bi-annual electronic journal on McLuhan.

The McLuhan Probes

DISPLAY IMAGE: McLuhan Slide Blank

MICHAEL B. LeBLANC: I was twelve years old when I first heard of Marshall McLuhan on a television comedy show. North Americans of my generation will remember when on Laugh-In Henry Gibson asked the question in rhyme: "Marshall McLuhan, what are you doin'?" Although I was from a media family, and I lived in a Toronto suburb, an hour commute from McLuhan's University of Toronto office-my young mind was on other things. So, the name was vaguely familiar when, as a university student, I found "Understanding Media" on a library shelf. I borrowed the book, but gave up after about twenty pages, preferring more readable thinkers like Toffler, Fuller or Papenek. I suspected this experience was not exclusive to me, and for the first time I realized the truth of Henry Gibson's question.

DISPLAY IMAGE. McLuhan Portrait

Marshall McLuhan was a communication theorist who taught in the English Department at the University of Toronto. He considered himself a grammarian studying the linguistic and perceptual biases of the mass media.

DISPLAY IMAGE: Gutenberg Galaxy

In his 1962 book Gutenberg Galaxy, (subtitled The Making of Typographical Man), McLuhan claimed that print technology had modified the forms of our perception, shifting and concentrating perceptual emphasis from the ear to the eye, with tremendous consequences for individuals and cultures.

DISPLAY IMAGE: Understanding

Two years later McLuhan published Understanding Media. He studied the way information shifts its focus from specialist emphasis on detail towards a need to interpret the contexts created by media forms, hence the aphorism 'the medium is the message'. He died in 1980.

During the late 1960's and '70's, McLuhan was a darling of the media. He made the cover of TIME magazine, and millions read his Playboy interview. In fact, we give copies of the Playboy interview-without the pictures-to our students, since it is still the most accessible introduction to his thoughts and ideas.

DISPLAY IMAGE: Probes

McLuhan, recognizing the shortened attention-span of a television-influenced audience, used epigrams, which he called "probes" McLuhan's probes are short snippets of wit, sometimes self-supportive and sometimes self-contradictory, calculated to elicit a reaction. A good example of a McLuhan probe is "The medium is the message" McLuhan often utilized hyperbole as a rhetorical device to provoke discussion. When McLuhan says " .at the speed of light man has neither goals, objectives nor private identity. He is an item on the data bank-software only, easily forgotten", he is testing an audience, looking for an argument At other times, he is eminently quotable: "We are living far ahead of our thinking" is today a commonplace that was startling when McLuhan said it at the end of the '60's. The McLuhan Probes project was initiated in late 1984, when the directors of the Herbert Marshall McLuhan Foundation approached us to develop an Internet-based forum for discussion of McLuhan's ideas. The Foundation is a non-profit corporation based in Nova Scotia, Canada, and continues with the full support of Corinne McLuhan, who transferred the electronic rights of her husband's work to the Foundation in 1989

Students in the Communication Design program at the Nova Scotia College of Art and Design in Halifax, Canada, and design students from Connecticut College, New London, USA, were invited to create an ongoing series of electronic, visuallyorganized and hyper-linked documents that illustrate some of McLuhan's probes.

In late 1994, the World Wide Web was just beginning to become established. Image maps were still very experimental, and the majority of web users were using text-only browsers such as Lynx. Furthermore, in Hypertext Markup Language typographic control belongs to the person browsing; the designer has very little authority over the typeface or the placement of text on the screen Today, advances such as Netscape's browser-side imagemaps and Tables make it much easier to control graphic and textual elements in HTML. Even so, as typographic forms are used by today's designers to carry semiotic information, and much of McLuhan's work deals with the use of typography as a message-carrier, the lack of typographic control was the principal impediment to using HTML for this project. A more suitable delivery vehicle for the Probes was found to be Adobe's Acrobat technology. Although the enduser would be required to first download the Acrobat document before viewing, designers can use familiar tools like Quark XPress, Adobe Photoshop or Pagemaker to assemble their work. Once completed, the design can then be handed over to the instructor/editor for conversion to Acrobat format, where hyperlinks and other interactive details are added. Acrobat also has the merit of being cross-platform, and the typefaces that are used in each document are stored as scaleable outline fonts. Andrea Wollensak will be showing us some Probe examples in a few minutes

DISPLAY IMAGES: McLuhan Probes web pages

Although we rejected the use of HTML in the Probes themselves, we do use the Web to display thumbnails of the Probes for downloading, and to provide information about the McLuhan Foundation and the McLuhan Listserv.

DISPLAY IMAGES. McLuhan Probes Exhibition In June 1995, the city of Halifax, Nova Scotia, Canada hosted the 'G7 Conference'. This is an annual event where the heads of state of the leading world economies, along with Russia, get together to discuss world problems and have their pictures taken together. The McLuhan Probes was part of this festival. Apple Canada loaned three PowerMacs for the exhibition, held at the Anna Leonowens Gallery. An installation of imagery from the first two McLuhan Probes and a 6-minute video accompanied the electronic work. Although Bill Clinton and Boris Yeltsin missed the event (old Boris seemed a bit hung over and distraught over Chechnya), over two thousand people from around the world paid us a visit

I will now hand the presentation over to Andrea Wollensak, who will show you some examples of the Probes and talk about what we have in mind for the future.

ANDREA WOLLENSAK. Marhsall McLuhan has gone beyond literary theory, bringing cultural criticism into popular culture, while maintaining true to his critical inquiry in priveledging the medium and the message. Areas of cultural history that McLuhan catagorized are explored by the probes that I will be

presenting.

Andreas Huyssen in "Twilight Memories, Marking Time in a Cultural Amnesia" defines stages of cultural history isolated by McLuhan as : the definition of a "primitive" tribal society; a cool audile culture with an oral technology of speech; a hot visual culture with a technology of phonetic writing; and an even hotter visual culture with a mechanical technology of print (the Gutenberg Galaxy); and finally a return to a cool culture on a higher level, an audile-tactile culture with an electric technology of television and the computer. As you will see, many of these ideas were interpreted visually by the students. The perspective of the students work is one of being born into an era of advanced technology, where their reading of McLuhan's text exists in a contemporary and temporal context, one without the history of predictions.

DISPLAY IMAGE : FIRST PROBE The first Probe is from Volume 2, number 4. Cory Harrison is the designer, Nova Scotia College of Art and Design

the text reads. "The American image of itself, American goals, American directions, have been scrapped... I am not making value judgements. I am simply observing that if you accelerate any structure beyond a certain speed it collapses"

"Rigid distinctions between thinker and doer, observer and observed, object and subject are being eroded... old ground rules and Human perceptions are being transformed by this new resonant surround where nothing is stable but change itself"

"... The whole world becomes a happening. It ceases to be an ordinary place of work or play. This is a terribly involving situation and I think people do resent it. It makes far greater demands of them than they feel it should."

DISPLAY IMAGE: SECOND PROBE The second Probe is from Volume 2, number 3. Amy Braddock is the designer, Connecticut College.

The text reads: "myth is highly speeded up information and experience as in dreams where you begin to move at the speed of your own nervous systems you inevitably come up with mythic structure, you do not have classified data ub dream life, you have myth- multi-layered, rich, fast moving data. It is collage, transparency, etc.

DISPLAY IMAGE[.] THIRD PROBE The third Probe is from Volume 1, Libby Taggart is the designer for one section of this probe, Connecticut College

The text reads: "In America, the lay out and design man may be may be a very great artist and nobody would ever know it. We are so ashamd of our commercial activities that we refuse to inspect our world for symptions of virtue or beauty which, we feel, could only creep into it by accident.".

DISPLAY IMAGE: FOURTH PROBE The Fourth Probe is from Volume 2, number 1. Karla Hatt is the designer, Nova Scotia College of Art and Design

The text reads: "Touch and smell and hearing do not claim objectivity. The horse that's known by touch alone is all horse, but not visibly recognizable. The horse drawn by a blind man would be a blotty gestalt."

MCLUHAN DESIGN GUIDELINES guidelines to participate in the journal we be on-line and will include upcoming thematic and deadline information for participation, a library of suggested list of probes, and technical information for downloading available software for viewing. FUTURE OF MCLUHAN PROBE PROJECT The McLuhan Probes web site beginning early next year will be a bi-annual on-line journal. The format of the site will be divided into two areas- the continuation of the probes, and a new section of critical writings on McLuhan's ideas. This text based area of the site will be structured thematically as a "call for papers". The first deadline for articles will be December 15 and that issue will be on-line in March 1997. The deadline for next years issue #2 will be July 15 to be on-line in September 1997. Interested authors should submit abstracts or proposed texts (under 300 words) by electronic mail to both Michael and myself. Selected authors will be invited to submit full manuscripts once reviewed by the editorial board and the McLuhan Foundation. Guest editors are invited to submit thematic proposals. The visual probes will continue to be reviewed for the journal also on a bi-annual basis, the same deadlines apply to the probes.

The upcoming journals themes are Spring 1997[,] education in the age of amnesia Fall 1977[,] media and terrorism

jhhl@panix.com

Henry Lowengard

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CYBERGOMI: HERE TODAY, GONE TOMORROW

For my part of the poster session, I demonstrated my animation program Vapor Paint and showed a video tape of some of the animations and VRML objects made with the program.

Vapor Paint is written with a lot of philosophy in mind - ideas about how drawn art should be created on a computer. Here are a few of the ideas built into this program's design and interface:

- An "infinite" canvas should be used, with floating point coordinates so that a drawing may be as detailed as possible.

- All colors are 48 bit RGB with 16 bits of transparency.

- As much screen space as possible should be reserved for the working drawing and navigation around that space into the much larger canvas space should be natural and unconfusing.

- The drawing commands are edited in a schematic space much like the wireframe sketches of a 3D modelling program, and later rendered into frames (or other "products" like audio files or VRML descriptions) by a variety of renderers This "work screen" can easily be customized to show the same data in a variety of ways, both to aid in animating and to speed up its drawing on slow systems.

- The basic data structure corresponds to a marking gesture, with the coordinates of the path of that gesture (X,Y), a depth (Z), a variable width along that path (R), a variable "pen pressure" (M), and a time stamp for each vertice in that gesture(S). This structure is derived and edited by interpreting a more usual series of mouse movements, or via macro programs Then at rendering time provides the information to create various textured lines and areas.

- Certain of the editing functions use the timestamps built into every vertice to control how the editing gesture is mapped to the object, rather than simply mapping length to length. - There are facilities for laying out and sketching in the same conceptual space as that in which the animations are built

- The gestures are organized into key frames, which are organized into sequences. All time is given in floating point "Frames", and the renderers can merge several subframes together to provide motion blur.

- The rendering view is also animated as a series of view key frames The view can be rotated and re-scaled and corresponds to the final aspect of the finished frames.

- All the elements of the animation - views, key frames, colors, gestures, processes and more - are available for editing either by hand or by macro and can be navigated, reordered, selected, labelled or hidden. The hiding feature is especially useful for cutting down on screen clutter and making test animations quickly.

- Instead of the usual pull-down menus and pop-up windows, Vapor Paint uses large forms with its own interface elements. This tends to be faster and less confusing to work with: no piles of windows all over the screen in various stages of activity and relevance.

- The macro language is heavily used to provide services usually found in custom files. Macros can do everything that can be done by mouse and keyboard and also be called automatically during the rendering process, to aid in filling out a form, asynchronously via the keyboard or for interpreting mouse movements into a custom editing or creation tool

- Vapor Paint also has a hypertextual help system built in for reference

Vapor Paint currently only runs on the (extinct) Commodore Amiga computer. It is very compact and flexible, having been written in 68000 assembler. An entire, uncompressed bootable system, complete with ARexx interpreter (the macro language), help files and example files fits on a standard 880K floppy disk and can run in as little as 1MB on operating systems dating back to the late 1980's. Nevertheless, I've written a renderer in very generic C which runs on SGI and NeXT equipment (and probably anything else with a C compiler). A modeller will be harder to write because of the conflicting graphic APIs native to the various operating systems.

Vapor Paint allows me to create animations with a particular, identifiable "look" to them. Armed with my drawing tablet and trusty Personal Animation Recorder card, I can create video animations with perfect timing and good color in a very short time. I can also use its internal structural organization as a database for more general graphic work, to visualize coordinates taken from other sources, edit them and convert them to other forms.

More information and an program package will (eventually) be found on my home page, <http://www.echonyc.com/~jhhl>.

peter@rain.artcenter.edu

Peter Lunenfeld

Graduate Faculty Art Center College of Design, Pasadena, California

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"A HYPERAESTHETIC CASE STUDY: JENNIFER STEINKAMP"

Summary

Emerging digital cultures have to this point been more conducive to systemic analysis than to the close reading of individual art works. We must delineate objects, spaces, and sites worthy of consideration in their own right, rather than simply as manifestations or harbingers of things to come. Jennifer Steinkamp's site-specific projections – explorations of color, environment, and the conditions of spectatorship – open up spaces mental and geographic for the contemplation of the future present. Her work, which I categorize as "light in space," constitutes a remarkable project for an hyperaesthetic analysis.

"Once you know the future, you can make it come earlier" Joseph Brodskey, "At a Lecture" (1996)

I. An Ontology of the Phenomenological

"Gag" – I walk into a house, the sound of gagging penetrates the air, I ascend the staircase, look up and see that the skylight has been covered with an imagescape that swirls in tandem with the retching sounds.

"Un-titled (1993)"- I open a door, and all is darkness, except for a luminous play of color on the floor in front of me. There is no way to resist walking into the light, the projection plays down on me like a sunset devised by a technologized god.

"Elbowroom"- I open another door, walk into a small room and the projected light moves from blue tones to red, the airy heavens looping into fiery hells and back again. The interlaced projections take hold of the space, and I watch the wall in front of me swell and deflate like a lung.

These are just three records – descriptions, really – of the effects of Jennifer Steinkamp's artistic interventions on and in space and on and in me. It is difficult to categorize phenomenological experience, much less create a coherent aesthetic around it. Yet Steinkamp's work begs an ontology of the phenomenological, and places it in direct conjunction with the social. For Steinkamp's work is about the place of bodies in space and their relationship to the work, the environment, and each other.

Emerging digital cultures have to this point been more conducive to systemic analysis than to the close reading of individual art works. The next step in the development of a what I have called a hyperaesthetics for the techno-culture is to delineate objects, spaces, and sites worthy of consideration in their own right, rather than simply as manifestations or harbingers of things to come. So, in today's session I will be discussing Jennifer Steinkamp, who is doing some of the finest computer-generated work anywhere.

II. Hardscapes and Imagescapes

Steinkamp's lush imagescapes do indeed immerse viewers in shimmering fields of color and form but I will eschew what has been a quite common set of comparisons for Steinkamp – those made with non-figurative painting, and to the Abstract Expressionists and color field painters in particular. Critic David Pagel states this case: "Without paint or canvas, her abstractions fulfill many of the Abstract Expressionists' intentions, simultaneously pushing painting into the fourth dimension." I am not implying that there is nothing to be gained by discussing Pollock or Rothko, but rather that art criticism routinely bows to these venerated masters whenever abstraction enters the frame Abstract Expressionist paintings, however, were generally quite autonomous from their environments, while Steinkamp's major projects have all been explicitly site-specific.

This attention to the environment of the piece is an integral part of Steinkamp's finely focused process of production. From the earliest 3-D modeling of the space of the exhibition, to the development of animations on high-end SGI graphics engine hardware, to the melding of image and sound, Steinkamp is determined to precisely situate the work within its architectural context. She develops detailed three-dimensional computer schematics of the hardscape and then designs a series of renderings to plan for the deployment of the projectors and speakers. Once that is completed she begins to run a series of simulations of the play of light within the space. Lately, as she has developed a lasting collaboration with the techno-sound artists Grain, she has been incorporating the aural dimension into her simulations as well. All of these elements combine to transform the inert white walls of a specific space into extruded, pulsating abstractions. For "Un-titled (1994)," the exterior, rounded walls of the California Museum of Photography's theater served as a parabolic canvas for Steinkamp to create a dynamized audio and imagescape with movement both elliptical and mirrored. "Balconette" (1994) made use of an otherwise anonymous architectural detail at the Allen Memorial Art Museum in Ohio, playing off romantic implications of an inaccessible portal. Lately, Steinkamp has been able to develop her own environments, most successfully with "Swell" (1995). In a light proof room, projectors are situated on either side of specially constructed wall . There is a pass-through enabling the spectators to walk from one side to the other. It becomes apparent after a few moments that the "front" projection extends only part of the way across the wall, and that in fact, appended to the wall, is a scrim of equal height, which serves as the screen surface for the "rear" projection. It becomes further apparent that as other spectators move from the front to the back, they intersect with the projection and their shadows become a part of the piece itself. With this awareness comes the invitation to interaction, the conscious decision to cross from spectator to element of the piece, to become involved in "Swell's" social construction

III. Light in Space

A comment once made about Robert Irwin that "the ultimate message of his work, simple yet profound, is that the more you look, the more you see," could apply, as well, to "Swell." But Steinkamp's relationship to Irwin is more pointed. An emblematic West Coast figure, Irwin was one of the seminal '60s "light and space" artists. He created both ephemeral yet important interventions into architecture and sublime painting discs that seemed to float on walls. Irwin's art challenged the viewer's perception of the environment and the play of light within that environment. Subtlety and almost diaphanous materials – neon tubes, sheer scrims, highly determined lighting schemes – were the distinguishing characteristics of his work. How all of this relates to Steinkamp should be obvious,

but there is more.

Irwin was also well known for his obsession with the automobile, and the great flowering of California car culture in the 1960s (that last stand of aestheticized mechanization that Tom Wolfe summed up in his title The Kandy-Kolored Tangerine-Flake Streamline Baby) The mobilized gaze that the driver commands from behind the wheel, landscapes whizzing by at sixty miles an hour, the glimpses of architecture, the distanciation from the human pedestrian, all of these have helped to shape both the modern and the postmodern, from the Futurists to J.G. Ballard. It also fed into Irwin's art, but what the customized hot-rod was to the '60s, the full-blown, RAMhogging, graphics engine is to the '90s. And it is precisely that sort of high-end, Silicon Graphics equipment (in all its purple and indigo glory), that Steinkamp uses to create her animations Her work, like Irwin's, is involved in a highly self-conscious fetishization of technology, a reveling in fuxe and sheen I have chosen to refer to Steinkamp's work as "light in space," rather than "light and space," in part because her work is designed to live in a certain space for a certain time and then to simply turn off, like a light with a switch. In Steinkamp's words, the work is "continuous and then dead." One might here think of Dan Flavin, but the tubes which remain after the power is off at least memorialize the piece; yet without power, a Steinkamp installation is simply architecture with the discreet addition of inert projectors.

IV. A Structuralist Digital Media This inert quality is somehow reminiscent of a movie theater when the lights are up. But when the lights are down, works like "Elbowroom," "Un-titled (1993)" and "Swell" attend to the importance of color and form, and the way they can wash over the spectator In this, Steinkamp shows herself to be the inheritor of the mantle of the "pure" structuralist filmmaking of the 1960s. In her work there is a constant modulation between the aesthetization of space and the spatialization of aesthetics, without a definitive declaration of its most fervently held position. Light is here creating a physicality. Light both re- and de- materializes architecture. The wall becomes another space. The space becomes another image. the image becomes another wall.

The late Paul Sharits created an extraordinary body of flicker films, some of which explored the effects of bathing an audience in an ever-changing progression of colored light. In works like T,O,U,C,H,I,N,G," and "N.O.T.H.I:N:G" (both 1968), Sharits seemed to live completely within Goethe's aphorism that "color is at all times specific, characteristic, significant." Yet, while Sharits was working within the controlled space of the theater – in darkness, with the sole light source of the film projector – Steinkamp is engaging with the diffusion of environmental light sculpture, and, indeed within the constraints of a number of differing media.

One final thought about film. Steinkamp's interactions between the entirely virtualized environment of her simulations, and the installations themselves – the mix of hardscapes and imagescapes – create a subsumed tension somewhat reminiscent of the working style of Alfred Hitchock. Hitchock was a skilled draftsman (one of his earliest jobs was designing advertising for electric cables) and throughout his fillmmaking career, Hitchock was famous for his detailed storyboarding and meticulous pre-production notes. For Hitchock, the planning process was the movie, and the sets, the actors, the fillming and the cutting were depressing distractions from the purity of his first visions.

V. OCTOBER 31st

In discussing Steinkamp, I've jumped from figures as diverse as Irwin to Hitchcock, ranged across media from painting to sculpture, and moved through technologies at a dizzying rate The discourse around art has concentrated on the concrete object: painting, sculpture, and architecture. The advent of the computer, however, has destabilized these systems – blurring categories and boundaries beyond even postmodern models. A dynamic object demands constant recalibrations in focus, a shifting between three temporalities. Hyperaesthetics demands theorization in real time. In contemporary American intellectual life there is the aforementioned fascination with the notion of the cyborg and all things wired, but there is a new ground swell against the serious discourse about art. What does it say about how we have to conceive of this work? How to confront the problem so many now have with this kind of intergenencity?

One recent salvo fired in this brewing conflict was the special issue the journal October published this summer. In it, the editors are highly suspicious of the term "visual culture" as a descriptor for either a social sphere dominated by the image. or for the emerging interdisciplinary academic discourse now going under this umbrella. Two decades old, October was for the first ten years of its run essential reading for those interested in the then emerging discourse of postmodernism, but it has since calcified into a publishing organ for its remarkably prolific, if prolix, editorial board and their students. The details of their guarrel with visual culture emerge in the form of a questionnaire that they sent out to a range of art historians, film scholars, and cultural theorists, from which selection they published more than a dozen responses. The details of these disciplinary disputes will be of interest only to those who enjoy watching academics squirm through their arcane turf battles, but what this questionnaire and its responses crystallize is a remarkable anxieties that the emergent digital arts are generating among the professoriat.

From the editors' almost hysterical reaction to the opening of the Deutsche Telecom galleries of technological art at the Guggenheim Soho to the entirely hysterical comments of respondent Emily Apter on the origins of all things cyber -"Mobilizing ghostly, derealized selves within a dirty realist. sleaze, or pulp tradition (a tradition drawing visually on sci-fi, cartoons, comics, graffiti, porn, fanzines, slash and snuff movies, film noir, flight simulation, surveillance cameras, and technical imaging), cyber operates through a combination of ontological projection and ethical subjection." - there is a sense that there is something commercial and evil crawling out of all those PCs, and that the proper course is to stop in one's tracks. Columbia University's Jonathan Crary, in fact, counsels us all against "examining computer graphics, virtual reality, or other recent technological products," and suggests instead that we continue our study of "colorless, nonvisual discursive and systemic formations and their historical mutations." Now there is a rousing call to arms!

I bring up all of this not to start a generational war – cyber nomads stalking the tenured postmods – but to point out that an artist like Jennifer Steinkamp creates work that demands an open field of inquiry aware of the present technological moment and informed by a raft of artistic and aesthetic discourses. Steinkamp's insistence on acknowledging the body of the spectator, and her resistance to the facile demands for a rote sort of interactivity lends her work a seriousness that her often playful titles belie. Hers is a fully phenomenological interactivity, one in which the body in space is acknowledged as an active subject, and where the choice to orient the body in relation to the work is seen as every bit as "contemporary" as the deployment of buttons and tiresome tree structured interactions. If Steinkamp is creating the new visual culture, I, for one, want to see it.

Biography:

Peter Lunenfeld is one of the coordinators of the Graduate Program in Communication & New Media Design at the Art Center College of Design. He is the founder of mediawork: The Southern California New Media Working Group and is the editor of The Digital Dialectic. New Essays on New Media (MIT Press, forthcoming). <pterl@artcenter.edu>

Jacquelyn A. Martino

Interaction Designer Philips Research

WITHOUT A SPECIAL OBJECT OF WORSHIP An Interactive Book Arts Computer Installation

SUMMARY:

The author discusses WITHOUT A SPECIAL OBJECT OF WORSHIP. This interactive installation is inspired by the Veneto-Byzantine architecture of Venice, Italy. A traditional artist's book acts as the input device that allows participant control of digital 2D and 3D animations. The imagery presented in the artist's book and in the animations is complemented by an original sound track inspired by chants and religious liturgy. The integration of image and sound in the dimly lit installation space creates a sacred, meditative space for interaction.

KEYWORDS:

book arts, multimedia, interactive, installation, Venice, Byzantine, meditation, digital media, computer graphics

This paper briefly describes the stages involved in the making of Without A Special Object of Worship. Without A Special Object of Worship is an interactive installation inspired by the salt-beaten Veneto-Byzantine port city of Venice, Italy In this installation, a traditional artist's book acts as the input device that allows the participant to control 2D and 3D digital imagery in a sacred, meditative space. This unique model of interaction coupled with the creation of an installation space proved to be quite challenging. What follows relates some of my aesthetic and technical discoveries during the development of this piece.

The first phase of the project was devoted to a variety of experiments with materials and concepts The project began with a six week stay in Venice, Italy. During this period I developed a series of Polaroid transfer prints mainly of Venetian architectural structures as seen in Figure 1.



Figure 1. Polaroid transfers prints of Venice, Italy. A series of 34 images presented in a handmade portfolio case. (Photo by Pat Swain)

Shortly after this period, I became interested in book arts and began making my first small artists' books. Initially the books did not deal with a specific subject matter, but soon they

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began to take on the shape, color and texture of Venice (Figure 2)

While exploring book forms, I was also experimenting with combining digital painting with programmed imagery. Through this work, I became interested in developing methods for lowcost archival quality output of digital imagery. Essentially, I was making digital images-painted and programmed-and outputting them to the laser printer on a variety of substrates. Printing multiple images on single sheets of paper, at first by accident and then by design, provided break through realizations about the potential of layered imagery I continued to work on still digital images in series, but it was some time before I began to incorporate them in book structures. The first books were simply a series of digital images bound at the left, without serious consideration for the book as a form. Later books, however, proved to be more interesting. The final area of experimentation involved 3D computer animation where I was concentrating on creating textural animations of tearing paper. In all of my work-both digital and traditionaltorn paper became the metaphor for expressing the constantly changing face of Venice, particularly her churches.

Slowly I discovered that all facets of my work were concerned with the constantly changing states of an object. This notion gives way nicely to the structures and forms found in book structures, animation and interactivity because all the forms allow for changes over time to be visualized. The non-tactile animation carries a far away dream quality while the book structure provides a tangible physical representation of change and movement over time. The interactivity allows the participant to control the timing of the experience and produces a constantly varied aspect to the work. I realized that I could combine my seemingly disparate works into a single interactive exploration of Venice with an artist's book as the vehicle for interaction.

Having decided on the content and method of interaction for

the piece, the next phase of development was devoted to more technical concerns. My challenge was to design and develop an artist's book that could indeed communicate with the computer and allow a participant to control the digital imagery. The idea was realized by incorporating an electrical circuit in the book. The circuit outputs an analog signal corresponding to the individual pages of the book. This analog signal is then converted to a digital signal through an analog to digital converter (ATD). A simple program interprets the received signal and displays corresponding digital imagery on a computer monitor.

I quickly created a book prototype in order to test the theories behind the idea. Although the prototype, Figure 3, was neither beautiful nor elegant from an aesthetic stand point, it did provide the confirmation required to move ahead with production. Many book forms were explored on the journey to finding a book that would perform reliably.

While I was exploring viable book forms, I was simultaneously creating the digital content in the form of 2D and 3D animations as seen in Figure 4.

The goal of the installation was to create a meditative space for reflection through the exploration of Venetian imagery. At times it was very difficult to mentally maintain this goal as I was working on such varied tasks. The requirements for addressing the technical issues of the book did not always blend with the requirements for creating imagery. At times I felt as though I were working on many separate projects-technical discovery, 2D imagery, 3D animation-rather than a single installation piece. Once I finished the 2D imagery, however, the work flowed more intuitively. At that point I had a reference for color, scale and texture for all of the imagery and the remaining parts followed quickly.

The final element was the addition of sound. For this I worked with a sound artist and was able to create an original



Figure 2. First Book Form Using Torn Holes. This book was one of the first to suggest a Venetian theme. (Photo by Pat Swain)



Figure 3. Original Book Prototype. The first version of the wired book using a voltage meter in place of the ATD. (Photo by Pat Swain)

sound track in the Gregorian chant tradition that mimicked the layered, textural quality of the visual components. The result is an interactive book arts installation that allows the participant to control digital imagery by turning pages of an actual book.



Figure 4. 3D Digital Animation Still. This animation depicts the untraditional page turning of a digital book.

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Without A Special Object of Worship © 1995, Jacquelyn A Martino

ian pollock & janet silk

INTIMACY, CONCEPT, INTERACTION: ARTISTIC POTENTIAL OF VOICE MAIL AND THE TELEPHONE.

Summary: This article examines the use of the telephone as a medium for artistic practice; from its early development to a case for alternative application. The theme of democratic communication is introduced as it relates to the potential audience for telephone art. The proliferation of telephone technology and use of voice mail systems are identified as infrastructure that is already in place. The listener is challenged to participate in an exciting, intimate, yet public exchange. Included in this article are descriptions of some of the telephone based installations by Ian Pollock/Janet Silk.

Concept: Take the Call

The flame dances inside the machine. The flame is controlled by the vibration of your voice, interpreted by a membrane separating two worlds: the world of the speaker and the world of the listener. You hear it ring, cracking the silence with its demand for attention. A revelation, the telephone is a bridge between fiction, dreams and everyday reality. That furtive voice on the other end of the line, sweaty, sweet and seductive, it can take you anywhere. You can talk with anyone. Like visionaries with ringing in their ears, you take the higher calling. Inspired, all you have to do is answer. Pick up the phone.

We were given a sound residency which allowed us to create our first telephone piece. The white box gallery seemed less than an ideal space for site specific sound work and the time constraints for radio distribution did not work for us, so we looked for other venues. The telephone seemed perfect for point to point narrow casting. Often art ends up made by artists for an art audience. Galleries and museums are institutions of the margin. Art in the public sphere tries to escape this marginalization, the telephone touches us all. Telephone art extends beyond the common boundaries so that we may reach out and touch someone. It augments the master narrative by introducing imperfections, chance and viruses. Feed back from various non-art audiences including the visually impaired, physically challenged and youth groups, encouraged us to look at the telephone as a way to engage with a wider audience. We became intrigued by the possibilities of a familiar technology.

Area Code (1994)

Area Code is a self-guided, self-paced walking tour through San Francisco using the public telephone Participants pick up maps indicating locations of specific phone booths, and then call from these booths to hear stories, in the form of fictional letters.

Area Code explores the relationship of the body to its environment, its presence and absence, the body through time and in history. It shows the "residue" humans leave behind and the awareness of it in the present. Area Code makes the history (and in some cases future) of the site visible By remembering history we are able to locate ourselves in time and in the

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landscape.

Intimacy: Familiar Sounds

Successful but short-lived early experiments in telephone broadcast included neighborhood concerts. On November 1877, in St. Louis, Missouri, it is reported that all the local newspapers were connected with each other for one week by using the Bell Telephone. A regional manufacturer in St. Louis and the Bell Telephone Company joined forces to connect 41 telephones covering 6 miles in an exhibition circuit, over which entertainment was transmitted. They agreed to this, in order to report on the magical results obtained by the conveyance of sound over distance.

For this event, the entertainment director is John Birge, a local resident The signal is given, and moments later the silvery notes of a coronet reach the 12 sets of earphones connected to the Semple's residence phone Everyone in the room smiles. Following this, it is announced that they have just heard the rousing "Hattie Polka" played by James Stevens 18 blocks away. Then Peter Schick plays several light airs on the clarinet Next "Home Sweet Home" by Mrs. McPheeters, Miss Grace Russell, Mr. Russell and Mr. Hayes, followed by "Old Log Cabin" by Mr. Mueller of 910 Washington Street. The highlight, however, is Miss Fitch's "Sweetheart" whose every trill and roulade is heard throughout the circuit. The neighborhood concert concludes...

...And with it the idea of community control of electric communication.

At the Gate (1995)

Across from San Francisco city hall a refugee camp is visible through a fence. Like in an anthropological exhibit, maps are mounted on the two fences separating the lot from the street access. The text on the maps cites the number of refugees world wide to date, as well as the number specifically displaced in Bosnia. Other texts comment on ethnic propaganda. humanitarian aid, cultural survival and other issues about war.

A voice mail system accompanies the exhibit and features interviews with refugees from Bosnia in the United States. This connects the abstract concepts of the map to individual identities on the phone In addition to the interviews the voice mail system lists resources for direct aid for those displaced by the war.

From 1893, until after World War I, an organization in Budapest used the telephone to transmit daily programming to more than six thousand subscribers. In operation the service, named Telefon Hirmondo, offered political and economic news, concerts, sports, recitations and lectures. It was the only example of sustained and systematic programming in the nineteenth century that prefigured twentieth-century broadcasting systems. Its roots were in the theatrophone, a device presented at the Paris Exposition Internationale d'Electricite in 1881. The theatrophone was used primarily to broadcast theatrical plays and operas. Beginning about 1896, nationally known authors read serial installments of their novels. By 1908, semipublic installations of the Telefon Hirmondo attracted many listeners, and in 1911, a version of it was presented to subscribers in Newark, New Jersey. While the Telephone Herald was very popular, both it and the Hirmondo would eventually lose ground to the advent of wireless communication.

It takes 50 years for technology to become popular, 100 years to saturate the culture. The killer application for the phone is its potential for democratic communication. We can all talk to each other. In the early history of its development, there was

much concern that the telephone would usurp the social order. The phone did challenge cultural and class assumptions about what communication ought to be like between various groups of people. Suddenly members of different classes could move into and out of one another's territory with the help of electricity The same is true today While the internet is still inaccessible by the computer illiterate and the poor, the telephone is everywhere. There is a worldwide audience because of the proliferation of telephone technology and its relative affordability. When compared to the limitations of gallery-dependent work, the possibility for real contact is evident. The history of communications technology is closely linked to a desire for two-way interaction. Television and radio did not succeed this way, but the telephone did.

The telephone creates an intimate space for the listener. We whisper our stories into your ear It's just between you and us. Like cinema, we project our scenario in the landscape by asking the listener to engage with us from public phones. As a memorial, we retell personal narratives through the phone to simulate friendly conversation. As these tales move over the wire, we transport the listener through time and space to reflect on histories and political questions.

O seconds, 12 minutes, 2 hours, 20 days (1995)

For the 50th anniversary of the bombing of Hiroshima and Nagasaki, participants are invited to listen to a series of stories in a voice mail system, illustrating the long term effects of the bombing of Hiroshima and Nagasaki. Narratives describe the city of Hiroshima and its inhabitants from the time of the detonation of the bomb in 1945, to two fictional events sometime in the future.

The stories in this installation chronicle the many faces of trauma throughout the legacy of the bombing. Listeners travel through the entire catalog of human emotion: from horror to grief to denial and shame; from solemn remembrance to social action and finally to utopian euphoria or doomsday pessimism. O seconds, 12 minutes, 2 hours, 20 days shows the reverberation of shock waves from the explosion as it travels through time and history.

Interaction: We are connected

The voice is transmitted into an electric signal. Stretched over a membrane it explodes into a pleasurable experience of communication 1 can feel your voice tickling. What are you wearing? I want to see you as we talk. In the 1960's AT&T spent over \$500 million dollars developing a Picturephone that allowed people to view each other as they spoke on the phone. It turned out that they only sold a few hundred of the devices, mainly because no one really wanted to see the person they were talking to. They didn't want to pay attention to the person on the other end of the line, or to be seen. As one person said, "I don't want people to see me when I'm on the phone. I want you to think that I'm all ears as I cook, go to the bathroom, watch the game, doodle I'm all ears, but my eyes, my thoughts, my life is mine."

Most commonly strangers on the phone meet at the night exchange. As personal ads move from print to voice mail, which offers discreet screening capabilities, phone sex, partyand private lines present libertines with safe opportunities to explore sexual terrain. Drawing on the power of the human voice to seduce, these cultural phenomena encourage anonymous encounters that are highly charged. For many people it satisfies the desire for human contact.

Museum of the Future (1996)

Museum of the Future, into the twenty-first century and beyond

What is this perpetually unknown, elusive territory called The Future? How does its long-range shadow of cultural anxiety impact on us. Listeners are asked to explore these concepts of the future by means of a voice-mail system entitled Museum of the Future. Narratives, theories and satire deconstruct the fantasies that drive utopian, futurist ideology. Listeners are asked to participate and contribute their own visions of a future, which are subsequently integrated into the piece.

We feel that there remains much territory to explore in telephone based art. The possibilities continue to grow as more services come on-line. We look forward to work involving live interactions, three-way calling and party lines, caller ID, call forwarding, fax on demand, and more. Telephones make up a geometry of fibers and networks, they offer an infrastructure that circumvents traditional distribution systems and permeates existing social structures, inviting new relationships between people.

rapop@garnet.berkely.edu.us

Sonya Rapoport and Marie-José Sat,

Independent Artists

BRUTAL MYTHS: COLLABORATIVE CREATION AND INTERACTION

(.us)

SUMMARY In this poster session, we propose to illustrate our use of the Internet as a medium for presenting our interactive artwork: Brutal Myths. This piece is inspired by the Malleus Maleficarum: The Hammer of Witches, a medieval manual for witchhunting from which fallacious myths were derived. Brutal Myths is about misogynous mythology and the physical and mental mutilations that developed as a consequence of their perpetuation. Our collaboration as artists is part of this project.

OVERVIEW

Our presentation consists of three parts: 1. an audio recording excerpt of a verbal exchange between the two artists while creating the web work; 2. a videotape transcript of the interactive sequence of one of the seven myths depicted: the Myth of Castration; 3. the fears and frailties in men that are presumed to be the source of those myths.

INTRODUCTION:

In constructing our web artwork, BRUTAL MYTHS, we realized we had planted the seeds of interaction between two people of widely different backgrounds. Among the major differences were our attitudes toward religion, beauty, marriage and the concept of what is a work of art. We both learned from each other, while having to accept our different positions on issues we could not compromise on. But overwhelmingly, we both evolved and felt enriched by our collaboration. The video sample of our piece shows how our cultured differences have been tilled into an artistic statement.

INTRODUCTION TO AUDIO PRESENTATION :

First is a typical verbal exchange between us, Marie-José Sat and Sonya Rapoport. In the transcript of this audio excerpt, Marie and I are discussing how Muslim women, who were made to believe that genital mutilation is prescribed in the Koran, would not accept that it is not so. In the same way, Sonya finds herself unable to criticize the concepts of the Jewish God even though she has reservations about religions in general. Marie, born a Catholic and a non believer, has no such problems in criticizing her birth faith or any other faiths, religions or God figures.

AUDIO PRESENTATION TRANSCRIPT:

Marie: It really doesn't matter if it's the Koran or the Muslim religion or whatever it' is that is partaking because it is really men transforming whatever religion they have and their thinking about women, and their own fears. Sonya: Now if you can accept this... Marie: I'm trying to... Sonya: Now if you can accept this that you told me that the women are not listening that it is not in the Koran, there's an emotional response that they cannot, that they've been indoctrinated, that it's part of their lives to believe that it's [genital mutilation] a religious edict. Do you follow me? Then you must understand that my response is very bifurcated. Marie: But they're uneducated and they are not making a work of art, Sonya. You're educated and you're doing a work of art. Sonya: I cannot be too critical of the Jewish God in my piece. That's it! Now if you can figure out how to defy and it's not too blasphemous, I will accept it, but I cannot use the piece - that one little sentence I cannot go along with. Marie: Which little sentence? Sonya: That I'm anticipating you're putting in. (laughing) Marie: That God's lving or that God is a bastard, or God enslaved Adam and Eve or... Sonya: Well, why don't you figure out what you want to put in there. Marie: I don't know what I want to put in there. I'm trying to work it out. Sonya: You're trying to be very logical how can we prove that Eve is not guilty. That's the essence. Marie: That for one thing and how can we propose a different reading of that same Genesis and in the same time expose the kind of reading that has been made of it and has produced the sexism, and the fear in men and the myths and all that about women and the Malleus.

INTRODUCTION TO VIDEO :

The art web work, BRUTAL MYTHS, is based on the misogynous mythology of the Malleus Maleficarum, The Hammer of Witches, a medieval witch-hunting manual. It exposes the seven methods "by which women infect with their witchcraft the venereal act and the conception of the womb". Presented is a sequence summary of method #3: "To remove the members accommodated to that act" and its associated myth: "The Vagina Eats up the Penis".

VIDEO PRESENTATION TRANSCRIPT:

Brutal Myths by Sonya Rapoport and Marie-José Sat ARE WOMEN THE GUILTY DAUGHTERS OF EVE? Visuals are of Adam and Eve in the Garden of Eden. Excerpts from the story of GENESIS lead to the theme of BRUTAL MYTHS: Man, destined to toil in the fields, plants herbs embittered by his anger against woman who is responsible for his plight. XVth century Europe had been plagued with years of religious and civil wars, and resentment of the dangerous woman reached its peak in gruesome witch trials. Pope Innocent VIII denounced an epidemic of Demonology, a contagious infection spread through Bitter Herbs. In 1487 Innocent VIII endorsed the Malleus Maleficarum: The Hammer of Witches, a witch-hunting manual accusing women of destroying men by planting Bitter Herbs throughout the field. The field soon became a Garden of Herbal Evil where Bitter Herbs germinated Brutal Myths about women in the hearts of men.

THE HERBS AND METHODS:

Seven Methods By Which The Herbs Infect With Witchcraft The Venereal Act And The Conception Of The Womb As Proclaimed By Pope Innocent VIII And The Malleus Maleficarum Click among the herbs from the Garden of Herbal Evil: TORMENTIL inclines the mind of men to inordinate passion HEMLOCK obstructs men's generative force CLE-AVERS removes the members accommodated to that act HENBANE changes men into beasts by their magic act VIPER'S BUGLOSS destroys the generative force in women BIRTHWORT procures abortion DEADLY NIGHTSHADE offers children to the devils, besides other animals and fruits of the earth with which they work much harm.

A click on the herb Cleavers links to THE GARDEN OF HER-BAL EVIL where man plants the root of the herb CLEAVERS which purportedly removes the members accommodated to the venereal act. Cleavers has largish claws that grasp and strangle; its sharp edged leaves feicheth blood; the slender roots are full of strings; it germinates the Myth that the: VAGI-NA EATS UP THE PENIS. Related images are: Lot with his daughters who rape him and an image of a Magdalenian carving of a phallus growing from a vulva. Genital Mutilation is the response to the myths of castration and clitoris growth competing with the male member. The purpose of the genital mutilation is to preserve a girl's virginity for marriage. The vaginal stitching up provides enhanced pleasure for men only An uncircumcised woman is considered dirty, oversexed and unmarriageable. The affected function for potential for sexual pleasure is destroyed and replaced by a future of pain, disease and misery. Visuals include the Inquisition Pear torture, description of female genital mutilation as practiced in Africa, a mutilation victim, and sex therapist Annie Sprinkle demonstrating to an audience that "a cunt has no teeth" on stage at New York Avant-Garde Theater.

The next link is to DESTROY THE MYTH Eve is compensated for her guilt as the Mother of all Mankind. She is supported by the liberating serpent. Eventually God enriches the soil in which man can plant a Blissful Garden: "Let each one of us dig down after the root of evil which is within one, and let one pluck it out of one's heart from the root." The Gospels

A click on HEARTSEASE, one of the seven blissful herbs, provides the link to the method that destroys man's vulnerability and eases his heart's fear of castration from the herb CLE-AVERS.

John Wayne Bobbitt's image is the featured example of castration. His wife Lorena claimed physical and sexual abuse. A nail voodoo fetish figure with a mirror deflects the malign influences and incubates the herbal cure.

Herbal pharmacists from the XIIIth century prescribe an INTERACTIVE MEDICINAL REMEDY performed with the cutout printed herbal image in the next link, the cut-out is to be boiled in water Breathing the steam prevents loss of member and vulnerability to the external genitals.

MALE FEARS: THE SOURCES OF THE MYTHS

The Malleus Maleficarum, which was the inspiration for this piece, spelled out for us the collection of sick phantasms and anxieties that some men could feel towards women. Interviews conducted with a few men (which will be included in a future version of the art-work) confirmed us in the view that "men have a greater fear of—and thus, need to dominate and control—women than women have of men" (A History of Their Own, Bonnie S. Anderson & Judith P. Zinsser, p11–12).

As Nancy Chodorow wrote: "Boys and men develop psychological and cultural/ideological mechanisms to cope with their fears without giving up women altogether. They create folk legends, beliefs, and poems that ward off the dread by externalizing and objectifying women." The prejudicial myths about women therefore have their origins in those anxieties.

We believe that the principal fears in men are as follows, we indicate for each the present day news item we chose to illustrate it by in the art work:

1. Inability to control their sexual arousal, desire and needs: arrest of Douglas Krout, convicted child molester, captured after a 100 mph chase. The girl, 11, returned after he threatened to "blow her brains out" if she told what he did.

2. Proving maturity and manhood: Grant Butcher had 65 amateur fights in 3 years and 29 pro-fights in 4 years. At 37 he has brain atrophy and is in a convalescent hospital for the remainder of his life.

3. Fear of castration of the exposed organ: John Wayne Bobbitt, castrated by his wife, Lorena Bobbitt who severed her husband's penis, after years of abuse, when he came home drunk and raped her once more.

4. Fear of impotence and orgasmic potential: the myth of Don Juan, depraved nobleman, irresistible lover and seducer of women

5. Need to return to the mantle of woman's womb: the fetus in the womb is an image of the "happy time when he had space in her, and she in him, when he owed his whole life to her" that haunts men.

6. Insignificance of father's role compared to mother's: Susan Smith is serving a life sentence for drowning her two children Her parents were divorced when she was

6. Her own father committed suicide. Her step-father abused her from childhood to present. Her latest boyfriend left her because of her children

7. Incertitude of paternity. Larry Hillblom, DHL billionaire, resided in Saigon where he fathered hundreds of children to teenage virgins.

As a consequence many of our social practices and customs derive of the patriarchal power system to ensure control over women and reassure the male fantasies that female malignant instincts towards them are under check. Hence, marriage and social customs still restrict drastically the sex lives of women. whereas men's sexual achievements are generally celebrated as a proof of their virility, women would be viewed as "whores". Until recently, strict laws condemned the adulterous woman, in order to keep her husband certain of the paternity of his children. Men inflated their power both outside and inside the home while women, uneducated and without social standing outside marriage, were to remain his subservient in the house. The horrid genital mutilation practices on women are the demonstration of the fear of castration and/or competition with the penis: all proceedings include a "brain-washing" course to teach women to obey and fear men as their husbands and masters. This work intends both to denounce the mutilations inflicted upon women and to attempt to allay men's fears by destroying the myths that surround their perception of women, therefore eradicating men's needs to control and dominate women. This is our contribution as women to the development of the Web as a new artistic and technological medium, in the possibly non utopic hope it might be free of sexual prejudices and differences.

nirjan@facu.unimas.my

Niranjan Rajah

Lecturer in Art History and Theory University Malaysia Sarawak

LOCATING THE IMAGE IN AN AGE OF ELECTRONIC MEDIA

Summary

As East Asia accelerates from Medieval culture and consciousness, through a compressed period of industrial modernization, into the communications era, the convergence of living sacred traditions and information technology presents a deep ontological enigma. Starting from the premise that the image is an index of the locus of reality, this session will attempt to locate the image in an age of instantaneous communication, virtual reality and hypermedia.

The word image is linked in etymology with the Latin *imitari*, which is the root of the word imitate. In the Medieval view the likeness between any thing and any representation of it must be analogical. Here, analogy is similitude in the sense of simile rather than that of simulacrum. Medieval representation imitates the idea of the thing and not its substance.

The image of a Hindu devata, latent in canonical prescription, must be inwardly visualised by the icon maker in an act of non-differentiation. This inner image is the model from which he proceeds to execute in a chosen material. The viewer in turn applies his or her own imaginative energy to the physical icon, realising the devata within the immanent space in the heart. All images are interior and reality itself is imaged within consciousness.

From the Islamic standpoint, the law of all phenomenon can be symbolised geometrically in the way that space, seen as extension, is created by unfolding through the dimensions and can be folded up again, leading back to the point of unity. It is the confusion caused by sculpture in the round, chiaroscuro, perspective and other illusionistic representations in the stages of folding up that underpins the prohibition of images in Islamic art.

In modern consumer capitalism everything that was once directly lived becomes representation as images proliferate beyond the viewers control. Guy Debord has described this spectacle as capital accumulated until it becomes an image. This is the televisual imaging of our desires. The image of desire itself. It alienates us as it permeates our consciousness. In works like Theme Song(1973), Vito Acconci assaults the limit of this image. He implicates the viewer and paradoxically compounds the alienation of a medium that promises interaction but does not permit it.

Today the alienation of the spectacle has dissolved into what

Jean Baudrillard has called the ecstasy of communication. There is a loss of private space and simultaneously, a loss of public space. This is the ontology of Paul Sermons Telematic Dreaming(1992). With electronic interactivity, the body appears to be situated wherever its effect is. Enabled by microtechnology, consciousness has left the physical body and merged with the image in an interactive outer-space.

Email to Paul Sermon:

Telematic Dreaming. Disembodied consciousness and contact across two and three dimensional worlds, between image and physical reality, between man and his own image. Remember Michelangelo's Creation of Adam. Contact. New ontology or old delusion. Electronic communion or physical alienation. Paul, do you have any comment on my understanding of your work?

Pauls reply:

(.my

Consciousness always seems to be the starting point of any discussion about Telematic Dreaming, the notion of the cause and effect situation, the rapid fire of consciousness back and forth between the remote and the local body. Without putting too much emphasis on the historical notion of a great artwork or a masterpiece the reference to Michelangelo's Creation of Adam is an appropriate one. Its not my initial intention, however, when I install the piece I am always struck by its presence - watching the hands of two people move towards the point of touch is an event in itself. The senses of sight and touch are exchanged.

Email to Paul Sermon:

Help. I need to set up a home page in conjunction with ISEA96. The problem is that my work - The Failure of Marcel Duchamp/Japanese Fetish Even!(1993-96) has an crotic element that is unacceptable on Malaysian servers. Part of the aim of this project is to address territoriality in the Net. Information that is globally accessible (instantaneously) is not universally acceptable (local laws and values). The work itself is a harsh parody of Marcel Duchamps Etant Donnes. Could you possibly direct me to someone who can help by providing space.

Pauls reply:

We could certainly locate your web site on our server at the Art School in Leipzig. And judging by the content of the site, I would find it a very interesting possibility.

With regard to the reading of images, Roland Barthes has asked if analogical representations or copies produce true systems of signs and not simple agglutinations of symbols Is it



possible to conceive of an analogical code - a language of the image, or is the image the limit of meaning.

Etant Donnes cleaves from logos, an abyss of eros. It represents the culmination of the humanist trajectory in the philosophy of being. The perspective of the eye is fused, or rather, confused with that of the I in what must be the end game of retinal art. Sculpture and photography are reduced to indifference in this paragon of visibility. This parergon of reality This hypereality.

In Hellenistic usage, *aisthesis* implies physical affectability as distinguished from mental operations. Ananda Coomaraswamy has remarked that the Greek origin of the modern term aesthetic means nothing but sensation or reaction to external stimuli - what the biologist calls irritability. With this observation the conventional dichotomy of pornography and art is dissolved. Fredric Jameson has even proposed that the visual image is, in itself, essentially pornographic.

Today, Duchamps delayed image is no longer an esoteric encounter. It is democratically accessible (Given:) as the slow download (Waterfall?) on a personal illuminating screen (Gas!). With this mass, interactive dilation of desire, the meaning of the image has been displaced by its very presence. The image has become an absolute fetish. It is even argued that as a consequence of the limited spatial resolution in all physical systems, including the eye, and the nature of light as discrete quanta, every image is in principle a digital one. The image as sheer technology.

Paul Valery had prophesied that just as water, gas and electricity were effortlessly brought into our homes to satisfy our needs, visual or auditory images would one day serve us at a simple movement of the hand. Ultimately, in keeping with this utilities analogy, the current system of instantaneous use and retrieval of images on a mass basis is dominated by the circulation of capital. In the new order of our fast homogenising world, what is really at stake is the authorship and ownership of reality itself.

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Martin Rieser

(Senior lecturer in new media , University of the West of England)

INTERACTIVE NARRATIVE- EDUCATING THE AUTHORS

In the brief time that interactive narrative has existed as a part of digital media, it has continously been transformed and reinvented both in form and in through the audience's increasingly sophisticated understanding of interface conventions. In this its development resembles the early days of cinema As we move from the equivalents of 'tableaux vivant' to the appearance of the first D.W Griffiths or Eisenstein, the need for authorial understanding of the medium becomes the more pressing. Even defining its quintessential differences from other forms of narrative is not an easy task

Defining its properties

In our inner lives we are constantly converting the past into an edited hierarchy of the significant or trivial. This process is one of memory, but while events may be recalled in an associative or seemingly random manner, they are always tied into a mental structuring implicit in the history of the individual, which makes a personal narrative out of apparent chaos This unspoken frame of reference permits non-linearity.

But even when narrative enters into the social domain (although communication tends to rely on linearity in the bulk of oral, written or cinematic narrative) there is no clear juncture between linear and non-linear forms. It is simply untrue that linear media dominate the form of narratives. Many narratives break the linearity of time or viewpoint. Where would Hollywood be without the 'Backstory' or the post-modern novel without its sudden shifts of voice and genre? One must distinguish narrative form from the specificity of its medium. Linearity and non-linearity are both familiar fictional forms regardless of media. Non or multi-linearity is not by itself the defining criteria of interactive forms .

While any definition of narrative must surely revolve around a shared imaginative process of construction, this process can be linear or non-linear. To be effective it demands an active participation on the part of the audience. How then does interactive narrative differ from preceeding forms? It is my contention that so-called interactive media contain the potential to liberate writers and artists from the illusion of authorial control in much the same way as photography broke the naturalist illusion in art, exposing it not as an inevitable form, but as just another set of conventions.

The real problem for many commentators on interactive narrative media is that the addition of user interactivity appears to place an intolerable burden on what is generally understood as traditional narrative structure. It implies that the reader/spectator be transformed into a true authorial role as shaper of events , weaver of stories, a possessor of agency . For the artist willingly struggling to achieve this transfer of control of narrative to the reader, the task often seems akin to squaring the circle. Without direct authorial control the narrative risks fragmentation into a matrix of small, seemingly arbitary story pieces or disappears altogether in a maelstrom of chaotic events.

It is also not suprising that interactivity in multimedia is prescribed by the nature of the interface and tends to involve trivial 'point and click' actions on the part of the audience. This


Shell or web model of interactive narative structure

where the user is freed both from the slavery of linearity and the reductivism of branching plot choices?

In the written work of Robert Coover for example, we can find an attempt to map a different approach: the sudden move from stream to stream of parallel lives or consciousnesses. In The Babysitter 7 interwoven scenes are retold with ever

The Babysitter ⁷ Interwoven scenes are retold with ever more fantastic erotic vigour, as though a heavy breather had control of a narrative joystick and kept pressing a "more bizarre" button. This method has transferred seamlessly into his later hyperfictions. This "electron shell" structure offers a possible structural alternative to the common branching of hyperfictions or the maze form of the spatially mapped narrative common in CDrom narratives such as Freakshow, Myst or The Seventh Guest.

Grahame Wienbren also proposes an alternative model, a free two-way transaction between material and audience, only patially achieved in his own interactive cinema piece "Sonata" 8

"The ideal is a responsive representation machine, responsive in its capacity to change according to how the viewer responds to it. With such a machine, a new language of cinematic communication will be possible and a different type of narrative can unfold." ⁹



streams or flow model of interactive narrative

In Graham Weinbren's Sonata the viewer can only control aspects of the narration - moving from the murderer of Tolstoy's Kreutzer Sonata telling his story in the railway carriage, to the events themselves, which can in turn be overlaid with the mouth of Tolstoy's wife berating the author, references to Freud's "wolfman" case, Judith and Holfernes etc. In one sense Sonata is linear, with time's arrow pointing forward, but it never reads the same way twice.

This creation of meaning by the audience through the association of parallel stories or story fragments avoids the problem of chronology, since the arbitary jumps are felt to convey meaning in the same way as in dreams. Such a structure can be envisioned as in the diagram below:

This model has proved to be a valuable one for students to explore: Ian Whalley's experimental student Conversation Piece ¹⁰, parallel conversations, recorded in front of Matisse's "Snail" in the Tate Gallery anchor a dynamic multimedia typographic interpretation of the human interactions. Viewpoints can be accessed by selecting the representations of two pairs of spectators. Casting himself in the role of the observer, his wry internal thoughts counterpoint their banal blather in both sound and expressive dynamic typography. Seemingly a piece of lightweight humour, the work has to be re-run several times before its actual density is revealed.

In David White's student work Inside Woody Allen's Brain¹¹ he attempts to match familiar fragments from Allen's films to moving text projected in the form of the audience's questions, who thereby assume the role of his psychoanalyst. The piece depends entirely on <u>inflection</u>. The spatial intersection of moving 3D icons and the written questions' position allow for a wide combination of responses. Allen's thoughts lie scattered on the floor like children's toys. If one picks up a 3D New York cab and uses it as a cursor, the floating questions respond with Manhattan-based material. Intersect with a question in front of Allen's comic persona and the inflection is comic, intersect over a serious persona and the answer is correspondingly deep. Allen's alter ego responds accordingly as a series of integrated quick-time movies of him agonising on the couch.



Simple Matrix model of interactive narrative

In Jon Dovey's Moviola Toybox¹² CD rom cotribution, The Desktop Theatre of Amnesia (Jon is a member of the Ship of Fools research group) the techniques of parallelism were tested in a simpler structure, as emotional states and their visually equivalent symbolic analogues are mapped onto a matrix of Quicktime mini-movies, like multiple personalities caught inside adjacent frames, reinforcing poetic resonance by proximity. Accessing the material in any order , the audience reconstructs the curve of an unhappy love affair.

This approach was developed in Lorraine Atkinson's student work The Streets I knew so well ¹³. Based on memories of living in Berlin for several months, the matrix of a mental jour-

elevation of interface over content and meaning has rightly been identified by Grahame Wienbren as a product of software dominating narrative form:

"However the structure that appears to have become established is based on the viewer's choosing what he or she wants to see next and in most computer programmes this is determined by where on the screen the viewer has clicked or which key has been depressed. The underlying programme is organised in a tree structure of image segments with branches at selection points. The main reason for the adoption of this model in my view, is that someone who has invested substantial time in learning a programme that takes a specific approach to interactivity, may begin to believe that it is the only, the right, or the best approach".

This schematic domination of the structure at the expense of content is vividly critiqued by Gareth Rees :

These writers have all come up against the exponential problem, the combinatory explosion of the number of endings as the number of choice points goes up. With ten binary decision points, there are a thousand endings, with twenty, over a million....If every English-speaking person wrote a single section, together they could not complete all the branches on a tree with 28 decision points

(a story in Chinese would get one decision point further) ... 2

And the absurd reductionism of such an approach satirised in an imaginary interactive Hamlet:

*1.[the battlements of Elsinore Castle] HAMLET[·] To be or not to be, that is the question

If Hamlet takes up arms against a sea of troubles, go to 3; if he shuffles off this mortal coil go to 2* ³

In the Ship of Fools research production of 'Media Myth & Mania' ⁴ in 1993, we encountered the intrinsic problems of the tree form, which forces the participant to repeat a part of the logic branching on each replay and offers only pre-determine paths, constraining any real freedom of choice in the development of narrative. The immediate strategy we adopted to compensate for these constraints of structure was one of pastiche and humour, rapidly switching position and viewpoint to encourage the audience towards a critical handling of the material.



Typical "Tree" structure for hypermedia narrative

Designed as an interactive spoof game, using digital sound and photographic sequencing, it examines issues of power and control of the mass media by a multi-choice biographical journey through the life of a media Mogul. The individual player identifies with the protagonist, where anarchic humour is employed in various parodies of contemporary biography. Based on this data the player makes moral choices at various life stages viewing the consequences in dramatised photoromance style tableaux.

In consequence the piece was structured as a bifurcating interactive biographical narrative, with the player assuming the role of the either male or female "Mogul". The player chose between two action options at each level. There were more than 80 Interactive tableaux images in the whole game, plus accompanying sound, text and Quick Time movies. A mythic parallel universe of neo-classic futility interweaves the narrative at various key points as a metaphor for the ultimate emptness of the scramble for media control. Three years on, the whole attempt now seems a trifle naive and this medium.

Even modifiving such a structure to reconverge the outcomes into a more manageable shape merely increases the mechanical and contrived nature of the narrative.

Inertia in artistic practice and commission is ensuring that , although interactive narratives will soon become commonplace through broadcast on cable, satellite, network or CD-rom , such forms as exist often rely on these simplicitic or limited structures and also tend to remain mere extensions of prior spectator modes such as video, or cinema. The critical problems are compounded at present by the lack of achieved examples and further muddied by a tendency to lump all genres of interactivity under the same general heading.

Closure

An even greater problem is that of closure, one of the springs of narrative must surely be a simple desire to know what happens next? but in literature and cinema this is motivated by a close identification with the characters in the plot. In the Victorian novel character was destiny, in the Post-Modernist canon character slips into multiple responses and a sense of unknowable complexity. Closure is less important, but a necessary catharsis. Without such curves of emotional involvement and release, surely the narrative ceases to engage? Stripped of such possibilities does the narrative have a future?

In an influential essay 5, Andrew Cameron has argued that most hyperfictions are for the above reasons likely fail unless our understanding of the audience's role is radically transformed. But his argument is ambiguous about future strategies for creating interactivity. He focusses on the computer game as a way forward, ignoring other possible forms of interactive narrative.

" It is here that we find the apparent disjuncture between the nature of interactivity and that of narrative. The moment the reader intervenes to change the story.. is the moment when the story changes from being an account of events which have already occured to the experience of events which are taking place in the present. Story time becomes real time, an account becomes an experience, the spectator or reader becomes a participant or player and the narrative begins to look like a game." 6

New Structures

If the rigidity of the game seems a rather too trite a form for narrative in new media, perhaps there already exist other models which could offer the choices of interpretation and viewpoint which play such a strong artistic role as in the novel, ney is literally mapped on screen. The user can bridge into deeper levels of the matrix through half images which correspond to a concealed matching half, which in turn starts a new narrative section. The images release ever greater levels of detail, h revealing hidden words and accessing richer combinations of sound and moving images, unfolding in the shape of a swaztika.



Three dimensional narrative matrix model

This matrix journey is an obviously appropriate one for computer narratives, mimicking the structure of digital memory and capable of extension into a hugely rich collection of fragmentary mini-narrative blocks. This approach has been employed by practitioners such as Malcolm Le Grice¹⁴ and Bill Seaman¹⁵ as a way of neatly side-stepping the strait-jacket of articulated narrative, allowing the audience to set the selection criteria of matching, but as in a card game, the choice of a particular image forces the computer to turn up a corresponding narrative fragment. Here we begin to approach Weinbren's responsive 'representation machine'.

Spatial analogues and immersive environments

While spatial analogues of narrative remain, as we have seen, one of the dominant forms in many game-like quest stories on CD rom , such forms are derived from the natural need for a participatory spatial environment in VR. In multimedia all the imagery is pre-created, in VR only the <u>model</u> is generated. The audience creates its unique narrative journey on each engagement.

Although the Spatial metaphor is a prevalent form in many interactive narratives, as Cameron points out this is:

 $^{\circ}$ more than just the change from a simple line to a more complex diagram or space, it involves moving from one kind of representation to another. $^{\circ}$ 16

The role of the artist can be radically challenged in the construction of such immersive narrative environments. The action of the artist/author begins to resemble the designer of a model and, although the artist may describe its properties in great detail, he or she is no longer author of the events set in motion by the audience.

The <u>participatory</u> aspect of audience as performer is implicate in most VR sessions Brenda Laurel has already explored this in her Place holder¹⁷ experiments at Banff Centre in the early 1990s, where local Canadian Native Indian myths were incorporated into a participatory performance. Her extension of drama into Virtual Reality marked an important step in the development of interactive narrative forms. Participants could create their own stories within the broad boundaries set by the artist. Laurel's work fused improvised theatre with the cutting edge of VR simulation, combining sensor feedback for arms and torso as well as hands and head. The participants could alter their voices electronically to match the mythic characters whose identity they assume, and can swim or fly through the recorded video landscape mapped onto a computer 3D model. The result may have relied on the improvisation skills of trained actors, but to some extent it allowed an audience access to a convincingly free persona.

Alternative models

If we try to accept, as Cameron contends, that games can be seen as coherent templates for new forms of interactive narrative, then even such commercial models as Sim City or Civilisation can become more than simply fascinating examples of complex simulation, through their use of a probability schematic to form the story .But, while it is true that the player follows formal and rule-based interactions for pleasure and stimulus, one can never achieve full immersion and engagement with the unfolding growth of the narrative. Playing such games, one is naggingly conscious of participating in an apparently reductive medium, one incapable of addressing the deeper existential concerns of art. This lack of resonance, seems precisely caused by the random shifting nature of its unfolding narrative and the absence of characters (although the causality of time and action is maintained).

Perhaps if we examine the development of early theatre, we do have access to quite other models as examples of social and participatory story spaces without predetermined outcomes. Such as are common in ceremony and ritual- symbolic affirmations of spiritual watersheds or transitions, precise narrative codings of resonant moments in a culture's development as well as in individual lives. A rules-based and compelling immersive experience, often embodying the primary narrative mythologies of addlescence, maturity and death, where the boundary between author and participant, actor and audience was dissolved.

In dreams as well a form of associative narrative occurs, seen as the "royal road" into the unconscious by Jung and Freud alike. Narrative does appear to underlie our deepest mental structures -Jung has outlined the narratives of the collective unconscious and the process of individuation and demonstrated how ritual and rites of passage externalise such structures culturally.¹⁸ Narrative as this type of spatial metaphor is ubiquitously implicit in every cultural expression : in plain mythology (Aboriginal Songlines) ; in the visual arts (sculptures of Richard Long) and everywhere in architecture.

A Gothic cathedral such as Chatres is the work of many hands, guided by a shared and often repeated vision. Its beauty is both in the detail and its overall shape, a metaphor of the natural universe in stone: forests, filtered light, soaring trunks, interlaced branches-immediately recognised, its architecture can be read by the worshipper either as a series of self-directed journeys or as a guided ceremony, for example by tracing the floor maze on their knees as a analogue of pilgrimage or

the stages of the Latin Mass ¹⁹. This image serves as a useful model for an immersive narrative environment -the only limits of agency are the fixed walls and the rules-based rituals of Christianity, where the mediaeval mind found a living enactment of religious narrative.

In the current Dreamhouse project²⁰, Ship of Fools were seeking to bring such an experience up to date, combining spatial, ritualistic and dreamlike elements. As in many other games we find ourselves in a house. However, here the house stands as a place of identity, a place that offers us experiences that reflect upon who we are. In the dream world, the house represents self, a space of memory and formation

Here it is a place where we tell stories, a narrative space. Stories which inter-relate to create a space of reflection. Our walk through house offers access to a number of rooms or experiences. Each has been designed by an artist reworking traditional storytelling structures around a particular mythology. So the house becomes an interactive theatre, where different tales are triggered and linked by audience exploration.

The bland domestic environment of a real suburban house (in fact a real Barratt's 'Show Home' in a suburban estate at Bradley Stoke, the negative equity capital of the U.K.) is the main interface. Through various devices-doors, windows, mirrors and other objects, gateways to the narratives of a mythological world are opened by the user. The piece focuses on the transmuting of known mythologies into more personalised or contemporary forms. Various rooms are appropriately matched to the different psyches of those involved in authoring the piece. Short connected narrative fragments can be awakened by the viewer through an examination of the interface environment. A visitor to the house can interact with these presences and be caught up in their world.

The themes of intimacy and alienation are explored through non-linear narratives presented through such devices as multiple talking heads, each with their particular fragments, or through a hall of sleepers who can be individually awakened. The interactive house is a place of magic, permeable to other mythic spaces, but the narratives involved attempt to form a bridge between the personal and the political. Various sources of narrative structure and imagery have been adapted, ranging from Oedipus, Orpheus and Euridice, Theseus and the Minotaur, Icarus and Daedalus, Celtic domestic myths and legends, Biblical reference and stories and the modern mythologies of Science and Technology. The literature is not simply reworked, it is re-formed for the new medium, for example all the protagonists in the Theseus legend talk in poetic duologues, precisely counterpointed against each other, but only one character is audible at any one time. The audience must locate the story somewhere in the middle of the two monoloques.

Daedalus The Sybil

Wings and rainUnder sea A slow pageant spiralling to madnessA body rolls and shifts I remembered falling : in strong currents Stars or something worseAmbition and ecstacy curled in rictus Smoking to the seaPicked by fishes

> I connect nothingYour care, your mind on the shore

The god's eye blank, The god turns away vengefulashamed

The Sybil spelled in signsLocate your heart hissing, urgentopen your armoured closeness engraved in madnesslocate a centre

At Cumae I raisedBuild around the flame an architecture of atonementin tender stone For my deep neglect

At Cumae I weptand calculate its beauty

Conclusion

In speaking of the pleasures and engagement of VR environments, Janet Murray of MIT Media Lab identifies "Immersion, rapture and agency"²¹ as the key requisites of interaction in virtual space. While these certainly identify the pleasures of the medium, they do not of themselves create the complexity of meaning found in the fixed structures of traditional forms. Char Davies's Osmose 22 is a case in point, where an audience can float through a semi-transparent virtual world viewing natural processes , gliding effortlessly through trees, following the rising sap. It is a beautiful "tableau vivant", with more in common with landscape painting than narrative form. In the search for narratives without predetermined scripting, I believe that through use of independent agents, artists will increasingly be led towards the granting of autonomous agency to individual characters-at present more a pious hope than a reality.

Laurel 's researches in interactive narrative led directly to the Oz project 23 at Carnegie Mellon University Drama department, which used live actors and directors to test Laurel's rules-based coda for dramatic interaction in virtual space-the ostensible reason was cost, but perhaps encoding the complex rules of drama and character are well beyond any Artificial Intelligence programmer's ability at present. The end of such simulations must be in convincing forms of artificial life and the complex coding of autonomous agents using genetic algorithms. At present the state of the art in actual programming seems to be at the level of Carnegie Mellon's Lyotard ²⁴interactive cat project or MIT's attempts at programmed behaviours, exemplified by Bruce Blumberg's virtual dog in the Artificial life Interactive Video Environment²⁵, where a computer generated ball-fetching creature is mapped onto a mirror image of the real user's environment.

In its small way Andrew Bourne's "Trees" ²⁶ too uses a measure of programmed behaviours in the form of agents representing the two sides in a road building dispute. The audience can intervene or remain passive , changing the outcome each time. The interventions will prompt the writing of a unique poem, concatinated from fragments, which comments on their commitment to the cause at the end of the piece.

Only through the open minded commitment of artists, writers and programmers who are prepared to explore the full expressive potential of the medium can we even begin to see a meaningful artform emerge. The nuturing of environments where such collaborative working can blossom remains the essential pre-requisite of success.

_ Martin Rieser 1996

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HICKORY DICKORY DOCK: THE CLOCK STRIKES ONE IN HYPERSPACE!

Summary

Hickory Dickory Dock is an art installation that critiques the aesthetics of space and time in interactive computer programs. In particular, the artwork highlights the conceptual and aesthetic limitations of language and symbols in human-computer interaction. The artwork also comments on many of the myths and illusions surrounding interactive computing. Keywords: hypermedia, human-computer interaction, temporal perception.

The Perception of Time

Time is of your own making; its clock ticks in your head. Angelius Silesius

Most interface designs in interactive programs emphasize the use of spatial references for navigation and orientation. There has been very little focus on the temporal dynamics of the medium and how the perception of time impacts the process of human-computer interaction. Since our perception of time is primarily based on our knowledge and interpretation of actions in three-dimensional (3-D) environments, we tend to rely on the use of 3-D spatiotemporal references in the design and interpretation of audiovisual information for the two-dimensional (2-D) computer screen. Moreover, these interfaces contain words and symbols that represent a Western perspective of time which is not always appropriate for the non-narrative structure of interactive programs.

Temporal orientation is based on spatial representation. In



aboriginal cultures the spatial representation of time is derived from events that occur in physical space. A good example is the Australian Aboriginal culture. In this culture there is no concept of time as we know it in the West. The Aboriginal Dreamtime is not a linear perception of time but a spatiotemporal perspective that integrates the past and present, the visible and the invisible, the actual and the potential (1) Space and time are directly linked to events. Simultaneity is emphasized rather than sequence.

The artwork of the Australian Aborigines illustrates these principles of space-time. Their paintings are meant to be read as a simultaneous whole, not sequentially. The Western figureground relationship that assigns hierarchies to visual information does not exist in their work. Their artwork is also void of linear perspective which assigns order and direction to the work and distances viewers from the action conveyed in the paintings. In his book Voices of the First Day, Robert Lawlor points out that Western cultures focus on "fixed and isolated quantitative aggregates that exist as if distinct from any previous condition, as well as from any ongoing transformative process' while the Australian Aborigines perceive objects as an integral part of the transformative process (2). The Aboriginal Dreamtime integrates the "actual" and the "potential" into a metaphysical continuum in which time and space are inseparable.

In Western civilizations the perception of time eventually shifted away from the use of space to define temporal events to the use of numerical measurements that defined time as a quantification of space. Precision methods of telling time were originally developed for navigation at sea in the eighteenth century. Clocks, calendars, and numerical methods of representing time became the norm. This abstract representation of time replaced temporal orientation that was based on concrete events in space. The recollection of events was relegated to the temporal hierarchy in which those events took place. As Marshall McLuhan points out, human memory is "set down through fixed chronology. We remember events by memorizing dates" (3). Events that happen at regular times are temporal markers that are equated with numerical representations of time.

The Western perception of time is derived from a linear perspective of time that can be traced to the development of one-dimensional planes in Euclidean geometry Orientation is based on forward and backward directions along an arrow of time. Psychologists have shown that time is measured linearly by distance and location based on a) where we are and where we are going and b) the amount of progress toward a goal (4, 5). This linear representation of time which supports sequential activities may not be appropriate for interactive programs that emphasize alternative temporal perspectives such as simultaneity, associative links to information, and non-narrative communication structures.

Research has shown that temporal orientation is also linked to differentiated patterns of activity that are usually defined in relation to landmarks on the calendar (6). Our routines on Monday through Friday, for example, may differ from our activities on the weekend. We use these different schedules to determine our temporal orientation in the week. In fact, research has shown that three particular days-Wednesday, Saturday, and Sunday-are the principal temporal markers that help us determine our temporal orientation in the week (7). But how does this type of orientation work in a computer program where similar actions produce dynamically different screens of information that continually reveal new visual structures and spatial relationships? Since the temporal dimension of interactive computing plays a key role in the differentiation of actions, perhaps time can no longer be treated as an abstraction that is separate from events and actions in space.

It is worthwhile to take a look at the temporal perspective of Eastern cultures where time is defined in terms of actual events and potential events. In his book About Time: Einstein's Unfinished Revolution, Paul Davies cites the Tibetan monk Lama Govinda who describes the nonlinear space-time continuum as follows:

The temporal sequence is converted into a simultaneous co-existence, the side-by-side existence of things into a state of mutual interpenetration . . . a living continuum in which time and space are integrated (8).

In Japan the term *MA* is used to describe the integration of space and time. For the Japanese, the existence of space is defined by the temporal flow of movements or events (9) Even the interval between events is important because this space symbolizes the potential for all possible actions. The term *MA* refers to an empty space "where various phenomena appear, pass by, and disappear . . . and signs exist in an infinite variety of freely ordered arrangements" (10). The Oriental antipathy to sequence, abstraction, and precision is summed up in this statement by Harold Innis:

The world does not fix a notion with a definite degree of abstraction or generality but evokes an indefinite complex or particular image. It is completely unsuited to formal precision. Neither time nor space is abstractly conceived: time proceeds by cycles and is round ... (11)

The Eastern philosophy of time is very similar to the temporal dynamics of hypermedia programs. In these programs, spatial relationships are defined over time, and time must be viewed as an integral part of actions and events. Unfortunately, Western language and symbols establish labels and categories that limit our perception of space and time. In order to fully explore the potential of interactive computing, we need to reevaluate these perspectives.

The Spatiotemporal Structure of Hypermedia Programs

Visual space structure is an artifact of Western civilization created by Greek phonetic literacy

- Marshall McLuhan

With the development of language in the West came linguistic categories, deductive reasoning, and diachronic logic, all of which defined sequential hierarchies in space and time. The spatial structure of hypermedia programs is built on these cognitive hierarchies. We interpret our position in space using an egocentric, horizontal-vertical coordinate axis. Terms like up/down, left/right, center, and in front of/in back of describe our position in space.

This same coordinate system is used to define the hierarchical structure of objects in the computer interface design. This hierarchical spatial order in turn defines a sequential temporal structure in the interface design that emphasizes causality. Language and symbols in the computer interface reflect this decidedly Western perspective of time. Words like "forward" and "back" and arrows that point to the left and right underscore the linear, narrative interpretation of time and space that limits the perspective of time to specific directions and discrete numerical values.

These perspectives are often at odds with the spatial and temporal experiences in an interactive multimedia environment where simultaneity, random access, and non-narrative communication are emphasized. Moreover, in interactive programs, cycles of action and time defined by the interactive process establish a spatiotemporal dichotomy between the possible and the actual, a tension that is not accurately represented by the language and structure of interactive interface designs

Hickory Dickory Dock

Time is the mediator between the possible and the actual. - G. J. Whitrow

The artwork Hickory Dickory Dock explores the issues of space and time in the interface design of interactive computer programs. Hickory Dickory Dock is an installation comprised of the storyboard for an interactive computer artwork. In this installation, twenty-four screen designs are framed and displayed back-to-back to create twelve stations that are arranged in a formation resembling the mathematical symbol for infinity. The documentation that accompanies the installation consists of twenty-four notecards mounted on a ring. The cards contain the author's programming instructions for the storyboard. The installation demonstrates how computer interfaces use Western labels and categories to limit spatial and temporal orientation to specific cultural perspectives.

Computer interfaces should clearly define different levels of human-computer interaction and provide orientation cues for navigation. In two of the screens in Hickory Dickory Dock, the statements 'You are here.' and "Where are you?' remind the viewer that temporal orientation is dependent on a sense of spatial location, i.e., where you have been and where you are going

However, since temporal orientation is based on our perception and knowledge of 3-D space, it is difficult to develop temporal cues for a 2-D environment like the computer interface. The "arrow" is a commonly used interface symbol that exemplifies these perceptual problems. Arrows that point to the right, left, top, or bottom of the screen can be confusing because there are no spatial cues to tell the user where the arrows actually lead to. The arrows point to a space that is hidden from the viewer. The 2-D computer interface lacks the visible, physical transition from one space to another that defines spatiotemporal orientation in a 3-D environment. In Hickory Dickory Dock the 3-D layout of the storyboard helps the viewer understand the spatial and temporal restrictions of Western language and symbols in the 2-D computer interface. The installation forces the viewer to abandon the interactive technologies (mouse, keyboard, touch screens) and metaphors that have become an accepted part of human-computer interaction. The viewer must translate the commands and symbols in the interface design into movements and actions in the 3-D environment. In so doing, the viewer must make the conceptual leap from abstract temporal references to concrete logic. In this process, the viewer experiences the problems inherent in trying to use visual and linguistic abstractions to define physical actions that are based on the perception of 3-D space. For example, the viewer must compare the meaning of arrows that point to the left and right of the computer screen to corresponding movements in the 3-D environment. It quickly becomes clear that the spatiotemporal meaning of the 2-D interface symbols does not map directly to the actions in 3-D space.

The twenty-four individually framed screen designs symbolize the measured control of the Western temporal order. They represent abstract units of space and time that are detached from the events and actions in the physical world. Temporal and spatial continuity are reduced to static, isolated symbols of time that echo the discrete, mathematical units of the Western clock. The measured space of time represented by the screens underscores the patterned logic of temporal orientation. In the installation there are cognitive links between the paired screens that are displayed back-to-back. Although the viewer senses the temporal interconnections between these screens. the relationships remain elusive because only one screen is visible at a time. Continuity between the screens becomes a cognitive function based on memory. Once again we are reminded of the lack of correlation between abstract temporal references in the screen designs and events in the real world. The screen designs are mounted between oversized pieces of Plexiglas, creating transparent borders that visually link the storyboard with the external environment and remind us of the need to bridge the gap between abstraction and reality. Throughout the storyboard a frame in the center of the screen design is a recurring visual element that acts as a window on time. This window defines a passive role for the observer and reinforces the concept of temporal determinism. The frame also symbolizes the elements in computer interfaces (such as computer windows) that create perceptual boundaries and limit our interpretation of space and time. These perceptual limitations are further emphasized by two screen designs in which the frame is combined with navigational arrows placed at the top, bottom, and sides of the screen. The viewer can use the arrows to reveal or isolate parts of the underlying information in the frame. The viewer can never access all of the information at once. Although the frame highlights the perceptual limitations of the

computer interface, the frame also suggests the prospect of new directions in spatial and temporal perception. The frame allows the viewer to group information in different ways and experiment with different spatial and temporal perspectives, including microcosmic and macrocosmic levels of orientation. These screens suggest that if we can alter our perception of space and time, we may be able to devise new temporal cues for orientation.

The frame in the screen designs is centered on a solid black background. This background eliminates spatial and temporal landmarks and creates a sharp contrast with the ordered, temporal structure of the frame, the navigational grid, and the language in the interface. This contrast is further emphasized in the screens that include 3-D graphics. The graphics are freeform images composed of layers of transparent, colored light. The images create different levels of space and time that defy the constructs of Euclidean space. In these images, time becomes multidimensional and nonlinear. The limitations of language and symbols in the interface give way to an open pictorial space that is subject to diverse interpretations. The arrow of time is bent.

In one sequence of screens, however, the frame is completely eliminated, and the viewer is presented with a new set of navigational ambiguities and restrictions. In this sequence each screen contains a single word, NOW, EARLIER, or LATER, in the center of the screen and arrows for navigation near the right and left edges of the screen. Once again, this sequence demonstrates the spatiotemporal ambiguity that exists when 3-D navigational cues are used in a 2-D interactive environment. The arrows always point to an invisible screen, making each screen an isolated, fixed moment in time. As previously discussed, the interface lacks the spatiotemporal continuity that exists in a contiguous 3-D environment. The screen designs in the artwork emphasize this spatial and temporal segregation by using large areas of blank space to separate the arrows near the edges of the screens from the words in the center.

Language and Design

Time came not from heaven but from the mouth of man. - John Wheeler

The opening statement in the installation "Ready, Set, Go" challenges the viewer to a race against time. However, the initial feelings of empowerment that are aroused by this challenge quickly subside when the viewer realizes that he or she doesn't know the rules of the game. The viewer must surrender to the power and control of the clock that keeps ticking away.

As the viewer progresses through the installation, there is a continual emphasis on the role that language plays in the perception of time. The installation begins with written instructions derived from telephone answering machines, "At the tone, please leave your name, the date, time, and a brief message" Written responses appear in various screens beginning with "This is John. It's 7:30 am on Monday. Call me before noon."

Language establishes temporal markers in the storyboard that emphasize the sequential order of time: "Call me before noon; Call me before your break; Recorded Earlier; LIVE." Language also reduces time to categories and generalizations that simplify and exclude information, and limit our perception of reality. This limited perspective is demonstrated by a sequence of screens in which each screen contains only one word, NOW, EARLIER, or LATER, and only one screen, the one with the word NOW, provides an exit from the sequence. If the viewer tries to select EARLIER or LATER to leave the sequence, an "error" message, "You can only select NOW," appears and reminds the viewer of the deterministic order of time. The voice messages that are written rather than spoken also emphasize this temporal determinism by creating a permanent record and spatial visualization of the passage of time. The written messages, which are less intimate and subjective than audio messages, distance the viewer from the action and emphasize the abstract perspective of language and the Western system of temporal references. The infinite loop of repetitive messages underscores the deterministic nature of this temporal order.

One screen contains the quote "Oh dear! Oh dear! I shall be too late" from the White Rabbit in Lewis Carroll's Alice in Wonderland. This quotation and a subsequent modification of the quote from first person to third person, "He's late! He's late! He's going to be late," remind us that everyone, participants and observers, is subject to the deterministic order of time.

Several other screen designs contain references to Mother Goose nursery rhymes. These screens, which include nonsensical references to time and counting from rhymes such as Hickory Dickory Dock and Buckle My Shoe, provide a saturcal commentary on our early childhood exposure to the abstract temporal framework of clocks and numbers.

The nursery rhymes also introduce the concept of rhythm and repetition as temporal references. The author's programming instructions in the documentation indicate that the nursery rhymes should be displayed on the screen one word at a time, thus emphasizing the rhythmic structure of the rhymes. Since rhythm is a characteristic of oral communication, the rhyming sequences establish an interplay between the temporal abstraction of numbers and the subjective interpretations of time that are inherent in human recitation.

The Documentation

The scene of action of reality... is a four-dimensional world in which space and time are linked together indissolubly. - Hermann Weyl

The documentation that accompanies the storyboard provides an additional commentary on the use of language and symbols to define the deterministic nature of time. The documentation serves as a gallery handout for the viewer, but it also contains the author's programming instructions for the storyboard. This dual role causes initial confusion for the viewer who is not sure how to use the documentation. If the documentation is a gallery handout, the viewer should take an active role in using the material. However, the documentation contains the author's directions for programming the work so the viewer's role is reduced to that of a passive observer. Other parts of the documentation further emphasize this passive role by underscoring the deterministic nature of time and the interactive process itself. For example, on one of the screens, the words Yesterday, Today, and Tomorrow, appear in a list in the frame in the center of the screen. Yesterday is crossed off the list, and the documentation indicates that the "Viewer must select Today." The documentation also notes that if the viewer selects Tomorrow, the error message "You cannot get to Tomorrow without going through Today" appears on the screen. In other sections of the documentation, the combination of third person and active voice in phrases like "The music stops" and "The music continues" highlights the deterministic nature of the interactive program.

The physical construction of the documentation, twenty-four notecards on a ring, resembles a collection of samples and invites the viewer to find the right card for each screen display. This matching process requires the viewer to make the conceptual leap between the verbal descriptions of the program and the interactive processes the descriptions reference. The result is an ambiguous matching game that reflects the questions and uncertainty that exist in most forms of human-computer interaction.

The notecards with their script-like font and centered lines of text also resemble a group of formal invitations. Many of the instructions are even written as if they were announcements to a performance:

"Yesterday, Today, and Tomorrow" appearsequentially and simultaneously with "Five, Six . . . "

These announcements remind us that the viewer is really an observer rather than a participant in this interactive experience. The role of the observer is limited to occasional moments of interaction that are carefully marked in the documentation by the instruction 'Interaction permitted here.'

The documentation is also a commentary on the problems that arise in using language to describe the process of humancomputer interaction. These problems stem from the lack of direct correlation between actions in the 2-D computing environment and events in the physical 3-D world. For example, the documentation includes phrases such as "Screen 6 leads to screen 7" in which "leads to" is crossed out and replaced with "links to". Similarly, the command "Select the arrows ..." goes through several iterative changes including "Click on the arrows ..." and "Touch the arrows ..."

Language in the documentation also reminds the viewer that the computer program itself is controlled by a temporal hierarchy that consists of an event loop defined by causality and predetermined actions. Phrases like "Screen 6 links to screen 7" affirm the deterministic logic of the computer program where the interaction is limited and controlled by the structure of the underlying software.

The documentation is also a commentary on the paradoxes that occur in the perception of events in time. We usually describe events as simultaneous or sequential, but not both. Psychologists have shown that we cannot physically perceive events simultaneously because the brain processes perceptual stimuli sequentially (12). Rudolf Arnheim points out that what we perceive as spatial simultaneity is really experienced as a temporal sequence. For example, the physical layout of a building is experienced in time as you walk through the building (13).

These paradoxes are illustrated in the documentation. One of the screen designs shows the corresponding times for cities in many different time zones. In the documentation for this screen, the author's programming instructions use a circuitous play on words to describe an animated display of information in which the different "simultaneous" times are displayed individually one after another (i.e., sequentially), and then flashed onto the screen as a group:

Simultaneous Time Zones' appear sequentially.

"Same Time Zones" appear simultaneously.

Music and the Sounds of Time

The notion of time fades gracefully away ... - Christopher Isham

Anthropologist Claude Lévi-Strauss maintains that "music uses time to obliterate time" (14) Music is ethereal, ephemeral, and it encompasses space. It lacks the fixed, hierarchical structure of the temporal order created by Western language and symbols. The structure is multidimensional and simultaneous, not fragmented. As McLuhan points out, there are no boundaries to sound because we hear it from all directions at once:

> Acoustic space is build on holism, the idea that there is no cardinal center . . . The acoustic mode rejects hierarchy; but, should hierarchy exist, knows intuitively that hierarchy is exceedingly transitory (15).

Some cultures use the holistic qualities of music to create metaphysical interpretations of time that integrate their emotional and psychological perspectives of time with concrete actions. For example, traditional Japanese musical ensembles do not play with a conductor who directs the beat using one absolute temporal reference. Instead the individual players rely on spontaneous interaction with each other to create "subtle, differentiated time-patterns [that] create omnipresent currents of music" (16). The Australian Aborigines use song and dance to integrate the legends of their ancestry with the surrounding physical space. Using music that is devoid of temporal references, they define spatial areas that transcend the limitations of the physical world. Like the Japanese musical ensembles, they do not restrict themselves to a specific temporal rhythm during the performance of their work. They freely add information to their music to create an omniscient experience (17).

In Hickory Dickory Dock an except from Brahms's Waltz in A Flat repeats in the background. The music provides a satirical commentary on our discrete methods of measuring time. The simultaneous, all-encompassing nature of music contrasts with the fixed frames and measured layout of the installation. The music bridges the gap between the viewer, the physical environment, and the Cartesian world inside the screen designs.

However, the semantic structure of the classical music also reinforces the semiotic constraints of the language and symbols in the storyboard. The formal structure of the waltz, characterized by measured rhythms and cyclical refrans, is defined in terms of the Western temporal perspective. The holistic qualities of music are constrained by a temporal order that suddenly seems very artificial in a tactile 3-D world. The control that time exerts on our lives and the impact the clock has on the quality of life become more disconcerting, and the confining spatiotemporal structure of the installation suddenly becomes even more intolerable. A Western "dreamtime" emerges in which time is suspended between abstraction and reality.

Conclusion

The future is contained in the present . . . - La Place

Hickory Dickory Dock highlights the constraints that Western temporal perspectives place on the design of interactive multimedia computer programs. By exhibiting the screen designs in the storyboard as finished works of art, the installation critiques the temporal constraints of interactive computing by celebrating the principles it appears to reject.

Temporal orientation is based on our perception of distance and differentiated patterns of activity, both of which are measured in terms of abstract, metric landmarks defined by the clock and the calendar. The computer interface in interactive programs represents a different temporal order in which time must be integrated with actions and events. However, this computing environment differs from the 3-D world of tangible objects because in the computer program, conceptual events take place in a metaphysical space.

In interactive multimedia computing, we can no longer rely on linear temporal structures that limit our perspective to sequential hierarchies and causality. Interactive multimedia computing is a medium that requires new temporal perspectives that transcend the perceptual limitations of the Western temporal order.

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ltosa,nakatsul@mic.atr.co.jp

Naoko Tosa & Ryohei Nakatsu (.jp)

ATR Media Integration &

CommunicationsResearch Laboratories

FOR INTERACTIVE FUTURE MOVIE :BODY COMMUNICATION ACTOR, "MIC" & FEELING IMPROVISATION ACTOR, "MUSE"

Abstract

Artist adopt artificial life techniques as a method for artistic expression. Besides this use, it is possible that the medium itself becomes a product concept. Marshall McLuhan's principle that "the medium is the message" does not emphasize sound and image content, but instead draws a link with the technical nature of future media that will break the chains reality has with equivalent symbols As technical standards rapidly improve, reality as it stands now is becoming alienated from our lives. As we create a virtual life that is nothing short of an artificial life, and communicate with this life itself, we have to ask where our future is leading us.

1. Introduction

In this paper, we address the issues of communication and esthetics of artificial life that possess "human form" in modem society, both from artistic and engineering standpoints. From the standpoint of an image maker, artists seek images that can be touched physically as well as emotionally. This is not, interactive art relying on equipment of the past. Instead, it is interactive art based on communication and on creatures that have a real ability to participate in an interactive process. From an engineering standpoint, researchers have long dreamed of producing human-like robots or computer agents that can communicate with humans in a really human-like way. As it has been recognized that the non-verbal aspect of communications, such as emotion based communications, plays a very important role in our daily life, we have come to the conclusion that if we want to create life-like characters, we have to develop non-verbal communication technologies.

2. Neuro-Baby

Based on the above considerations, one of the authors began a study to create "Neuro-Baby" (NB), a baby-like character that can understand and respond to the emotions of humans. Based on the experiences of developing the early version of NB, we started the development of a revised version, "MIC & MUSE." The basic improvements in "MIC & MUSE" are the following.

2.1 Enriched characteristics and interactions

In the original form, NB had only one visualized figure of a baby. It could recognize emotions of humans and respond to them. Emotion communication, however, is only one aspect of non-verbal communication. In our present study, therefore, we included another kind of non-verbal communication: communication based on music. In addition to "MIC," which is an emotion communication character, we have created "MUSE," which has the capability of musical communication.

⁶ Friedman, p 76

2.2 Improvement of non-verbal communication technology

Non-verbal communication technology has been improved to achieve context-independent and speaker-independent emotion recognition. This technology was also applied to the recognition of musical sounds. Details of emotion recognition technology will be stated in Section 4.

3. Design of 11 MIC & MUSE"

3.1 Personality of the Characters

"MIC" is a male child character. He has a cuteness that makes humans feel they want to speak to him. He is playful and cheeky, but doesn't have a spiteful nature. He is the quintessential comic character. "MUSE" is a goddess. She has beautiful western looks, is very expressive, has refined manners, is feminine, sensual, and erotic; these are the attractive features of a modem woman.

3.2 Emotion

How many and what kinds of emotional expressions are to be treated are both interesting and difficult issues. The following are some of examples of emotional expressions treated in several papers:

- a. anger, sadness, happiness, cheerfulness
- b. neutrality, joy, boredom, sadness, anger, fear, indignation c. anger, fear, sadness, joy, disgust
- d. neutral, happiness, sadness, anger, fear, boredom, disgust e. fear, anger, sadness, happiness

In our previous study, we treated four emotional state Based on the experiences of demonstrating our first version NB to a variety of people and based on the consideration that with an increasing number of emotional states the interaction between NB and humans becomes richer, in this study we have selected seven emotional states.

MIC recognizes the following seven emotions from intonations in the human voice. An arrow(-->) indicates how to make intonations. The physical fon-n of intonations is called prosody, and how to treat prosody will be stated in Section 4.
 a. Joy (happiness, satisfaction, enjoyment, comfort, smile) --> exciting, vigorous, voice rises at the end of a sentence b. Anger (rage, resentment, displeasure)

- > voice falls at the end of a sentence

c. Surprise (astonishment, shock, confusion, amazement, unexpected) — > screaming, excited voice d. Sadness(sadness, tearful, sorrow, loneliness, emptiness) — >weak, faint, empty voice

- e. Disgust > sullen, aversive, repulsive voice
- f. Teasing --- > light, insincere voice
- g. Fear > frightened, sharp, shrill voice

Speech input Speech feature calculation Extraction of speech period Speech feature extraction Speech feature extraction Emotion recognition using neural network Mapping on emotion plane Recognized emotion Generation of reaction Selection of output speech

Fig. | Blockdiagram of the processing flow

(2) MUSE's emotions are generated by a musical grammar (we use moods of the melody and resume of piano)
a. Joy --> rising musical scale, elevated, allegro
b. Anger --> vigoroso, 3 times same sound (repetitious)
c. Surprise --> several times same sound (repetitious)
d. Sadness --> falling musical scale, volante

- c. Disgust > dissonant sound, discord
- f Teasing > scherzando
- q. Fear > pesante

3.3 Communication

In most cases, the content for media transmission conceals the actual functions of the medium. This content is impersonating a message, but the real message is a structural change that takes place in the deep recesses of human relations. We aim for this kind of deep communication. (1) People use a microphone when communicating with MIC. For example, if one whistles, MIC's feeling will be positive and he responds with excitement. If the speaker's voice is low and strong, MIC's feeling will be bad and he gets angry.

(2) People can communicate with MUSE in an improvisational manner via a musical installation.

4. Processing

In this section, the recognition of emotions included in speech are described. Also, the generation process of Neuro Baby's reactions, which correspond to the emotion received by it, will be explained.

4.1 Feature extraction

(1) Speech feature calculation

Two kinds of features are used in emotion recognition. One is a phonetic feature and the other is a prosodic feature. As the phonetic feature, LPC (linear predictive coding) parameters, which are typical speech feature parameters and often used for speech recognition, are adopted. The prosodic feature, on the other hand, consists of three factors: amplitude structure, temporal structure and pitch structure For the features expressing amplitude structure and pitch structure, speech power and pitch parameters are used, each of which can be obtained in the process of LPC analysis. Also, a delta LPC parameter that is calculated from LPC parameters and expresses a time variable feature of the speech spectrum are adopted, because this parameter corresponds to temporal structure. Speech feature calculation is carried out in the following way: Analog speech is first transformed into digital speech by passing it through a 6 kHz low-pass filter and then is fed into an A/D converter that has a sampling rate of I I KHz and an accuracy of 16 bits. The digitized speech is then arranged into a series of frames, each of which is a set of 256 consecutive sampled data points. For each of these frames, LPC analysis is carried out in real time and the following feature parameters are obtained. The sequence of this feature vector is fed into the speech period extraction stage.

(2) Extraction of speech period

In this stage, the period where speech exists is distinguished, and it is extracted based on the information of speech power. The extraction process is as follows. Speech power is compared with a predetermined threshold value PTH; if the input speech power exceeds this threshold value for a few consecutive frames, it is decided that the speech is uttered. After the beginning of the speech period, the input speech power is also compared with the PTH value, if the speech power is continuously below PTH for another few consecutive frames, it is decided that the speech no longer exists. By the above processing, the speech period is extracted from the whole data input.

(3) Speech feature extraction

For the extracted speech period, ten frames are extracted, each of which is situated periodically in the whole speech period, keeping the same distance from adjacent frames.

Let these ten frames be expressed as f 1, f 2...... If 10. The feature parameters of these ten frames are collected and the output speech features are determined as a 150 (15xIO) dimensional feature vector. This feature vector is expressed as F, = (F, F2........ Flo)

where F i is a vector of the fifteen feature parameters corresponding to the frame f This feature vector F, is then used as input to the emotion recognition stage.

4.3 Emotion recognition

As for recognition algorithms, there are two major methods: neural networks and HMMs (Hidden Markov models). Although the HMM approach is main stream in speech recognition, we have adopted the neural network approach here



Fig. 2 Configuration of emotion recognition part

because of the following reasons: a. Content independent emotion recognition is our target. Although HMMs are suitable in content recognition, neural networks are considered to be better algorithms. b. HMMs are suitable where the structure of the recognition object is clear to some extent. As phoneme structures are the basis for the content of words or sentences, HMMs are appropriate. In the case of emotion recognition, however, the structure of the emotion feature is not clear. Therefore, a neural network approach is more suitable.

(1) Configuration of the neural network Configuration of the neural network for emotion recognition is shown in Fig.2. This network is a combination of eight sub-networks and the decision logic stage combines the outputs of the eight subnetworks and outputs the final recognition result. Each of these eight sub-networks is tuned to recognize one of seven emotions (anger, sadness, happiness, fear, surprise, disgust, and tease) and neutral emotion. The construction of each subnetwork is as follows

Basically, each sub-network has the same network architecture. It is a three layered neural network with one 150 input nodes corresponding to the dimension of speech features, 20 to 30 intermediate nodes and I output node. The reason we have adopted this architecture is based on the consideration that the difficulties of recognizing emotions varies depending on the specific emotion. Thus, it is easier to prepare a specific neural network for each emotion and tune each network depending on the characteristics of each emotion to be recognized. This basic consideration was confirmed by carrying out preliminary recognition experiments. Although negative emotions such as anger or sadness are rather easy to recognize, positive emotions such as happiness are difficult to recognize. Thus, the detailed architecture of the networks, such as the number of inter-mediate nodes, differs depending on the specific emotion.

As it is necessary to combine the outputs of these eight subnetworks and decide the total output of the emotion recognition stage, a final decision logic is prepared. The details of the decision logic will be described later.

(2) Neural network training

For the recognition of emotions, it is necessary to train each of the sub-networks. As our target is the speakerindependent and content-independent emotion recognition, the following utterances were prepared for the training process. Words: 100 phoneme-balanced words Speakers: five male

speakers and five female speakers

Emotions: neutral, anger, sadness, happiness, fear, surprise, disgust, and tease

Utterances: Each speaker uttered 100 words eight times. In each of the 8 trials, he/she uttered words using different emotional expressions. Thus, a total of 800 utterances for each speaker were obtained as training data. Eight subnetworks were trained using these utterances.

(3) Emotion recognition by a neural network

In the emotion recognition phase, speech feature parameters extracted in the speech processing part are simultaneously fed into the eight sub-networks. Eight values, V=(vI, v2...... v8), are obtained as the result of emotion recognition. To evaluate the performance of emotion recognition, we carried out a small emotion recognition experiment using sub-networks trained by the above process. By the simple decision logic of selecting the sub-network with the highest output value, an emotion recognition of about 60% was obtained.

(4) Mapping on an emotion plane

As described above, the output of the emotion recognition network is a vector V=(v | i, v2, ..., vg) and the final recognition result should be obtained based on V.

To carry out the mapping from V onto E. The simple decision logic shown below is adopted here.

Let m I and m2 be the first and second maximum values among v I, v2..... v8, and also let (xml, yml), (xm2, ym2) be the emotion positions corresponding to m I and m2, respectively. The final emotion position (x, y) is calculated by

x = c X x, +(1-C)X X .2, y = CXy - 1 + (1 - C) X Y .2

(c:constant value).

Through the processes of 4.1 to 4.3, the emotion rccognition of MIC is carried out These recognition processes are mainly designed for emotion recognition, but for the present study is also applied to the musical sound recognition of MUSE.

4.4 Generation of reaction and selection of output speech

(1) The structure of animation

There are four emotional planes, all of which use the same x,y data. a. Plane "a" generates facial animation by choosing the 3 key frames AI, A2 and A3 which are closest to the (x,y) data point. The computation of a weighted mean frame A is done as follows. Let al, a2, and a3 be the distances between A and AI, A2, A3.

Then, A is calculated by

A=(A 1 /a 1 + A 2/a 2 + A 3/a 3) /a 1 + 1 /a 2 + 1 /a 3)

b. Plane **"b"** generates an animation of the character's body by mapping each (x,y) data point on the plane to a body key frame.

c. Plane "c" is a mapping of each (x,y) data point to camera parameters such as zoom, tilt, and pan d. Plane "d" is a mapping of each (x,y) data point to background tiles.

(2) Selection of output speech

' This is a mapping from the (x,y) data points of the emotional plane to 200 sampled speech utterances, and one of the utterances is selected as the output speech. A personal computer is used to play the selected sounds

4.5 Reaction of the characters

Reactions of MIC & MUSE were carefully designed and were visualized using computer graphics. Several examples of emotional expressions by MIC are shown in Fig. 3. Several examples of emotional expressions by MUSE are shown in Fig. 4.

4.6 System configuration

The system configuration along with specific processing assigned to each computer. Two workstations running in parallel to realize real-time interactions are the key to this system.

5. Conclusion

As for the characteristics MIC & MUSE, it is desirable to design a cyberspace where the characters will live and to develop methods that will allow communication between the characters within the cybcrspace and interaction with humans. The basic concept and the details of these life-like characters are discussed both from artistic and engineering standpoints. This research was carried out by a collaboration between an artist and a researcher, where the artist first proposed the basic concept and requested for necessary algorithm and the researcher clarified the specification of the algorithm and realized it on a computer. We think this kind of collaboration is a key to the success of the research. These artificial life characters or "androids" will unravel a new point of view in a new direction which allows the blending of art, computer science, psychology, and philosophy in a kind of novel research on realistic human expression.

100666.25700@compuserve.com

James Faure Walker

Painter and Computer Artist

(.uk)

COOL HEAVEN BLUES, AND SQUARES

Summary

An unsuccessful attempt to mount a major art/computer exhibition in London, the musings of a digital painter, and what this has to do with malls and tourists.

This talk is about my unsuccessful attempt to curate a major show of computer connected art in London. As a painter using computers, I sometimes feel caught up in a family squabble about who's doing the real art, who's living in fantasy land. So it's been useful for me to meditate about art and its functions. This past year I've been photographing tourists - electronically of course - and I realise now that I identify with their hesitant curiosity, uncertain where they're heading. I wanted to call that show Cool Heaven, conjuring up both the spiritual and the offbeat, the unattainable ideal of a pure and immaterial art. I wanted to maintain a critical perspective, the sense that dreaming about a promised land didn't mean there wouldn't be trouble along the way.

Russell Square is near the British Museum. Initially I was after

a certain shape - a backpacker with a map - to insert into a large painting as a vertical accent. This happens to be the informal but standard dress of the the modern pilgrim. I like the sensation of being a bit lost, everything vivid and strange. These back-packers stop at the same point each day to look at their maps or hesitate over a menu. What many of them are seeking is the best way to the museum, which is actually right there in front of them. On one occasion I found another photographer at work, with a plate camera, but he was photographing the hotel.

Lingering in my murky semi-consciousness is the idea of electronic media as the gateway to the promised land of art New technology will of itself improve art, at least the way we experience art, or the way we make art - that's the bare theory. It's a lovely idea, especially if you don't put it to the test. But as many of us secretly know, electronic art so often falls short of the promise that canny theorists explain the discrepancy away by saving we need a different set of measurements, and maybe a different set of judges. Then it'll be clear that, indeed, through the intervention of IBM, Macintosh, SGI, art does become an enhanced product. There are gaps in the logic: does a truly mediocre painter take wing as soon as he or she converts to cyberspace? Or does the mediocrity just get to us faster? What happens to all the practitioners who persist with physical art, installation, video, etc...sooner or later it will converge, surely... or are they expected to retire from the scene gracefully? So, maybe we shouldn't march off at a tangent just vet and hope everyone else follows. Well, some of us like the isolation and the self-delusion ... something close to the heart of the art of painting I suppose, fictions with light. But what if the PR of the new electronic art is taken too literally? What if the ordinary visitor pays to see an exhibition of virtual reality art? Can we supply the magic in the right quantities? Is this what we should be doing? And if a cut-down version of interactive art becomes the norm for the provincial art centre, what becomes of non-interactive art? Will that seem a contradiction in terms? Just something dusty and boring that grandad used to do? Painting, or non-interactive art, certainly won't be the cool thing to do.

Last year out of the blue I was asked to propose an exhibition of computer art for a suburban arts centre in London. I went along thinking this meant a few prints in a library foyer. The arts complex, the Croydon Clocktower, was more ambitious their first exhibition was Picasso. Luckily I already had an exhibition planned in outline. A small gallery - again close to the British Museum - had suggested something a few months earlier and I'd assembled slides, mostly from ISEA exhibitors. The trouble was this gallery couldn't really stomach the mix of computers and art they talked of rag paper, and couldn't see their regular clientele paying for something reducible to binary code. The people at Croydon had different priorities. Market research revealed that computer art - if only as an idea - had an appeal to the shoppers in the malls nearby. Paper quality, artworld kudos, artistic integrity didn't really come into the equation, and I found that refreshing. The more they heard and saw of the interactive and the virtual the more they liked it... especially the rides. When I spoke of the excellent spread of catalogue essays I'd lined up, or of the sheer beauty of some non-interactive piece, I could sense their eyes glazing over.

Once the new kind of art centre, already excited by interactive guides and web sites, gets a whiff of user-friendly art there is no going back. This was, and is my dilemma. London has not seen a major exhibition of electronic art since Cybernetic Serendipity of 1968. Art schools have largely ignored the field. Galleries won't touch it. And much of what is done as 'electronic' art is embarrassing, and adds to the impression of pretentious trivia. So I was all too eager to make a splash by showing a good range of the best of what's been going on, and that meant mostly from overseas. I become a cyberspace salesman. I didn't spot the catch. It was like getting a part in a TV drama and finding it was a game show. And like the game show ratings meant a lot more than artistic substance. Once you book in a few interactive installations, video projections, and VR set-ups, you find the non-interactive silent stuff consigned to the corridor by the toilets.

To be fair, the job of an arts centre is to deliver something accessible to the tired shopper. I'm fascinated by malls, the ones with food halls of supposedly international cuisine, i.e. different brands of fried food. It's an ambience so hygienic and artificial that highbrow art would have to scream to break into the catatonic stare. And then it would be just another promotion. I think of it more as a subject for art, or at least for observation, than as a place for art. And as if to confirm how hostile its fixed smile really is I found myself repeatedly ejected by Security for taking photos - this was in Georgia this year. Art, culture, heritage, tourism, shopping are all shading into each other in the market economy. And this gives me something to work on

One of my favourite sections of the British Museum is the less visited basement of Roman sculpture, and whilst at a glance it looks unpromisingly remote - the polar opposite of user-friendly, interactive, multimedia immersive electronic art with acquaintance it's rich with wicked detail. Among the bull's tormentors is a scorpion stinging his testicles. On a tomb a widow caresses the portrait of her young husband. This room is full of drama, comedy and soap opera. It tells me that life hasn't moved on that much in two thousand years I work both in physical and electronic paint - you can call that ambivalence. And it probably makes me an unsuitable advocate of pure electronic art. It's not that I doubt the intense beauty of Kawaguchi or Abe or Verostko's images, the mesmeric hold of Sommerer and Mignonneau's creatures, or Stelarc, Bar-Min-Ski, Innocent, Jamie Sheridan, Weintraub's Realms, etc. But I don't want to sever the connection with ordinary things. I don't feel any of this determinism that says pop art, minimal art, conceptual art, and then, wow...immaterial cyberspace art. No. I like that Roman variety, life being more interesting than worrying about where art's going. The art centre, gallery, museum world has become acclimatised to hype, and correspondingly it sometimes seems there's a preference for sensational, noisy, headline-seeking exhibits visual sound-bites - or for the antithesis, the over-designed empty spaces of a minimalist aesthetic, which I've always found a caricature of the meditative life .. not much to do with emotion recollected in tranquillity. The title, Cool Heaven, arrived by accident, and was better than the preferred 'Cyberlight' I thought. A friend, originally French, mispronounced the name of a computer store called Callhaven. I have to be careful being glib about the spiritual. Web searches reveal groups in the US who have used Isaiah to compute the position - to the side of the moon - and temperature of heaven. I actually dislike the disembodied, not-there feel, and don't identify with the X-File mentality that floats in, but if you're a conscientious curator, or a commentator you have to reflect what is out there ... and the need for the sacred, the mythic, the transcendental is certainly finding expression in cyber world. Time for another square: Leicester Square is the cinema centre of London. Tourists come in their thousands every day. Families argue about Pizza Hut or Burger King. People also walk to work, mill about, carry bags, check watches, and complain about the shoes they've just bought. Part of the routine of being there is to take a snapshot - so here I fit in with the scenery - but what fills the viewfinder is mostly other tourists. And while families wait in line for the movie, or for the interactive rock museum, they are in a kind of non-time, minds absent, waiting for something more real to begin. Maybe they'll meet someone. Or maybe not. The entertainment industry is also keen on the interactive and the immersive, in

persuading people that a really involving experience is something as isolating as dental treatment, and likewise has to be technologically engineered and paid for.

And this is the crunch. In our enthusiasm for high performance art vehicles we cut loose from our roots in the physical dimension. That's fine. The freedom is exhilarating, But if you want to re-enter the milieu of mainstream art - and believe me, if you stood in line for hours to see the Cezanne show you know this too has some momentum - then you may not be let in as an artist. You'll be seen as a kind of DIY entertainer, the home-made theme park. I've seen quite fetching balls of light float round me in a VR piece - presented as revelatory art - but I've seen the same device in a Power Rangers movie, also presented as revelatory experience. Caught up in the world of organising a digital art show that has to draw in a new public - with an internet cafe of course - it's easy to lose your bearings. Computer shows have to justify the hardware, and in this case publicity was a third of the budget. So no time for subtlety, complexity - what does an artist want but attention? A week or two ago I found myself in a black leather chair discussing internet art on cable TV, and again there's this game you can play... where it's all simple stuff, new medium equals new art equals heaven round the corner, equals good thing. There's no hesitancy, doubt, enigma... the programme is called style cafe... and is as good as it probably could be, but what kind of vacuous idea are we all selling?... That art is such a weak ingredient in our lives that it can be slipped into the internet like special flavouring? On occasion ISEA conferences address the static work of art as if it were an out-of date format, the obsolete precursor of the multimedia and the interactive. And I like the idea of being wrapped inside a bubble of delights, and I've enjoyed my interactive and VR trips. But a whole sequence of dark rooms, cyber strobing, rotating rave forms, ambient muzak, is like handing over your brain to be massaged...your attention gets diffused, generalised, and submissive. Despite the jargon it doesn't have the feel of a two-way interaction. Paradoxically, I find still images more interactive, the eyes that look back, the immobility of form that gets you speculating...the sense of time stopped. One effect painting can engineer is to reflect thoughts back at you, give a sense of wholeness, of completion, resolution. Hollywood, Disneyland, theme parks are big on immersion and interaction too, but with spine-chilling thrills and spills. If it's dinosaurs it's in the name of education, bringing the past back to life. Some arts centres feel they should compete - mistakenly perhaps - but low attendance figures spell closure. An administrator may reasonably ask - and did in this case - why a VR exhibition needs to be about art rather than about kitchens. It sounds smart to say that 'art' isn't a mystery ingredient, but just means something done superbly and with a lot of flair; that the internet in its totality is just a huge spiritual artwork; that we shouldn't give the 'artist's' page any more attention than the iguana site; that, yes, virtual worlds are just interesting, regardless of what's in there. But that way you talk yourself out of the picture.

When they pulled the plug on the show this February I felt the usual frustration of dealing with institutions - no discussion, just phony pretexts, officious memos. But I also felt some relief. Trying to get the show to happen somewhere else triggered the same kind of response. Computer art wasn't something to take seriously. It was art on acid, art as interactive playtime, art as background styling in the internet cafe. Not a priority, said the museums. There's still this sniffiness about supposedly difficult art that hasn't been endorsed by the cognoscenti's art mag, so you slot it in somewhere else, unable to distinguish the original from the rip-off. It's all effects - the same mentality that gave Schoenberg and Lutyens their break into the film world, but only as composers of horror film music. Part of me says forget it. Just carry on with your work, follow your nose, get by somehow. All that matters is to do

the work Hope that sooner or later people will notice that some of this stuff asks tough questions. And part of me says it's just wrong that what's really become quite an art movement, and an international and variegated one at that, should be fed to the public in such trivialised form. It would be wrong to keep quiet.

Markus Weisbeck /Niko Waesche (.de)

mark@thetribes.com

DEPERSONIFIEDED PERSONAL AGENTS: A CHALLENGE TO WEB DESIGN AND THE PROJECT "LOGO.GIF"

In this speech I want to talk a little about my current perspective regarding the development of the Internet- a theme that a great number of people are constantly dedicating themselves to these days. Specifically, however, I want to talk about changes that are occuring right now, not changes that happen overnight, but rather shifts that will take some time to fully become apparent. These changes are caused by both technological as well as socio- economic developments. They are, in one way or another, portrayed by the media and by common perception as answers to the so- called "information overload" the Internet is facing today. I want to question this assumption a little, but more importantly, I want to point out how the combined impact of these changes is of special relevance to the World-Wide-Web designer, a field my partner Markus Weisbeck and I have been heavily involved in in the past year and a half.

First, I am going to talk about the unique position Web designers, whether they are professionals, hobbyists or anarchists or all three at once, are in today. Secondly, I want to get into some definitions in order to highlight what I refer to as the difference between the "interface" and the "information landscape." Thirdly, I will finally discuss the technological and socio- economic changes that are influencing the Internet "landscape" today Here, I will get into the so- called "agents" technology and developments imposed by social and market pressures, such as the rating system of the World- Wide- Web Consortium "Pics." Fourthly, I will speak about an aspect that in the media so far has almost exclusively been portrayed only as the "Battle of the Browsers," namely changes in the World-Wide- Web Interface. As if the future of the Web interface could only be defined by the dialectical battle between two corporations that happen to be at the exclusive top of market penetration right now. Here, I will present you with my favorite alternative Web browser- not Netscape, not Microsoft- but rather a character from the film Star Wars: R2'. My fifth point is my conclusion and a "fliegender Wechsel" as we call it in German to Markus Weisbeck, who will talk about his project "icon.gif."

1. The World As We Know It.

Web designers are in a unique position right now. Currently, everybody who builds a page on the World- Wide- Web is a Web design professional. There are no agencies that one could safely pronounce "established," more importantly, there are still no "rules of the game," no price structures, no fixed approaches, of course there arent any pre- determined career patterns. Everybody with some equipment and know- how can theoretically still create something that looks like a topnotch company CI on the Web This is good, this allows for the challenging infusion of a lot of creativity and spontaneity in the field. Moreover, it is a global game Best of all, this whole situation came about by chance, technologically at least. The original developers of the World- Wide- Web in the Swiss physics laboratories CERN never intended for the transfer of graphical layout.

Web design still focuses on their specific sites using an approach that is strongly remniscent to the handicrafts. The browser frame is the window through which the designer examines his or her work. There is- for the moment only- still not much necessity to look at the workings of the server software, of database technology, to look to the left right or behind the browser window. The simplicity and the intrinsic beauty of the Web design process as we know it has allowed the formation of whole "Internet suburbiss" of private home pages. A little, proud home cottage industry

2. Definitions: "Interface" vs. "Information Landscape."

Much of what I am going to talk about today refers to the distinction between an "Interface" and the "Information Landscape." The navigational interface is the tool the user controls to access information found on the World- Wide- Web. It should be easy to use and multi- use: open for simple browsing, collaborative tasks such as teleconferencing/ chat and other interactive exchanges. The standard Microsoft or Netscape browser is a navigational interface. There is, however, no reason why the interface should not be more adapted to individual user preferences. There is no reason why the browser should be rectangular and embedded in a computer screen. A Netscape affiliate and other companies are working on integrating Web navigation interfaces in a wide variety of household appliances.

The information landscape is what makes up the World-Wide-Web. It is that handicraft product I talked about earlier, the thing we read, browse, surf and interact in.

When I am tackling definitions I might as well also add that I am not going to really try to define "Agents technology" here. I use the term agents very loosely, referring to anything that supplies the user with individually selected information tidbits. Basically, the agents technology as I understand it is quite trivial, it ranges from the first simple UNIX email filtering systems to the database agent systems available on the World-Wide- Web today. What is not trivial is the design challenge that accompanies the agents development, this is what I will get into during my speech.

Right now, almost all the Agent technology readily available to the non-hacker consumer is embedded in the information landscape of the Web, i.e. it is found on single Web pages and is linked to specific information sources. Soon, however, the agents approach will migrate from the information landscape into the user interface. Agents will not only help us in the task of intormation filtering, but also to carry out monetary transactions over the Internet and help like-minded people and employees with the same research interests find each other on the Internet or in the Intranets of multinational companies.

3. Changes in the Landscape.

Change in the information landscape is basically coming from two directions. Both are related in that they are seen as neccessary cures to the so- called "Information Overload" of the Internet. The first is technological, the second socio- economic.

Instead of actively having to seek out information on the Web landscapes, we will increasingly find that the information will be brought to us, more or less specifically selected according to our own individual preferences. Already today, we see that most new Web development includes beginnings of this approach. The most famous example, "Firefly" by the Bostonbased company Agents, Inc. allows the user to share through a database/ agents system his or her music preferences. The thus has the ability to "learn" the tastes of the user, thereby making intelligent music suggestions for him. The same approach is applied successfully to journalism. Newspapers on the World- Wide- Web such as the Wall Street Journal, New York Times or Los Angeles Times present their readers with information categories they selected in advance. Point Cast and First Individual are even more innovative database information systems, mainly targeted at the business consumers.

We are hearing this argument over and over again: In order for the World- Wide- Web to be a legitimate commercial entity, it needs to change. Socio- economic pressures are having a great impact on Web development, altering its nature considerably. On the one hand, the geography of the Web is changing in that a distinct periphery and center are forming. The center is composed of very successful sites with easily recognizable brand names. These easily recognizable Web brands have an added value also because they can be used to sell advertising spaces. In a Hotwired editorial "Market Forces," David Kline pointed out that brands have even greater power in an electronic market place than in real-life markets. Kline quotes the consultant Carol Holding as saying:

> "There are only 30,000 items in the average supermarket compared to tens of millions of pages on the Web. Youve got to provide some mnemonic stimulus- youve got to have a pretty powerful brand identity with consumers- or you wont get noticed."

On the other hand, the geography of the Web landscape is changing because categorization is being added. Due to political pressure against perceived pornaography on the Internet the international World Wide Web consortium is suggesting to implement a way to categorize Web pages. This 'PICS' initiative is first being implemented by Microsoft. The important thing about this categorization initiative is that it can be used for other purposes as well, to build signification for educational sites, religious sites, trusted sites, politically incorrect sites etc.

The geography of the Web is thus changing in two ways: A distinct center and a periphery are forming and on top of that layers of categorization are being added. In addition, Web sites are technologically mutating from platforms for information presentation to fully-fledged programs and databases. What does this mean for the information landscape? Web sites will tend to become more uniform, more standardized and much more difficult to create. Most importantly, the information presented on them will be offered less as part of a whole site environment and more as information tidbits, small pieces of multimedia that can be passed on to readers with specific preferences. This brings us right to our next point, because these informational pieces are perfect mouthfulls for advanced agent technologies that are integrated right into your own user interface.

4) Personalized Personal Agent Interfaces: The Cheap Way to Go.

Currently, most agents still reside in the information landscape. They will however, migrate over to the interface soon because only here they can become really useful and powerful. Equipped with electronic cash technology, agents will be able to change how we interact with the Internet and how we go about many of our social and economic pursuits. Some of these developments may very well be negative, as became evident in the online debate on Hotwired between the founder of Agents, Inc. Pattie Maes and Jason Lanier. Lanier convincingly explained one of the dangers of the agents technology. Users will be prone to limit their spheres of interest in order to match the limited Artifical Intelligence capabilites of the agents. The lowest common denominators will win, as elsewhere in the world of computers.

This does not mean, however, that I and just about everyone else on the Internet are not secretly thrilled by the coming of the agents technology. here, I am not going to try to question the implications of this development as a whole, I want to point out the challenge that Web designers are facing here. In a nutshell, what is happening is that the World- Wide- Web model itself is changing: The point of consumption of information is shifting from the remote server to the users own computer. Furthermore, the nature of this information is such that its size, its media and its relevance can constantly change. Information in the Web will be continually retrieved by the agent and brought back to the home machine. This is a great design challence: What could an agent interface look like? How does one deal with the problem of highly dynamic content?

William Mitchell has written a popular but mostly disappointing book ("City of Bits," 1996, p. 14) about the virtual architectures of the future in which he gives us a simple solution to this design challenge:

"While the Net disembodies human subjects, it can artificially embody these software go-betweens. It is a fairly straightforward matter of graphic interface design to represent an agent as an animated cartoon figure that appears at appropriate moments (like a well- trained waiter) to ask for instructions, reports back with a smile when it has successfully completed a mission, and appears with a frown when it has bad news. If its emotions seem appropriate, you will probably like it better or trust it more. And if cartoon characters do not appeal, you might almost as easily have digital movies of actors playing cute receptionists, slick stockbrokers, dignified butlers, responsive librarians, cunning secret agents, or whatever personifications tickle your fancy."

What a wonderful world! This quote shows how decision makers in the New Media tackle the design problem. Incredibly naive. How can it be even remotely desireable to install trust in certain bits of information through the appeal of the interface and not the nature of the information itself? What happens to the rich diversity and depth of multimedia information as it is processed and regurgitated by a personalized personal agent?

The nature of the agent technology seems to demand a personified interface, so a great many people seem to be thinking The dream of avatars and cyborgs go way back into the mechanical age. The Britain- based company Agentware has already adopted a dog as its agent mascott, the insect mataphor used in Firefly is a little better.

The process of personification, however, pulls with it a number of problems, the greatest being that the potential range and depth of our information sources is flattened. In fact, the clear distinction between information landscape and interface is distorted through the personification approach, a distinction that I believe is very useful in our task of gathering and evaluating information ojectively. For the designer, too, this is a shame because he or she looses control over the ability to embed multimedial information within unique landscapes that illustrate how different elements correspond to one another, thus conveying greater meaning structures In his book about interface design "About Face" (1995, p. 53, 54) the software designer Alan Cooper describes the danger of using metaphors in general in software design. They are initially easy to comprehend, but then the functionality of the program is reduced to the simple stupidity of the metaphor. Instead, Cooper argues for the use of an idiomatic approach, in which the user is given a simple, yet powerful new language of abstract symbols and tools. One of Coopers credos: "All idioms need to be learned. Good idioms need to be learned only once."

"Searching for that magic metaphor is one of the biggest mistakes you can make in user interface design. Searching for an elusive guiding metaphor is like searching for the correct steam engine to power your airplane, or searching for a good dinosaur on which to ride to work. Basing a user interface design on a metaphor is not only unhelpful, it can often be quite harmful. The idea that good user interface design relies on metaphors is one of the most insidious of the many myths that permeate the software community."

The human face shares all of the problems all conventional software design mataphors share. It is, in fact, one of the worst metaphors one could use. I also believe however, that its limits will not make it a viable alternative to idiomatic design approaches. Designers should be aware, however, of the attraction this metaphor has especially today, in the world of commercial bots and agents.

To conclude, an example from the film "Star Wars" comes to my mind. The robots R2' and C3P0 had completely different modes of passing on information. C3P0 was a full humanoid, and acted as a storytelling human. R2', however, much less human in form, had the ability to project 3D images of events and narratives he had witnessed. I remember that C3P0 used this method to project a very emotional speech of Princess Lea- what she said I have no idea, however. In this mode, C3P0 was nothing but a future browser, a navigation interface for information landscapes. Lets think of C3P0 when designing our interfaces in the future.

5) Conclusion: Let the Bot be a Bot

The development that is making the apparent flood of information on the Internet more manegeable, a technological, social and economic development, is at the same time threatening to dissolve the separation between interface and information landscape and thus the incredible diversity of meaning that was linked to this separation. The separation itself is one of the main characteristics of the World- Wide- Web, nested in the concept of hypertext and of servers and thin clients. Breaking it up may be a step back. Let us not accelerate this development by playing with the idea of personalized personal agents.

My partner Markus Weisbeck is a Frankfurt- based Web designer currently carrying out a fascinating project that shows how this grand information landscape of the World- Wide-Web functions today. In "logo.gif" he uses Bot technology to make the socio- economic structure of the Web more visibleit is a visual metaphor for the whole Net. It also makes evident the powerful possibilities of representation the Web offered to firms and private individuals alike. In "logo.gif" a Bot was programmed to collect all images on the World Wide Web with the title "logo gif"- a surprising number of people have equipped their insitutional, corporate or private pages with a visual symbol called "logo." "gif" is the abbreviation of a image compression standard on the Internet. More than 200.000 'logo.gif' probably exit on the Internet today, representing an extremely diverse set of intentions- all, however using exactly the same name and the same idea of a symbol

konwenn@knoware.nl Léon CM Wennekes (.nl) FCC/Wennekes Multimedia bv.

'TIME' FOR A BETTER UNDERSTANDING AND MORE FUN

About MYSELF:

Since 1983 I am involved in the new media, first as a designer and presently as a consultant in the field of multimedia (CDmedia, internet and the like).

I have been working in this area since the early 1990's and have developed numerous interactive products since: CD-i, CD-ROM and networked interactivity including the development of an interactive 'service' surrounding. Here people can obtain special services and products that are tailormade for interactive situations: e.g. you can buy products but there is a lot of personal service around it as a result of databases where personal favours and habits are tracked, stored and used to create new services.

I am of the opinion that several new services will 'sprout' in this area in the years to come.

about TECHNOLOGY DRIVEN USER INTER-FACES:

Since the early days of computers, the same pattern repeats itself: an user-interface is designed around a technology-driven concept rather than a human perception-driven concept. Off course a lot has changed in a positive way, we see the development of 3D intuitive user interfaces that are constructed around our -evolutionairy and culturally grown- ability to deal with our spatial surrounding.

But still people find it more important to talk about bits and bites than about a friendly and understandable, dynamic interface.

Basicly I think we are still in a rather prehistorical situation. Given the situation that both hard- and software and their capabilities grow with tremendous speed, there is still little interest and effort in the development of 'natural' user interfaces.

about TIME:

The element that I consider one of the underdog of user-interface is 'Time'.

Time is a strange phenomenon. It creeps on and on but subconclously we are quite aware of time. A lot of people wake up just before the alarmclock rings. Another example is that we have build-in clocks that can tell us roughly what time of the day it is. Our biological clock can be a big help but it can also be an obstacle (e.g. when having a jet lag). Time is one of those strange things that has shaped our lifes and is therefore our own natural 'User interface'. Time is not

and is therefore our own natural 'User interface'. Time is not allways reliable. One minute in a dentist's chair can be awfully long and is in perception the complete opposite to the pleasure of listening to a live concert of your favorite band for that same minute.

Time is an instrument that shapes our life. We are connected to it and we play with it.

In general it is a natural instrument that came out of evolution and it is still ruling much of our behaviour. It is an instrument that can be used for navigation and knowledge. In interactive productions 'time' is seldom used to create user-interfaces with different storylines

theses of TIME

- Time can be used to create a special sense and knowledge and is therefore an user-interface tool.

- With the use of this tool in a proper way, you are able to avoid things that are not clear, not hierarchical and boring. Beside of that you can create a special atmosphere and knowledge.

definitions

There are different forms of 'Time'.

Time in the real world	> big circle (years, seasons, time

Time in the real world > small circle (Time of the day, Tides etc.)

Time in the relative world > This means that time can trigger events. as a direct result of.

- what you do

- what you don't
- how many times you do it
- with what interval?

In fact a lot of computergames use the relative time to create tension and dynamics

Last but not least there is 'non-time' > random generated events.

Since a couple of years I work on ideas and concepts that involve time in a dynamic way. Here are some examples:

EXAMPLES

1 the HomeShopping CD-I for Albert Heijn 1994

In a pilot project for Albert Heijn a CD-i was designed and combined with a modem. You can order aprx. 2000 articles in a shopping mall. There is information about recipies, about food, about detergents etc.

The CD-i is specially designed for people who have no time to do their shopping and therefore have the possibility to shop in their own homes. To create a dynamic interface I designed a main menu that was a result of the time of the day (which is off course connected to the internal clock of the player). During the day you would have a bright background with dynamic music. At 8 PM the scenery changed into a more shallow background combined with easy listening music.

2 'The national institute for the deaf' in St Michielsgestel 1995

In 1995 I was involved in a project to create a learning tool in order to read sign-language. The purpose was to design a surrounding where deaf and hearing people intuitively could learn sign language.

We developed a concept named: The European Island. This was an isle, roughly the shape of Europe, but a lot smaller. On this island a mansion was situated in the middle The mansion was inhabited by various people, or better, agents. They had various backgrounds and characters. Both in the

user-interface as in 'things to happen' the concept of Time was involved. When you set foot on the Island, Time related events happened. First there were always signs of what time of the year it was and what time of the day If you entered the kitchen in the mansion around 'dinnertime' there were cooking activities During 'summer' it might happen that one of the inhabitants of the mansion -an elderly woman- suddenly would invite you to look at the special flowers growing in the garden. By doing so she interrupted the learning process you were experiencing. But you could say 'no' and could continue with what you were doing. All these time related events had learning elements in it to teach people the sign language. The basic idea behind it was to create a dynamic, and non-predictable surrounding where people could learn and have fun at the same time. Due to european fundraising activities this project is momentarily on hold.

3 A CD-media product called 'BIG and SMALL' 1996

This is a world full of optical illusions where people and especially children can learn about the relativity of our perception. It is a real time 3D world completely devoted to time. In this world a changing city built of wooden toy blocks is the stage for strange puzzles that change during time. The city itself is a magic stage that changes due to the real time and the relative time. We created a short demo for the MILIA 1996 and at this very moment we are working on a new demo for the Buchmesse in Frankfurt. The demo I show you now is a short trip around one of the houses in the city. It ends in the 'big and small' museum where nothing is as it seems. The end product will be a CD-ROM where people can wander through ever changing cities, playing games that will never be the same.

CONCLUSIONS AND RESUME

- We see a general development in user-interfaces that are more situated around our own system of perception. One example is the development of 3D surroundings through which we can navigate.

Another example might be a more sophisticated use of Time as a navigation and knowledge tool.

This is not so strange since we feel very good in natural userinterfaces (due to a combination of evolution and learning processes throughout our life).

- The understanding of complex interactive structures can be easier when you make intelligent use of 'time' as a tool. It is my opinion that it is good to work with this universal and natural 'language' that everybody understands.

The technical infrastructure is less and less a problem for this development.

thank you for your attention

Léon Wennekes



institutional presentations

I N S T I T U T I O N A L P R E S E N T A T I O N S

Jose Alcala

(.es)

Director &Leader researcher

MUSEO INTERNACIONAL DE ELECTROGRAFÍA: AN UP-TO-DATE ART CENTRE. THE MUSEUM FOR THE DIGITAL ART OF THE XXI CENTURY.

THEME: An alternative model of New Tecnologies Research Centre for Artistic Creation

HISTORY

In May 1990, the Rector of the University of Castilla-La Mancha inaugurated a center for research into new electronic media technologies located in a restored 18th century Carmelite Convent building. The center's primary objective is to conserve, display and acquire an international collection of artist's work who utilize machines and processes related to new technologies, for the generation, reproduction and printing of images. In January 1991, the Museum incorporated an electronic media technology laboratory into its working structure, to carry out theoretical and practical research into applications of the field of artistic creation. Some months later a documentation center, with a small specialized library; and the Center for Image Research was established, designed to provide additional support for the new media workshop in the field of graphic design, corporate image and creative adverti-Five years after its inauguration, the Museo sina. Internacional de Electrografía is a dynamic museum; an art center with very specialized, unique lines of research, and though on a restricted budget, fulfills its five primary objectives: research : by creating an international artist-in-residence program that invites artists from all over the world to collaborate with the MIDE on their current research projects, with technical support and guidance from the University of Castilla-La Mancha and the Ministry of Education and Science; dissemination: by holding exhibitions, offering a documentation and media information centre, publishing ...; conservation: creating an active, dynamic collection of current works of art which are appropriate examples for displaying the latest national and international artistic applications of new image technologies; education: for artists, students and the curious, offering specialized courses and seminars (including programs of awards and fellowships for researchers, technical assistants and workshop assistants); and collaboration: by offering financial assistance for research projects, providing MIDE equipment and in the broadest sense, making MIDE's resources available to artists and researchers who wish to develop specific projects and activities. Some of the ways that this can happen is by MIDE contributing technical expertise, and offering financial assistance for research and interesting artistic proposals in diverse areas of research which falls within the specific realm of the MIDE.

AREAS OF RESEARCH

The Museo Internacional de Electrografía in Cuenca has the following, clearly defined, areas for research currently open: Digital image techniques and processes using new electronic media technologies. The contribution made by these digital technologies incorporating traditional processes of printing and reproduction. Creative techniques and processes of graphic

telecommunication technologies. (Fax-Art, Internet, real-time teletransmission etc.). Interactive multimedia, Computer Art and Postproduction of the dynamic image on digital video Educational philosophies that the new image technologies can generate. New museum models for contemporary art in the data transmission era. The would include possibilities of the virtual museum.

PROGRAM OF GRANTS AND AWARDS

One of the most important activities which the MIDE organizes annually is the Program of Grants and Awards, further fulfilling its original objectives mentioned earlier. This program makes significant social and professional contributions to the field, both on a national and international level and is structured according to the following divisions: Grants for Artists in Residence (International) Grants for Researchers in Residence (International) Attendance at Courses, Workshops and Seminaries (only National) Grants for collaboration in MIDE Research Projects (International).

DEPARTMENTS AND SERVICES

The collection The Museum's collection of technologically generated artworks consists of more than 2000 donations by artists from all over the world These works have been created using generative, printing and reproduction processes including: xerography, electronic graphics processing in colour, transfers, combined imaging techniques, performance, artist's books, installations, fax, electrostatic direct processes, information graphics, computer-aided photography, Internet related imaging, digital video and multi-media. There are nearly two hundred works on a rotating permanent exhibition at the MIDE as well as a traveling exhibition program that has travelled to various cities in Spain and other countries all around the world On other occasions the museum has collaborated and participated in organizing and producing cultural events with other institutions such as the Scottish Fotofeiss, New York's "Montage: International Festival of the Image", the Cypryot "European Cultural Month", the Catalonian "Primavera Photografica' and some Culture Departments of the Provincial Councils of Spain. In addition, thanks to new possibilities offered by the computerised communication network, Internet which provides access to specially created works for this medium and a sample of the works which make up the collection. The museum is open to receiving donations from artists working in the field of New Technologies in its broadest sense.

The Workshop In the MIDE Technology Workshop, production and development of specific projects and personal artistic research is carried out in the following areas: Creative uses of processes and techniques of electronic technologies for the generation, printing and reproduction of images. COURSES OF ACTION New media graphics processes and techniques (Generating, printing and reproducing images in the field of artistic creation). Transferring electronically produced images to a wide variety of supports. Transferring electronic/information systems images via IPU-Colour Laser Copiers on different support materials. Developing artistic projects related to these fields of action.

Multimedia and Digital Video Area. COURSES OF ACTION MULTIMEDIA Development of interactive systems Study of machine/user interface. Study of navigation and structure. Practical application of educational programs. Development of artistic projects in this support/language. COMPUTER ART Digital photography. Research into a variety of printing supports for the digital image. Development of projects by artists related to these fields of action. DIGITAL VIDEO Research and development into non-linear production. Combining multimedia, graphics, design productions onto videographic support; digital audio and 3D treatment Development of artistic projects on video support. NETWORKS & INTERNET Research into the potential of telecommunication technologies. WEB design Videoconferencing in real time. Development of artist's projects using media for communication OTHER WORKSHOP ACTIVITIES Technical consultation is available on media, processes and techniques. Advice on potential didactic applications. Technological assistance Organization of educational courses and seminars.

The Documentation Center The MIDE, as a center for artistic creation, has also established an important research center, providing artists and researchers with bibliographic and artwork resources, facilitating in-depth analyses of these specialized topics. Initiating the computerization of the Center's resources has been one of its primary objectives; creating systems of documentation including archives and conservation procedures. The Center currently contains data bases of it's collection, biographical information on artists in the collection and of other similar centers, together with specific information on each of the areas comprised by the MIDE. This area is currently working on digitizing all the Center's graphic and textual information in order to offer and promote its resources via the Telecommunication Networks, including optical supports in interactive media systems, to broaden the "exhibition space" and actually enter into the personal space of our users. The idea is to provide this model to comparable centers in Spain and abroad. The dissemination of information is contained on the MIDE Web site on the Internet and is internationally available for consultation. Entering into forums of contemporary debate and making known the activities of the MIDE with regard to the New Image Technologies form the basic philosophy and framework of the Documentation Center, a center which is open to all professionals who wish to conduct research in this area.

n-fabrik@euronet.nl

Vladimir Muzhwsky

Space of Cultural Revolution

LABORATORY OF NEW TECHNOLGIES: (A)MEDIALITY PROJECTS

Laboratory of new Technologies is a non-profit organization dedicated to the research of new forms of cognition, neurointeractivity, and perceptual/electronic materials in media. Founded in 1994, it started as a video art center, which pursued the idea of autonomous media reality, as a basic factor in the fabrication of meaning in the sphere of mass communications. Today, LNT has become a multimedia institution organized on a dual platform of old and new media integrated in the framework of (A)mediality. It focuses on the artistic manipulation of mentality and reflexivity by means of peripheral/subliminal structuring of human perception and creates autonomous enironments, with a capacity to interact with biosystems on all communicational and subcomunicational levels. Current projects of the Laboratory of New Technologies include: Perceptronic Materials, Pore, Subfauna and others.

(.ru)

2)Lecture (A)mediality.Towards Perceptronic Materials

Info:

Becoming of the electronic space of vision initially was connected with the dispersion of information, which presupposed that a certain nooconglomerate (invisible for masses by definition) has been formed as a controlling subpsychological ultramental constellation of hypercensored experience. TV as a first ray type electronic extension was directed to widen the horizon of cognitivly accessible objects across the border of physically accessible set of objects. It redirected the spatial constitutional factors of human mentality towards memetic references instead of physical basis of what we used to call a sign. Electronic consciousness became a self-transforming symbol spreading itself with a speed of high frequency transmission along the horizontality of meaning. Perceptronic materials is a theoretical experiment, which is aimed to investigate the formation of meaning within the framework of bioelectronic interaction.

abstract:

Any physical event, which was submerged in the electronic environment lost its semiotic significance to become a carrier of submental modulation: reflex became a new basis for the ideology of progress. As a matter of fact, with the development of technology, reflex as a counterthesis to mentality, became a formatting factor for the phenomenon of cyborgy. outer space related system of semihuman-semimechanic units capable of reacting faster, then ordinary mentality can afford to evaluate or consider the necessary information. The presentation of information was compressed to the blocks suitable for a reflexive reaction: mainly, pulsing modifications of perceptual submodalities formed the elements of the new conglomerate of meaning Born in the heart of military intelligence, the results of this research slipped out of hierarchical control into the deepest realms of ordinary consciousness, where they composed a new mythology of reinforced or technologically extended human organisms.

In fact, the field of this technological transcendence became an autonomous zone of meaning, independent both from its ignorant creators and military purposes. In military, electronic space still was converted into a suppressed conglomerate of functional support, which had to establish a certain level of concentration of perceptual resources in a certain physical location. Released as a mythologene, it started to form its own environment of reduction: and first of all, reduction of human factor. Anthropocentricity of meaning was the last step military could use to concentrate the mental power on the planet from globality to structural individuality. Cyborgs revealed their tekne-djani property of artificial spatial locators' as the charge of electronic meaning was transferred from the bodies of astronauts to the subliminal realm of mass communication.

Meaning itself started to be formed within the electro-bioextensions of human mentality neurotransmitter networks faced the competition of chemically induced weak mental connections in psychology (on the micro level), as well as on macro level of electronic processing and decompression of information. Specific types of noises and electronic turbulences started to interact with subliminal zones of human consciousness, which seemed to be rudimental since the first technological revolution took place in the western world. The property and intellectual charge of image had to face this recall in the conditions of mass media The image could not refer to an event as a sign any more, but still preserved its position in the "noise-signal" dichotomy paradigm. On both sides of this paradigm there was an event: autonomous electronic event in the sphere of noise and autonomous physical event in the sphere of signal. The mentality had to emerge again, and form a new meaningful triad of electronic space. Of course, it could not be the same, but only analogous to the previous anthropocentic reality of meaning.

Objects in the electronic space follow the paradigm of virtual content in the same way, as information follows the electric current in a chain. They perform a function of mediators, but mediate within the reach of their own transcendence, and hence, acquire virtual flesh of nooautonomity instead of a phenomenological transparent dependency on the reference content. Being embodied in the process of nooelectronic spatiali-

ty expansion, they perform three main roles: dispersion, amaterialization, and subanthropologization.

Antiepistemological multiplicity introduced with the development of media as many to many model of informational deployment, layered the monoreality of language Onedimensionality of discursive man was splintered into the omnidimensionality of bio-informational location. Perceptronic materials is a theoretical experiment, which is aimed to investigate the formation of meaning within the framework of bioelectronic interaction.

Amaterializtion principle is closely connected to the emerges of electronic space as a type of noogenetic environment. Because of the increased speed of informational processing, it overcomes the limits of perception and cognition, and converts semiotic structures into subliminal messages. The carrier of sign loses its material flesh, which causes selforganizing processes on the semantic level of informational structure. Pore is a good example of a research project in this framework. The synthetic meaning itself suggests an alternative relationship with the informational complexes, which instead of being reduced to the cognitivly accessible sets of facts, form the electronically holistic organisms, in accordance with their structure, electronic complex systems send and react to the informational modes, to which a human system can react only through transcending the textuality of its cognition. pore is based on the plasticity type of interaction, in which spatial location in the room becomes a trigger of the perceptual peripheral transmission of information from an electronic complex to a bioricepient. As such, both systems become spatially linked not only on the level of motion, but on the level of the peripheral thinking plasticity. Interacting with each other, complex electronic and biosystems form a new type of virtual material, which can be understood as a basis for a synthetic noospatial knowledge system.

Elizabeth O'Grady

(.ca)

Manager, Inter/access Electronic Media Arts Centre, Toronto

BUILDING A HOUSE ON SAND?: IS THE DIGITAL WORLD SOLID ENOUGH TO BE A NEW FOUNDATION FOR ARTISTS?

SUMMARY. Presentation of a Torontobased artists' centre focused on electronic art. Discussion of the challenges it is responding to and the implications of these in a larger context. Examination of the inter-relationships of the electronic artist, artists' centre, computer technology, the multimedia industry, and the Canadian public and cultural spheres Where is the place for an artist-run centre in the digital world?

This paper will examine inter/@ccess, a Canadian electronic media arts centre dealing with changes and challenges which are relevant to many people in electronic art. Inter/@ccess is located in Toronto, a central point of the multimedia industry, and a city which houses one of the largest arts communities and computer nodes in Canada. The Board of Directors of inter/@ccess is made up of Canadian electronic artists.

Over the past few years Inter/@ccess has faced many changes, among them: the increased permeation of computer technology into society; rapidly expanding possibilities for art creation with increased sophistication of hardware and software, changes in the situation of electronic arts and the electronic artist; and dwindling government funding. How have these changes affected inter/@ccess, and what are we going to do as a result?

The artist-run network in Canada used to be called "the artistrun movement" by its more radical proponents, but in recent years most of the movements of this network have been devoted to keeping itself alive. The first artist-run centres emerged in the early 1970s, and they still embody the optimistic, egalitarian and idealistic values of those times. The centres were started by artists for artists, to provide an alternative for the production and exhibition of art that was independent of the marketplace and commercial constraints. Governmentfunded in an arm's-length relationship, most centres take pride in remaining democratic and open to everybody. This is advantageous to emerging artists, and to those whose work and/or world-views are not in favour with/of the current commercial art scene. It also allows the public to see more varied or difficult work than can be seen in commercial galleries. On the other hand, artist-run centres have sometimes been accused of letting political considerations over-ride those of artistic quality. It's certainly true that the centres as a whole are very non-hierarchical, occasionally to the point of not getting things done because nobody wants to take control. In most artistrun centres, the volunteer Board of Directors is elected from the membership, so the structure really does function from the bottom up.

Inter/@ccess was started in 1983 by a group of Toronto artists who were experimenting with videotext. After a few years, they realized that videotext was not the way of the future, and that there was more artistic promise in computer-based art on a broader scale. So they bought a Macintosh computer and set themselves up as a computer access centre for artists. At around this time, they also initiated a bbs (bulletin board system) for artists, called Matrix.

As the 80's raced to a close, more and more artists began coming to inter/@ccess. They worked on the computers and talked about upcoming software and exciting capabilities on the horizon. Inter/@ccess started to host artist's talks about the new technologies, and to offer artist-in-residencies for longer-term projects. The organization began to receive regular support from the federal, provincial, municipal and local governments, and the annual budget grew to CDN\$100,000 (US\$74,000). It was always a struggle, and it came after years of unpaid work, but eventually the centre could employ four paid part-time staff members.

The situation was looking good at the turn of the decade, at which point inter/@ccess had a grand total of two Mac Ilci's, with one colour monitor and one grayscale. Now, in 1996, inter/@ccess can offer artists three good computers, several colour and TV monitors, a videophone and a videoprojector, ISDN connectivity, a colour flatbed scanner, a VCR and a camcorder. The working conditions are more pleasant, the payment structure is simpler, and membership rates are lower.

However, in 1990, inter/@ccess generated \$25,000 of its own revenue from the computer studio. This year we will be lucky to make \$5,000. This is a drop of \$20,000, or 1/5 of the operating budget, in about 6 years.

What happened? Why have the sands shifted from under the foundations of inter/@ccess?

This dramatic change for the worse in the revenues from the computer studio was one of the items which caused inter/@ccess to re-evaluate its priorities and come up with a new mission statement.

The obvious answer is that as computers penetrate more and more thoroughly into society, artists who previously could not afford to buy their own, have now bought. It's also an open question as to what prompted members of one of the most individualistic, materialistic and self-centred societies on the planet, namely contemporary North America, to expect that collective ownership, collective use, and collective administration of highly specialized artistic production tools would ever work out

Although computer technology has permeated all levels of society, its novelty continues to blind us to our inappropriate uses and growing dependence. In Canada there's a little creature called the Ad Fairy, she is related to the Tooth Fairy, and she whispers the following words of wisdom into artists' ears as they dream about how to spend their grant money: "Why share when I can own?"

"Why rent when I can buy?"

"The more computer power I have, the better my final product will be"

"It's new so it must be improved"

"It's compatible with what I have already so I probably need it somewhere"

and the best of all. "If I buy computer stuff that I don't understand, I will doubtless become very brainy and impress all my friends when I have figured it out"

Mirroring the rest of society, a polarization has taken place so that most artists who have become serious about electronic art now have their own system, set up to their specifications. The people who need to rent time these days are the emerging artists, the dablers and the beginners. Inter/@ccess is glad to be available for them, but this is not a sound ecology for an artist-run centre: ideally, veterans, mid-level people and beginners should be around to network and share knowledge and ideas.

The other artists' production centres in Toronto are also beginning to purchase computers of their own. First was the video post-production centre: they got the AVID suite. Video post was not an area inter/@ccess had intended to go high-end in anyway. since we knew the video centre would, but we lost those artists as mid-range clients as well. Two years ago, inter/@ccess had hopes of becoming the finishing centre for artists working in other media, who would to use our computers to manipulate work created in their own centre. However, it's turning out that everybody wants slightly different components, so the film centre, the photography centre, etc. are largely buying their own. In addition, museums and larger public institutions in Toronto are starting to set up public-access computers, to draw people in and appear more with-it. There is also competition from the private sector, for example the ubiquitous Kinko's.

However, widespread purchase of computers is only part of the picture. Even though inter/@ccess only owns three computers, the increasing speed of change in the computer world, where the software giants battle it out, firing upgrades at each other like lightning bolts, has had a significant impact on our operations.

In the mid-eighties, Inter/@ccess initially set the policies of its computer studio based on the model of the video production co-op, where members pay by the hour to rent the equipment. This was feasible in a computer centre nine years ago, but inter/@ccess has now outgrown this model. First of all, rapid obsolescence makes it unfeasible to invest heavily in computer equipment. Secondly, as a video artist, once you have learned the mechanics of the camcorder, you can go and begin shooting. In a computer centre, once you have learned the software, you can get ready to learn the upgraded version with the 15 new plug-ins due out next month.

The increased complexity of software is, for many artists, a mixed blessing. More options are available, and one might be able to get closer to one's vision, but it is also more difficult to make a choice and go on. This is not to suggest that every interesting piece of art made with the assistance of a computer must be complex; on the contrary. However, most artists will want to experiment, which is uncomfortable on a pay-perhour basis. Canadian video artists have been able to apply for production grants for several years, which would pay for the time to explore options, but this type of funding is only now becoming available to a few electronic artists. Finally, with the more complicated softwares, incompatibilities occur with different startups, conflicting extensions, etc One inexperienced person who gets into the system folder and "just tries to speed things up a little can make an awful mess for twelve other people!

As the potentials for electronic artists expand constantly, so do the learning curves. Inter/@ccess used to offer in-house technical help to artists. However, most artists could not afford the price of enough consultation to really be of use to them, and we could not afford to subsidize their learning time. In addition, it was difficult for inter/@ccess to find good consultants: we were paying about 1/3 of what such skills could command in the private sector.

Government funding in Canada is also declining. Globalization has caused contempt for anything which does not contribute directly to the bottom line, and dwindling public funding for arts is reviled as philistinism by some, but hailed as a return to the good old days by others. Would-be-deficit-free governments talk of cutting completely all cultural groups which do not generate at least 25% of their own revenue. At the same time, corporate sponsors are rejecting the traditional "arm'slength relationship" and demanding more decision-making power in exchange for their contributions. The bubble has burst, and any artist-run centre that didn't expect this was simply naive.

Individual artists have also had to adapt to the changes in public funding, and more and more of the electronic artists I know are gradually becoming commercial artists. CD-ROM manufacturers are eager to get their hands on cool multimedia content to move their products off the shelves, but few artists in this situation have creative control over their work. They hope to be able to do their own work on evenings or weekends, but that's not the same as being in a really fruitful spell and being able to devote yourself to it for days. In addition to removing people from the general orbit of inter/@ccess, this has also had the effect of decreasing the volunteer pool. The "Let's all get together, pitch in and make this happen" has been replaced by "I'm free for a breakfast meeting on Tuesday the 19th from 8:02 to 8:13."

Although it was inevitable at the time, many practices in the Canadian artistic realm were simply imported from Europe along with the fine furniture, without any re-thinking as to what might be more feasible on our rougher shores. When the first formal art structures developed in Canada, one of the strongest models and motivations was: "Those Europeans display art in stately imposing art palaces so we should have that here too." The results of Canada's great museum expansion boom of the previous two decades reveal that this attitude was slow to change: "If we build it impressive, they will come". But not enough attention was paid by the arts institutions to exactly who 'they' were, what 'they' were getting out of their visits, and whether 'they' would continue to come. Only in recent years have outreach and education in the arts become crucial. As a result of this lack of focus on what would best suit the particularities of the Canadian situation, we have a visually illiterate, impatient public which is largely

ignorant of its cultural heritage, and which looks upon an art gallery visit chiefly as a shopping trip. Electronic art installations, which are slower than games and which offer nothing to buy, are considered even less relevant by the majority of people.

In the 90's, this jaded public has become even more skeptical, and reluctant to engage seriously with electronic images, thanks to edutainment, media TV and music videos, manipulated photos and simulated newscasts. In addition, the art object that you, an artist, create may now be a virtual space through which the visitor's avatar navigates. You and your piece take on the role of host to thousands of masked guests. You know that not all of these are guests you have invited Some of them are party-crashers of the worst kind. They will do their very best to hack into the surroundings you have carefully constructed. They just bop around from Web site to Web site, looking for a good time. It is easy to see why digital artists fear that if their work is not simple, quick and immediately entertaining, it will be overlooked, yet that if it is too shallow, it will be dismissed by other artists.

How should an artist-run electronic media arts centre position itself, in light of all the above changes? Is is even possible for inter/@ccess to define a stable place for itself in this digital rush hour?

For inter/@ccess, the answer was to change our mandate and priorities, and also to change our location physically to enable our new activities. In 1995, we moved to a new, nicer, space which made it possible to host exhibitions and events. And we concluded that the principal function of inter/@ccess could no longer be as a computer access centre for artists.

Instead, as decided by the membership, "Inter/@ccess is a community network and resource base to enable artists and the public to explore the intersections of culture and technology through the creation, exhibition, presentation and discussion of electronic art forms and new communications media.

More specifically:

"We provide entry points for people looking to get involved in the use of electronic technologies.

And we supply an ongoing context for critical discourse for those who are well into their creative careers.

"We encourage knowledge-sharing, by helping people find others with whom they can collaborate.

"We present alternative views of the new technologies to those presented by mainstream media and government policymakers.

"Our reach is international, but we retain a local focus as we believe the Toronto area has something unique to offer. Members of culturally diverse communities are encouraged to participate."

Since the new mandate was adopted, inter/@ccess has hosted several successful exhibitions, usually accompanied by an artists' talk or panel discussion. We concentrate on installations, often interactive and/or time-based, as opposed to solely screen-based work. Like a happening, it's necessary for the visitor to be physically present to experience the piece, as her participation affects the outcome.

We make available free or discounted computer time for selected artists who are preparing an exhibition or an event at inter/@ccess, so that they may experiment freely without feeling the hourly costs mount up. In addition to project-based time, we offer a couple of what we call "Noodle Scholarships" so artists can just play around on the machines, which is often the best way to come up with a new idea. We have also set up a policy for User-Groups, where a group of artists who want to learn a new software can meet and share their knowledge. In addition, we have concentrated our equipment purchases on items which artists would use infrequently and most likely not own, such as a colour scanner.

We have begun hosting a public discussion series, as a licensee of Kit Galloway & Sherrie Rabinowitz's Electronic Café International Santa Monica, in which we explore questions of the impact of digital technology on culture and electronic art We have also set up a small lounge area with a Web logon terminal.

We are also preparing a skills exchange database, where artists can list the softwares they are willing to teach, for cash or bartered services. If someone is willing to volunteer and help set up exhibitions, then that would get noted as well, and artists could help to keep their costs down. We're also looking at taking on an advocacy role in electronic art in Canada We collaborate with other organizations where we do not have the resources to undertake an event on our own. In essence, inter/@ccess has moved from being an end destination to being a central node, and also a conduit, in a network. Information and people, bringing with them their own knowledge networks and using ours as well, flow in and out depending on the needs of the particular project. We no longer focus solely on providing the hardware and software of computer access, but with our new mandate inter/@ccess participates in all aspects of the art-making cycle: research, creation, production, exhibition, critique and discussion in the Toronto electronic art community. We do not intend to be the final or only resource of the electronic artist, but an essential resource which also functions to point people to others.

The sands in electronic media will always be shifting. We all know that the tidal wave is only just beginning. If no stable home is possible, perhaps the answer is to live in a hovercraft.

We are hoping that artists will still want to come to inter/@ccess and meet others in the flesh, in spite of or maybe because of the increasing amount of time they spend interacting virtually. So after 10 years of struggling to build up a solid foundation with machines and hardware, we have come to realize that our new role is to be a conduit for humanware in the wired world.

panels and roundtables

PANELS AND ROUNDTABLES

ARTISTS TEACHING ARTISTS: TOWARDS A NEW PARADIGM

Panel chair: Roy Ascott panel members: Bill Seaman, Victoria Vesna, Stephan Wilson

Summary

While there seems to be little space available in conventional education for anything more than a craft approach to digital arts, cyberspace offers an entirely new perspective on the what, why and where of art education.

Art education is in crisis. It is not simply the impact of new technologies on art practice that has put the academy into a spin, but political, economic and commercial priorities have put the very idea of the creative arts at the bottom of the academic agenda In place of art education we have multimedia training which, even as a crude market strategy, is shortsighted The multimedia industry is far from stable; the division amongst developers and manufacturers lies not only in software standards, protocols and procedures, but in the very nature of their view of consumer culture which fluctuates between respect and contempt for the mentality of the marketplace. Acquiring highly specialised skills without technological flexibility and creative adaptability is of very limited value in such a volatile climate. An art education for this digital age which is not integrative and holistic is worthless. The aim of higher education must be to enable the individual to acquire values as much as skills, and these cannot be created, tested or absorbed in the short bursts of learning that modular structures demand. The only reliable continuity which is not space dependent is that which cyberspace provides.

However, instead of developmental, open-ended curricula we have a over-determined, complex modularity for which more and more managers are required, thereby limiting the number of artists who can be hired to teach. While computers are now academically ubiquitous, connectivity is universally constrained the student may get on a computer but she won't necessarily get online. Corporate accountancy with its insistent bottom line has replaced personal accountability with its higher aspirations. Consequently anaesthetics, the dumbing of the culture, has replaced aesthetics, just at the point when our understanding of the complexity of life beneath the surface of things is replacing the old simplistic paradigm of appearance, and as the collaborative construction of emergent systems is replacing the solipsism of personal expression. The reactionary response is a kind of arts-and-crafts revival in the digital domain, accompanied by a weak kind of William Morris 'social concern' and the idealisation of the computer artisan. So much art in this domain is pure craft, no more than nominally interactive, indifferent to the mind or spirit, devoid often of any kind of creative thought at all. It is only when art education is returned to artists, poets, and visionaries, particularly those in dialogue with science and technology, that new generations of students can be expected to be helped. Then, many questions arise. How can the skills and insights of one group of practitioners be shared, questioned or absorbed by another group? Can we talk about learning communities rather than academic classes? Is Web space the only place left to go? Do the new forms of artistic practice and collaborative creativity in cyberspace require new protocols and new criteria? Is education for art in the Net radically discontinuous from past pedagogies? Do existing academic disciplines, departments, faculties and divisions make sense in our world? Finally a choice has to be made between two quite separate and distinct communities: those who wish to dissect, analyse, describe and control what is though to be the given immutable reality, and those who wish to seed, construct and cultivate new realities. The former will be quite content to continue to inhabit and dominate the old, fixed academic institutions, but the latter demand new forms, new organisms, new hyperstructures of learning.

The answer, it seems to me, lies in trying to develop a planetary discourse using worldwide networks to engender a renaissance of creativity and inquiry. But how far with the amplified intelligence of the Net do universities want to go, or are they capable of going? It is only by building new associative structures in interspace, between the virtual and the real, that we can take on board the questions of collaborative consciousness and artificial life which lie at the root of our cultural concerns as we approach the millennium. I believe it is time to set about constructing, site by site and node by node, a 'planetary collegium' - which would engage all our resources of mediated imagination and mind-on-line. But whereas institutional change is usually created top down, and biological change takes place from the bottom up, noetic change is an emergent property of mind, at once cognitive, moral and spiritual, requiring a global determination to realise our extended human potential.

(C) Roy Ascott 1996

Janice Cheddie & Roshini Kempadoo (.uk) BEYOND THE DIGITAL DIASPORA

Introductions: Roshini Kempadoo is an image maker and part time lecturer in Photography at Napier University, Edinburgh, Scotland. Roshini Kempadoo has moved from working primarily with still photography and now works with digital technology on photo installations and web based projects.

Keith Piper is a multi media artist who started his visual arts practice as a painter. Keith Piper has subsequently moved into traditional mixed media onto video art and now works with CD-ROM interactive and web based projects.

Derek Richards is a musician/performer ,sound designer and theorist with experience in theatre, popular music and film currently working as a multi media artist and producer on a range of projects.

I am Janice Cheddie chair.

Together we make-up an organisation entitled 'Displaced Data'. 'Displaced Data' is an evolving association of artists and writers of colour working with digital technology The association aims to encourage and foster debate concerning issues of cultural diversity, cultural democracy and digital technology and to encourage to the use and development of digital technology by artists of colour.

The panel is an attempt to examine and reclaim the concept of a 'digital diaspora', which is not only a name of an organisation, of which we were all former members of. Bur rather the concept of a 'digital diaspora' is a concept which recognises the concept of 'diaspora' as signifying historical relationships of slavery, indenture, colonialism, migration, exile and economic immigration A concept which underlies notions of physical and cultural displacement.

Within the concept of digital technology this concept emerges as a way of examining and articulating these experiences. But more importantly how we conceptualise notions of place, position and subjectivity as a series of processes, positionings and allegiances.

A concept which draws upon Black Art practice in Britain (Black Art as defined as art by artists of African, Asian and Caribbean descent) which stressed ways of examining notions of identity as being the product of non-linear, inter-textual and multiple sources

Within the concept of a digital diaspora artists of colour in Britain are using digital technology as a way of exploring the on-going concerns of this cultural practice. Rather than coming to digital technology for what it can do, these artists have sought to use digital technology as a creative medium.

Within this framework the idea of a digital diaspora is one which refuses the idea of the Internet or digital technology as returning or re-unifying peoples who live or experience diaspora. Rather, the digital diaspora can be seen as one which takes as its starting point the making and re-making of critical ways of thinking about one's place in the world as a series of multiple and complex starting points.

A starting point for this discussion is Paul Miller 's (aka DJ Spooky) statement " I am you, you are me with language we are three "

END.

Roshini Kempadoo

Image Producer and part-time lecturer in Photography and Digital Imaging at Napier University, Scotland.

'BEYOND THE DIGITAL DIASPORA' 'ANXIOUS REPETITION'

Work to illustrate the talk given can be seen at: http://omnibus-eye.rtvf.nwu.edu/homestead/

Summary:

This contribution touches on the issue of stereotyping and replication of 'real' situations and structures to that of media space/cyberspace and network communications. It is to note and examine the replication of economic/political/ social structures in digital development and the use of stereotypical icons we see increasingly being used.

Like other contemporary practitioners - I come from a particular specific art form practice - in this instance - Photography. For the last four years I have intermittently explored and developed different ways of working using digital technology, and computer networks to produce, exhibit and more recently distribute my work. My work until now has been concerned with digital outputs, getting the work off the monitor to stand as photographic images. Like many photographers, this has been a vital step to make - since photography (like graphic design with the advent of desktop publishing systems) is undergoing a fundamental change through the development of the digital image and electronic equipment. Like many practitioners of colour, the shift to using this method and process was logical to the development of my practice and approach. Fundamentally, my work is and has always been about the individual and collective status of people of colour about the reworking of notions of identity, race and the mapping of histories culturally, physical and spiritually By its nature the work is about the black Diaspora. It is a visual experience reflecting the sense of migration, movement, connectivity and displacement in its appearance, format and content.

The work entitled 'Sweetness and Light', is a piece produced for the project 'La Finca/the Homestead' curated by Paul Hertz for the Internet in April 1996. The work has been produced solely for the internet and does not exist in any other format or space. In retrospect, the work has a level of technical restriction that I would expect having produced such a piece for the first time - and yet I feel it contributes adequately and innovatively in content to what is out there. The piece is an analogy of the structures of colonialism and the development of media/cyberspace'. It looks at the parallel aspects in structure, act and motive; the replication of hierarchies and power bases, physical and psychological dominance and a clear strategy of economic and cultural gain. It starts with a quote by Aime Cesaire from the book 'Discourse on Colonialism' 1955.

> 'the essential thing here . here is to answer clearly the innocent first question: what fundamentally is colonisation ? ... agree on what it is not: neither evangelisation, not a philanthropic enterprise, nor a desire to push back the frontiers of ignorance, disease and tyranny... nor an attempt to extend the rule of law . the decisive actors here are the adventurer and the pirate, the wholesale grocer and the ship owner, the gold digger and the merchant, appetite and force..'

Out of the myriad of issues for discussion some of which have been discussed at this conference, I would like to touch on the issue of stereotyping and replication of 'real' situations and structures to that of media space/ cyberspace and network communications. I mean the replication of economic/political/social structures in digital development and the use of stereotypical icons we see. I don't want to question why this is happening, why there is a mimicking reciprocal process at play, between existing structures and ideologies - it is often obvious, but to note and examine it.

The financial/social and political structures of communication networks and digital developments are the same continued unequal system. The metropolitan 'developed' countries primarily of the West, having the money, power and therefore access and control of its development - perhaps with the exception of Japanese and other Asian technological development as Toshiya Ueno demonstrated in his presentation yesterday. The added dimension to this media/cyberspace development is that it is constructed as a 'new territory' a new uncharted space seeming to trigger all the predictable colonialist forms of behaviour and attitudes - 'appetite and force'. Lets be clear about the issues of access. There is absolutely no interest in selling electronic commodities at the price the worlds' poor can afford, nor is there likely to be In fact transforming information into a saleable good, available only to those who are able to afford it, changes the goal of information access from an egalitarian to a privileged status. There perhaps goes ability to adopt the concept where the 'community is more fundamental than individuality' Sean Cubitt referred to.

'Sweetness and Light' is quite an overt visual/written state-

ment making clear some of the parallel issues between colonial expansion and development of media/ cyberspace (The title has historical references- sugar plantations associated with the Caribbean and notions of enlightenment. It also comes from the term ' all sweetness and light' a Caribbean term referring to someone being angelic, as good as ever but with an ulterior motive.) The visual material is montages of photographs of British landscape - vistas and detail, anthropological imagery and references to the 'grey box' - computer hardware. I site the material within quotes from historical publications written about plantation systems. It can be argued that it is politically essential to look at and analyse media networks/cyberspace in this way - looking at the structures, process and institutions. While this is necessary however, it can never fully explain or makes clear how power relations are embedded and sustained it doesn't fully explain the consistent stereotypical forms of representations emerging in the vast amount of information flow, or the nature of the work we see. In other words the ideological framework being instigated

I can't go into any great depth to show the complexities involved and the way in which people of colour are constructed within a social and psychological framework. A framework, a matrix of ideas in which the white beougois male is at the centre, the norm, unexplained whilst the identities of those seen as the Other constantly interrogated, investigated and monitored. Historically this came into focus during the time of rapid colonialist expansion and is part and parcel of a colonial discourse that frames all our histories.

Both Edward Said and Homi K. Bhabha see the construction of stereotypes in any form of representation as crucial to the imperialist project. Bhabha asserts that stereotyping as part of the colonial discourse is "a form of knowledge and identification that vacillates between what is already 'in place', already known and something that must anxiously be repeated." Further to this, Lola Young suggests that this vacillation is necessary and occurs because the discourse is attempting to fix and stabilise that which is not static. This attempt to fix that which is not static is precisely what practitioners of colour have been marshalling against. The insistence on producing work that kicks out, rejects, frees up historically fixed representations and notions. To remove and liberate the catedories we are described and prescribed into - representations of ourselves or communities of colour that weren't created by us and constructed out of the fears and anxieties of the dominant white male group.

This of course is not an easy process, since we all construct and create stereotypes as deep psychological functions to our direct experiences and our making sense of the world. Not least for photography as an practice has been instrumental in at least two ways in the construction and sustaining of stereotypes particularly during the expansionist period of the West, and being so closely associated with notions of 'truth' and 'reality'.

My own practice has always been to work precisely with those historical images produced - to re-present them using my own photography, to suggest a process of constant repositioning, changing, non-permanence. Digitally created work, the seamless nature of digital montage, the over layering processes possible, the 'sampling' approach that can be taken and increasingly the multiplicity of digital production is particularly valuable and absolutely vital to this way of working. What better way to exaggerate and free up that notion of categorisation and fixidity by producing something within a form that is in itself non-linear, non- permanent the Internet ? Here we have a development that encompasses the ability to converse, to interact, to mediate - and not be historically bound up or subjected to a monologue, fixed and permanent ideas or experience. Or is it ? Roy Ascott said of Art and the Internet, 'Art is no longer seen as a linear affair dealing in harmony completion, resolution, closure - a composed and ordered finality. Instead it is open-ended, even fugitive, fleeting, tentative, virtual Forming rather than formed, it celebrates process, embodies system, embraces chaos.' Roy Ascott: Connectivity Art and Interactive Communications. Leonardo 1991. A mechanism to produce distribute and exhibit work developing in a very different way - notions familiar to people of the Black diaspora. And similar to diasporic notions, it is a space that is full of contradictions. A space full of anxieties and tensions which are not unfamiliar in experience. Yet like any new emerging issue, it has not developed in isolation or in a vacuum. It is important to debate and be aware of the context digital development arises from.

It is fair to say that the conceptualisation (although still in the making) of cyberspace has its origins in 'fiction', primarily science fiction - constantly looking forward with little references to the past. Those who have read sci-fi and other related media formats (we have seen in the examples of Japanese Animation given) will know that the image given to that fictional space of the future is not particularly positive In fact it is generally a dystopian view of the future although now counteracted largely by the positive commercial viewpoint With this rather 'flimsy and light- weight' reference point in conceptualising media space comes a kind of literal translation in the form of icons, symbols etc. on the screen or monitor. A translation of the mass of data doing things behind the scenes. Sci-fi characters, games, stories, comic strip figures, popular Hollywood heroes and heroines have created iconography that have an investment in a literal almost simple translation with the ability for instant recognition. The iconography we see on the computer has inherited this aspect generally things look as they are: the good guy or heroine squeaky clean, the bad person looks bad, large databases look large, corporations look powerful. The exception of this of course is when the process and concept of deception as a deliberate ploy is used. The graphics interface enables the translation of symbols to quick immediate recognition (creation of stereotypes and easily readable icons) to ease the way in which you make sense and navigate your way around the information.

Julian Stallabrass suggests ' the transparency of meaning in cyberspace, the absolute match between concept and appearance is a utopian feature which stands in marked contrast to the real world of meaningless detail and redundant matter'. The contradictions arise and get greater - especially for practitioners who may be addressing issues that often need to go beyond the 'playful' literal associations digital projects are increasingly being aligned to. How does a practitioner successfully produce work that moves beyond the powerful links between concept and appearance, of stereotypical icons and sc-fi dystopia? These are some of the issue I am attempting to address and Light'. Work that I feel vacillates between the 'real world of meaningless detail' and ' the transparency of meaning in cyberspace'..

c. Roshini Kempadoo - September 1996

*Diaspora = Dispersion, used collectively for the dispersed Jews after the Babylonian captivity, and also in the apostolic age for the Jews living outside of Palestine, now, for the Jews of Israel: a similar dispersion or migration of other peoples or communities.

ELECTRONIC SPACE & PUBLIC SPACE: MUSEUMS, GALLERIES AND DIGITAL MEDIA

Panel members: Annick Bureaud, Steven Bode, Mike Leggett (Chair), Jill Scott

Introduction. Mike Leggett With respect to the theme of the Festival, we need to look away from 'virtual' spaces for this session and return to some 'real' spaces in which, to quote Roy Ascott, ours is "an art which is emergent from a multiplicity of interactions in electronic spaces."

Now there is a certain irony in quoting Roy in the context of this Panel because in the 20 years I've admired his work he has of course been the champion, and has almost defined "telematic culture". or art on the wire - Homo Telematicus and the connectivist manifesto.

A multiplicity of interactions in electronic space can of course be encountered in the three dimensional space of a public gallery as well as the private space of "computus domesticus". Indeed the actual presence of people along with the virtual presence of those on-line could constitute a chance for divergent forms from within the emergence that Roy proposes.

This Panel session will focus on the institutional forms that need to be developed in order that the widest possible multiplicity of interactions can occur in electronic space in the most public way, for others to experience, in particular tax-payers and sponsors. We will discuss the practice of gallery and museum spaces providing access to, and information about art, and extending their function to a dynamic educational role that will ameliorate, or reduce, the tendency which divides the information rich from the experiential poor. To accelerate the movement away from an attitude revealed in this quote from a young fogey Sydney-based arts commentator who said: "Peering at a monitor is an impoverished aesthetic experience."

Organisations concerned with exhibition practice will need to: - mediate between the artist and the consumer to engage with these political issues; - address the logistical problems associated with the exhibition of 'the artwork of the electronic spaces';- and anticipate the other issues that will emerge because of the complexity of negotiations involving so many people and interests - this is not just a metter of dumping a few files on a Web server!

I draw your attention to the related Panel session on Friday morning, Between Exhibition & Network. In the abstract for that session reference is made to: "Long standing relationships between the artists and their audience, the curatorial process, and entrenched cultural institutions, neither apply to, nor nurture the development of contemporary art-making as it increasingly occursin this radically reconfigured terrain." The session this morning will avoid this kind of conjecture and focus on some experience and evidence about what some of the exhibitional institutions are doing in an effort to reflect contemporary art practice. I should add that my background is as an artist working with film, video and photography, and now interactive multimedia. Part of my practice has always been in exhibition and curation - I was a founding member of the London Film-makers Co-operative Workshop, the first cultural institution to integrate the production, distribution and exhibition of artists' film.

Before we start I should also make at least two corrections to what is printed in the Abstracts: - The title of this session is not correct. - In the second paragraph, when it says the

exhibition "contributed greatly to our appreciation of the dynamics of the development of the new medium" refers to the Museum of Contemporary Art in Sydney and not the cosmic'our'.- And the Web address now should be: www.mca.com.au

Museum of Contemporary Art CD-ROM Exhibition 1996: Mike Leggett "I have raised the issue of the dynamic educative role of public galleries and museums because this was, fundementally, my own motivation for researching and then developing the exhibition Burning the Interface<International Artists CD-ROM> which took place in Sydney between March and July of this year. * Presentation about the mounting of this exhibition, with slides and videotape. Points covered: Research, Motivation; Sponsorship 1; Definition and Planning; Sponsorship 2; Design; Marketing strategies; Preparation and Installation; Media; Merchandising; Educational strategies; Market Research. New Exhibition Practice in Australia: Phase 2 of MCA; Exhibition and curation agencies - Experimenta in Melbourne, and SIN Sydney Intermedia Network; Co-operative Multimedia Centres - Ngapardji in Adelaide; Access Australia in Sydney; Starlit and another in Brisbane; Melbourne and Perth.

Zuntrum fur Kunst und Medien (ZKM) Museum - Jill Scott Jill Scott is an Australian artist currently based in Germany and after working in the mediums of video and performance she began working with digital installations in the mid-80s and currently has the work Frontiers of Utopia in the exhibition that is part of V2 DEAF. She described in detail the plans for the 'hybrid' museum that is shortly to open at ZKM in Karlsruhe under the directorship of Hans Peter Schwartz using the Web site that describes the exhibit to illustrate her points. (http://www.zkm.de/departments/medienmuseum/main en.ht ml)

ASTN and CHAOS: Annick Bureaud Annick Bureuad is the President of Art Science Technology Network Inc (ASTN) which publishes FineArt Forum. She is the editor of the International Directory of Electronic Arts (IDEA) published by CHAOS. She spoke in relation to a consultancy she has recently completed for the French Ministry of Culture about the future for museums and their object-based structures, their architecture, the intellectual patterns of the staff. She raised the issue of 'cultural worth' in relation to the space available for creation, the narrativisation effect of art historical traditions. The novelty of technology in some contexts, for instance science museums, avoided content problems associated with time-based media. Artists' fees and commissions in this area needed urgent attention. Curatorial practices of themes and surveys needed to give account to the flexibility of forms that electronci media produced, which in itself raised problems of conservation for museum culture. Flexibility was the key for the future, along the lines of theatre possibly: Ars Electronica Centre may become a model. http://www-mitpress mit.edu/Leonardo/astn/whatis.html)

Film and Video Umbrella - Stephen Bode This London based organisation has been operating for nearly ten years and concentrates on researching and curating exhibits by British artists working with video and digital media. The presentation covered the logistics of running such an organisation and detailed a major exhibit held last year at the Natural History Museum in London. (http://kit.trdkunst.no/Projects/vabi.html)

BURNING THE INTERFACE<International Artists' CD-ROM> On-line info: http://www.mca.com.au

AESTHETIC AND COMPOSITIONAL ISSUES IN INTERACTIVE SYSTEMS

Richard Povall, Convenor

Present at the Round Table

Peter Coppin, Carnegia Mellon University, USA Todor Toddroff, Faculté Polytechnique de Mons, Belgium Martine Corompt, artist, Melbourne, Australia Jøran Rudi, Norwegian Network for Technology Acoustics and Music, Oslo, Norway Keith Brown, Manchester Metropolitan University, UK Martin Spanjaard, artist, Amsterdam, The Netherlands Niranjan Rajah, Universiti Malaysia Sarawak, Malaysia Richard Povall, Oberlin Conservatory of Music, USA Unknown1(U/K1), student from Utrecht Unknown2 (U/K2), artist from Denmark

This roundtable attempted to address formal and aesthetic issues arising from the making of interactive work. The following is a rough attempt to document the discussion, paraphrasing much of what was said (despite the appearance of a verbatim transcription.) I hope this style of documentation gives a more accurate feel for the roundtable which seemed a welcome opportunity to discuss an issue in some depth with a relatively small group of delegates

The panel convenor began by framing the discussion with a number of questions:

what exactly do we mean by the term "interactive"?
 what are the compositional/structural issues raised

by the notion of interactivity?

• how does interactive work affect our sense of structure — of the composed time domain?

• is it possible to deal with linear structures within an interactive framework?

 does interactive work have an aesthetic, or even a language of its own?

• what genuine role does the user/interactor play in the shaping of the actual material of the piece? or of the overall structure of the piece?

• how can we go further in developing a compositional or structural language for these new media?

how have interactive media affected notions of collaboration?

• just how much creative control should the artist give up to the user/interactor?

• are we interested in or willing to cede aesthetic content/structure to the user/interactor?

MS.talked about two notions or models of interactivity: i) the interactive object is like another human being — we have no idea how it will react, there is an element of unpredictability; and ii) the interactive object is like an instrument, which has a set of fixed expectations. The instrument, like any other, requires practice and familiarity to play well.

Most interactive pieces are like a crude version of ii).

RP:Is that because of intent, or is it more to do with the limitations of the tools available to most authors?

MS:Both. I build objects that try to use the human response model. My objects react not only to current stimuli, but to past events: they learn about past behaviour, and use that history when responding to current stimuli. In this way, the user should be able to understand the response of the object, but not necessarily predict it.

RP:Are the majority of artists not so interested in this humanresponse model because they want to keep a greater degree of control over the final outcome?

NR:Wanted to take a step back in questioning the meaning of the work interactive. In the late 80s I visited an exhibition by Yoko Ono at the Riverside Galleries in London. The piece consisted of a blank canvas with a number of paint pots and brushes in front of it. I watched many people take part in this "interactive painting", but felt unable to take part myself. Later, I felt I needed to make my own contribution, as an artist, and wrote, on the wall not the canvas, "why stop at the edge?" in tiny lettering. A couple of weeks later, visiting the gallery again, I noticed my words had been whitewashed over. The illusion of interactivity is something to watch out for — it's really parameters of control — this is an aesthetic issue.

U/K1:Difficult to hear on the tape, but made some comments about interactivity and the desirability of simple, straightforward interfaces.

MS:Then isn't television interactive? We push buttons and get pictures — not always sure what the content will be. If we don't like the result, we can move on, push another button.

RP:Perhaps a great number of CD-ROMs are nothing more than television — they are essentially navigable video.

MC:The act of creating the CD-ROM is often more interactive than the final product, which is often very limited. I don't know how to programme, beyond a little Lingo, so I'm at the mercy of the programmer.

RP.Are we interested in opening up the relationship between artist and interactor?

KB.In an ideal situation, we should be able to offer the interactor an infinite set of possibilities. This in turn creates a certain degree of responsibility for the interactor. At this point, medium, tool, and artwork begin to merge together. My ideal is the building of a four-dimensional physical environment that the interactor can explore freely.

RP.I was forced into decisions about new formal shapes when I started making interactive performances. I'm still taking responsibility for the final outcome, but am giving the performer a level of responsibility too.

KB:Is it then possible to make a qualitative judgement of the final outcome?

RP:Absolutely. The compositional issues are primarily to do with how well I design the environment, or, as I often prefer to think of it, the interactive instrument.

KB:The job of the arts educator is to give the student the parameters to be creative given the right tools. In creating interactive work, are we simply broadening this training/access beyond the narrow confines of the Art School?

Many interactive pieces are so limiting that you get bored very quickly — you feel they are simply a waste of time in fact. How do you open up the parameters to solve this problem?

MS:One way is to make so much material to choose from that it becomes impossible to hear/see everything on offer, another approach is to make an algorithmic environment in which the possible outcomes or instances are almost infinite. The real question to consider is how difficult these interfaces should be to operate, to work with, or to master.

KB:To some extent, then, the recipient becomes the creator, the artist?

MS It's possible to make an environment that gives so much back to the interactor that the experience is effortless and ple-asurable.

RP:So then, what is the role of the aesthetic — or, if you still prefer, what is aesthetic?

KB Aesthetic is the opposite of anaesthetic, which is the dulling of the senses, or the dulling of sensation — the aesthetic refines or heightens sensation.

RP How does that apply to what we're talking about here?

JR:This is extremely problematic. I saw a piece last night that allowed users to manipulate physical objects, or remote users to manipulate virtual objects via the internet, to control the soundscape we were listening to. So may users were able to take part that the end result was completely confusing — there was no understanding of how the interactivity worked. The piece was very unsuccesful. Very interactive, but unsuccesful.

MS:Aesthetic has a lot to do with the perception of beauty.

KB^No, not really beauty, but any sensation that can be qualitatively evaluated.

U/K2 The aesthetic of interactivity has nothing to do with beauty, but with experience. I have never experienced an interactive piece that was beautiful — in fact most of them were ugly.

RP:Does that necessarily have to be the case? Is it then impossible to make a "beautiful" interactive work?

MS.Does this have to do with how we receive work we don't understand? I often listen to contemporary classical music I have difficulty with, but with repeated listenings and over time I begin to find it beautiful. Aesthetic response can be conditioned by understanding.

KB Responses to an aesthetic experience also change with mood, environment.

MS:So when is something unaesthetic?

KB.That's an illogical concept.

RP So what's the role of aesthetic decision making within interactive environments? How do we deal with this while wrestling with the unique formal issues within interactive frameworks?

PC:A good composition is something that can be perceived as an interesting object at the end point by the viewer/user.

KB:lt could be said that succesful work of art includes all things that are relevant to it, and excludes everything that is irrelevant. Offering that for interactivity compromises that and will bring to it or take away from it what the author saw as necessary components.

RP:Isn't that the crux of this whole discussion?

NR:Some general discussion here about art vs.craft, the separation of art from realworld/ real life concernts, etc. Form and

beauty and the aesthetic of utility. Historically, fine art is designed for aesthetic contemplation.

Are we coming to a stage where "art" and "artist" are becoming irrelevant? Themore we produce things that don't look like "art", the more interactive they become, the more we move towards a rapprochement of art and life, or artist and producer/manufacturer.

MS.Doesn't this depend on your definition of art?

RP:...or your definition of "producer"?

KB:A work of craft is work with a known end; a work of art is a work with an unknown end — until it is finished.

NR:Before an interactive work can succeed, the notion of what we call "artist" must change.

KB.As a sculptor, I use CAD packages in ways they were never meant to be used — I subvert the programmer. In interactive work there's always a chance that the user will make unpredictable outcomes.

RP. There is an enormous difference between an artist subverting a tool, and an artist making a piece that is intended to be interacted with.

It's possible to make algorithmic interactive work with an infinite set of outcomes, but which still has the aesthetic stamp of the artist in each of those outcomes.

MC.I'm quite happy to make work with a very limited amount of possibilities. Especially in a gallery, it must be simple, very limited.

TT:The time required to master a work should be considered carefully in the design of its interactive interface. It's good to make work that is very coherent, with a limited number of choices.

NR:MC's 'Sorry" is an excellent gallery piece because it's so simple easy to use, straightforward, engaging.

PC:It's a great piece because it makes it so clear what an interactive computer piece is.

NR:You get the experience rather than you see the object. I think of the artist, not the object, when I see that work.

MS: You feel pleased by this piece because the response is immediate, straightforward.

RP.Can we then differentiate between work that is primarily for public exhibition and work for more extended use typically in the home? Are there particular formal or aesthetic decisions to be made in this regard?

TT:Complexity is the key. Work for extended use can be much more complex. In a gallery there is little time, people are afraid of being watched. The opposite is true with a CD-ROM

PC:Again, "Sorry" is a good example because it engages a person in space, in a direct physical way. It would be totally different as an internet piece, for example.

MC:Yes, it's designed for gallery use, not for the small screen. You couldn't use those large designs if it were for single user computer use.

RP:In some ways this is like a lot of video art which works well in a home environment, not in a theatrical setting — and

vice versa.

At this point, RP showed some work on ths computer, and some discussion ensued about the limitations of the authoring tools, and about the possibility of supporting "set pieces" within larger interactive frameworks. The overriding issues arising from the session seemed to be the essentially formal question aboutwhen and how the artist gives up control to the user

Cynthia Beth Rubin (University of Vermont) (.us)

BREAKING THE CODE: ART THAT DOES NOT STAND ON ITS OWN

Traditional wisdom has it that the successful art object should stand on its own, without the need for further explanation. Generations of art students have been taught if a work cannot be easily understood as a discrete object, it is poorly constructed. But the historical resistance to appended explanatory information is built on the assumption that the audience will have been initiated into the cultural codes of the artist, or more commonly, that they will operate with the same codes.

In today's multi-cultural world, this concept seems strangely naive. For years, artists have been taking their ideas from sources both personal and outside of mainstream culture, using references that could not be known to the average viewer. Furthermore, when the viewing audience is extended to those who may not have the same education or cultural experience as the traditional art viewing public, it is even more difficult to maintain that an art object should stand on its own.

Fortunately, we now have the World Wide Web. The introduction of the Web into the art world brings with it the potential to change the very way in which art is presented. The actual format of the Web is in opposition to the concept of the stand alone object, as it invites links from image to related textural information, to another image, to more information and so on. In fact, in viewing the WWW, the viewer's reaction to a nonlinked image is frequently that no matter how interesting the image, if it is not linked to something else it is BORING. No one likes a dead end on the Web.

And of course the 'World Wide' nature of the Web makes it imperative that artists go beyond the usual assumptions of a shared visual language, as the potential viewing audience is now everyone, everywhere. Even within the same country, the viewing audience on the Web may include those who never seriously looked at art before, as well as those who may not have felt comfortable in museums and galleries, but who find that the privacy of viewing on the Web makes the art world more accessible.

One of the important distinctions of the WWW as an environment for viewing art is that it allows the artist/performer/curator to place the work in a context. This provides the perfect opportunity to accustom viewers to the challenge of seeing art in the context in which it was created. The exchange on the Web can be opened in both directions: artists can be liberated from the cultural conventions that may have been imposed on their work in order to make it more acceptable to the established art world, and the viewing audience can be expanded to those who never had access to the cultural conventions in the first place

Thus the Web is becoming the alternative exhibition space of the 1990's Just as American artists in the 1970's and 1980's became frustrated with the exclusive nature of the gallery scene and organized alternative exhibition spaces under their own control, the Web is becoming the arena where art that might not otherwise be shown is readily available. While many artists are simply using the Web as just one more avenue for showing their work, many are realizing that at last they have a space where they potentially have complete control over the presentation of that work, apart from the obvious and (perhaps temporary) limitations of the scale of the screen

As Annette Weintraub noted in her presentation at SIGGRAPH 1996, art on the Web exists without boundaries. Museums and galleries post information on the wall, performers distribute program guides, and books include introductions, but seldom are these read with the same intensity as parallel information on the Web. This is because the information is presented in the same medium, in a sense in the same space, even in a presentation in which the viewer moves from image to text to a new site and back again. Presentation on the Web is uniquely fluid.

Many artists have made use of the Web for the development of "site-specific work", that is, Web pieces which could not exist outside of the Web. These are pieces in which very nature of the Web, including the linking possibilities and the advantages of presenting text and sound with the images are the basis of the piece.

But what about artists, as well as curators, who have turned to the Web as a way to show images that may have existed originally in other media? One would think that the lead in this area would come from those museums who have long provided supplementary information to their viewing audience Unfortunately, many museums continue to use the Web as just another way to present the same information. In the February, 1995 edition of 'Le Journal des Arts', a front page story summarizes the responses of curators from major museums to the emergence of new technology, including CD rom and Web presentation. Phillippe de Montebello of the Metropolitan Museum says "we are a museum, we are not in the business of being on the cutting-edge of technology. " He goes on to say "like many curators, I must admit that I am not attracted to multi-media, but without a doubt we must follow the trend, because if we do not control the content, then other will do it in our place".

If we cannot depend on museum curators, whose task it is to interpret art and place it in context, then where will we find innovative use of the Web as a vehicle for presenting art? Mr. de Montebello recognizes the fact that art presented within multi-media and Web contexts has the potential to speak of a different content, and yet he is not confident that this is the way to go. In fact, a quick look at the Web site for the Metropolitan Museum (http://www.metmuseum.org/) confirms this. We are given images of the front door of the museum, floor plans, and the organization of the collection. Only after passing through several layers of information that is relevant only to the traditional museum do we come to the images of the art itself, finally presented with information that adds to our understanding of works that were created in a different age, and thus are frequently in need of context. While the Louvre site (http://mistral.culture.fr/louvre/louvre.htm) is somewhat more interesting because it brings us to the images more quickly, it still does not show us something on the Web that is beyond what we would see in the Museum. The images are organized in the same collection mode as in the actual space.

If the curators cannot do it, what can artists who are not afraid of innovation do on the Web? And especially those artists who already work in electronic media, who certainly have already made the essential leap to understand that images are more than objects, and that paint and ink and other materials are just means to creating imagery. For, while the computer may never simulate paint, in the end, it is the communication of the imagery itself which carries much of the essential meaning.

The Web is still mixed in this regard. A quick search of artists' sites most commonly brings up scores of galleries that show prices for art, but do not place the art in context. Even seeing a large group of images created by the same artist gives the viewer an understanding of the hidden meanings, but this is as difficult to find as the images which include source materials and text. The Web first reflects the commercial sense of the current art world, and artists are sadly behind in recognizing that at last the power to present art as they would like is totally in their hands. To be sure, some artists have more access to Web sites than others, but even considering the large numbers of artists who do have access, the results are disappointing.

There are, however, some interesting sites which use the Web as an extension of the traditonal exhibition space without duplicating it. Philip Coman, a photographer, uses the juxtapositioning of image and text in his site

(http://www.interlog.com/~filphoto/page33.html) to move us past just images and explanatory information, into a space where the visual artist is able to communicate more of his own internal visions, simply by his organization of the site. Eric Morris , an artist in Sweden, uses his site (http://www.gallerys.se/room3.html) to give the viewer an overview of his work, which at first glance does not seem extradordinary. The global overview of his body of work however, with some explanatory information, gives us an appreciation of how serious this artist is, even if his particular painting style is more traditional.

Some sites have been created only to show the work of artists, and do so in a context that gives more than price information alone. One of these, Dotcomgallery (http://www.dotcomgallery.com/art/artists/index.html) shows works by a wide variety of computer artists, presenting more contextual information than one would normally find in an exhibition, and including a page layout that makes connections easy. The site that ArtNetWeb created for the CODE show last year at Ricco/Maresca in New York, (http://artnetweb.com/artnetweb/gallery/code/home.html) goes beyond attempting to simply replicate the exhibition itself. In the case of several of the CODE artists, the background information available on the Web was not as readily available at the exhibition itself. My own site (http://www.uvm.edu/~crubin/rubin_images.html) includes samples of the sources images which were the foundation of the images.

In brief, the time has come for artists to go beyond the idea of stand alone object. The Web has the potential to become the vehicle for habituating the viewing public to the idea that the stand alone precious art object must become a thing of the past. The ultimate alternative exhibition space has been given to us, and it is time to begin to utilize it to create a new open culture of viewing

1-'KÜNSTLICHE KUNST - ART AND AESTHE-TICS IN TIMES OF THE ARTIFICIAL'

organized by Martin Sperka E-mail: sperka@elf.stuba.sk

Associate Professor Slovak Technical University, Department of Information and Computer Technology, and Academy of Fine Arts and Design, Department of Visual Media Bratislava, Slovakia.

At the ISEA 95 there were two panels dealing with the "high end" of automation in Art - Artificial Life and Artificial Creativity (renamed to the Cosmic Art) Both panels opened discussion, which continued on Internet, especially concerning the paper of computer scientist Douglas Hofstadter, author of famous book Goedel, Escher, Bach

In his paper he dealt with music works (composed by computer program) which the audience could not recognize (without an explicit knowledge) whether they were created by computer or human composer. This can be considered as a parallel to the test proposed by Alan Turing and known in Artificial Intelligence (Al). The difference between analogy and original would be very difficult. But we can ask the question, how could we recognize it in case of human artists ? The resemblance (I do not mean primitive likeness or imitation) is the form of analogy and analogical reasoning is (according to many cognitive scientists) the key question of human intelligence.

Why should we create artificial art, when (as some art theoreticians think) "model is the tiresome alien, scientist without the blood and fantasy, tedious pedant, who does not understand unpredictability of art forms, their incalculability and secretness" [Ma94]. The question of sense, what should we model with machines is the crucial question of using new technology at all. It accompanies media since the time of Guttenberg (Why printing books, when the most of people can not read them ?). German art theoretician Wolfgang Welsh, at the conclusion of his lecture in Bratislava said "Media art undertakes to acquire a new visibility (Sichtbarkeit), on the contrary the traditional art attempts the side of the overlooked one. We should live in both worlds, but also in others, in everyday one, private, and maybe in the unknown worlds" [We95].

Another important question is what can be modeled with computers ? Introduction of computer networks with local data sources accessible from any part of the world means that machines have potential freedom in selection of information this is a big progress since the time when they were dependent on experts (who learned them what we - people wanted and needed). Machines can exploit huge archives of human knowledge. Autonomous agent, surfing in the global network, able to analyzing historical development and contemporary trends in art, is an analogy to the human artist who traveled in Italy in times of Renaissance or lived in Paris at the beginning of this century.

One objective at the ISEA95 panel was, that machine has no emotions. Marvin Minsky, expressed (at the dialogue with Otto Laske) [La92] that people gaze upon the emotions as deep and complicated. He consider the opposite. The fact that we can hardly understand the emotions is caused by the fact that in most cases they are simple, but they have a big power. Al and cognitive scientists chosen the wrong strategy, it means conception that they could solve easier problems, like understanding, memory, simple reasoning etc. at the beginning and the research of emotion problems postpone for the future. Minsky cites Siegmund Freud " People think that I work with emotions because they are serious and important subjects. On the contrary, what I really want to understand is routine reasoning But because of this task is so difficult and unbelievable complicated. I work with emotions - because they are much more simple*.

Emotions are one aspect of consciousness - the heart of creativity [Ki95] Therse topics as well as, historical view of the first experiments and theories in Artificial Art and formal aesthetics (by Max Bense and Abraham A. Moles examined 30 years ago), social computing, autonomous behavior and other themes will be discussed by the panelists: Frieder Nake (Information scientist, one of the pioneers of Computer Art, pupil of Max Bense), Peter Beyls (Music Composer and Theoretician), Gerd Doeben- Henisch (Philosopher and Cognitive Scientist) and Raymond Lauzzana (Editor- in- Chief of journal Languages of Design and co-founder of the Society for Computational Modeling of Creative Processes).

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2-"ARTIFICIAL CONSCIOUSNESS - WILL ART REPLACE THE ARTIST?"

Dr. Gerd Doeben-Henisch

email: doeb@inm.de http://www.inm.de/kip/kip.html

INM - Institut fuer Neue Medien Daimlerstr. 32 D-60314 Frankfurt

Background

The background of my talk is a philosophical research project at the Institute for New Media in Frankfurt (Germany). The project is called the Knowbotic Interface Project and its main target is the development of a formal philosophical theory of the str

uctures of human experience paralleled by a computer simulation based on this theory.

As an abbreviation I am calling this computer simulation an Artificial Consciousness [AC]. Other names used for this simulation are Knowbot or Semiotic Machine. The concept of an Artificial Consciousness is part of the more wider paradigm od Computer A

ided Philosophy [CAP] which has sharply to be distinguished from Artificial Intelligence [AI], from Software Agents, and from the Artificial Life [AL] paradigm. In what follows I want to communicate to you some philosophical reflections centered around

the

Why should we speak about AC?

Well, what are the reasons why we should speak about Artificial Consciousness in the context of this panel? Let me explain my point by considering some of the possible consequences which would be induced by the existence of an Artificial Consciousness.

The Artificial Consciousness as a concrete example of the artificial in general has the potential to destroy art in an intriguing way: (i) first it could substitute the artist as the originator of art-objects and art-events; (ii) then, second, for a pos sib

Loosing the specific Human Identity

Perhaps someone could think, that the un-recognizability of art would not pose a problem. I don't think so! In the contrary, it could pose a very serious problem to us. If the artificial would substitute the artist we would not have a problem with art a lone, but we would also have a problem with the specific identity of human persons. The human identity is triggered by the experiences which arouse mainly through bodily processes and through interactions with the surrounding world. If we would more and

mo

The Particularity of the human Nature - a Deception?

Of course one could doubt, whether the presupposition is true, that there really exists something which constitutes a specific human nature. There is a strong tradition in science and meanwhile also in philosophy- which is operating under the assumptio

n that it is possible to naturalize the human mind completely. This means for example that the consciousness of humans can adequately be described as an assemblage of emergent phenomena resulting from physiological processes only And because the human

phy

The biggest Challenge in History

Compared to the main traditions of philosophy, art, and religion in Europe, India, and Asia during the last 5000 years appears this mechanistic view of the human race as a big challenge; perhaps it is the biggest challenge in the history of ideas ever.

Clearly, the mechanistic approach in the research of nature and men has enabled lots of valuable insights into the functioning of the human body, especially also into the functioning of the neuronal system. But what prevents me to accept such an approac

h a

Consciousness revisited

Let me explain this a bit more. In the empirical sciences is an observer operating in an environment, where the question, what has to be counted as facts, has to be answered by the introduction of certain methods of measurement. It is a tacit convention that the ability of the observer to perceive and to interpret these perceptions lays outside of the scope of the scientific procedure. This ability is considered to be a kind of an invariant structure with regard to all possible measurements. If someone wants to investigate the structures which determines the manner how an observer is perceiving and interpreting, it is not enough to look from the outside of an observer onto his overt or covert behavior. Even the measurement of energy patterns in cell assemblies of the brain does not tell us anything about the way how an observer is experiencing reality from the inside of his neuronal h the target to explore the still repressed structures of the subjective human experience. We see this research not in opposition to the empirical research of the body and the brain, but as a necessary complementary strategy, which will in the future -hopefullyallow us to relate both perspectives, the subjective one and

the objective one, in a more explicit way than today.

Epilogue

In my opinion is this the only possible strategy to answer in the future the question whether humans are able to experience and to act in a human specific way which cannot be mimicked by any conceivable artificial structure. In this case would the artificial not be able to substitute an artist and therefore the artificial would not be able to replace art in all its characterizing aspects. But the real outcome of this scientific endeavor is open!. In this kind of future -without human persons- would art perhaps be understood as the mastery of a creative combinatorics and such an art could also become the main science of the future

Art was always Artificial

POSITION STATEMENT FOR PANEL KÜNSTLICHE KUNST - "ART AND AESTHETICS IN TIMES OF THE ARTIFICIAL"

Frieder Nake

University of Bremen, Germany

Artificial art künstliche Kunst^{*}, as it was called) was the selfcontradictory term coined by Max Bense in Stuttgart in 1965 at the ocassion of one of the first exhibitions of what later became known as computer art. The term was meant to distinguish, in words, art with the computer from that without, computer art, from non-computer art. The artificial has since then tremendously gained in strength, and reality sometimes gets replaced by virtuality. It may be worth the attempt to consider art and aesthetics under this aspect.

1. Art has always been artificial. And yet, mirrored by the machine, traditional art appears as if it was natural. Really, "artificial art" is, and should simply be understood as, machine art: art that gets created through a process marked by partial delegation of certain activities to a machine. Delegation by the artist, of some of his or her activity to some other actor, is nothing special or shocking. Virtually no artists produce their brushes and paints themselves. And Rubens or Vasarely, and many more, were managers of delegation as well as creative men.

2. Information aesthetics was the heroic attempt in the sixties by Max Bense and Abraham A. Moles and their disciples to use the mathematical concept of information as the guiding principle for an analysis of aesthetic processes, both analytic and generative. Although, on a very general level, some exciting insight into the nature of aesthetic processes was gained, the attempt failed miserably. Nothing really remained that would nowadays arouse any interest for other than historical reasons.

3. The failure of information aesthetics is due to its most fascinating starting point: the radical idea of an aesthetics of the object. All subjectivism was to be banned from aesthetics: Measure instead of value judgement, number instead of feeling, mathematics instead of psychology. An aesthetics of the object was supposed to produce methods of measuring the object such that a feature vector of quantitative and descriptive factors would replace the aesthetic object. It appears obvious, in retrospect, that this approach was bound to cripple as soon as the concept of an information, that was independent of the perceiver, crippled. Not many are left nowadays who still believe in such a concept. A radical aesthetics of the object is hard pressed when asked for the difference between aesthetics and physics of the object. This is so because there

is no aesthetics without value judgement, and there is no value judgement without human subject

4. Information aesthetics failed when it became clear that information was no objective measure, but rather a subjective construct. Yet information aesthetics was successful in introducing the aesthetic object as a "sign", i.e. as a semiotic entity. This great assumption has tremendously gained in importance. It has become the central idea of a different approach to aesthetics. Information aesthetics became a semiotic aesthetics. As such, the object as well as the subject are subsumed under the notion of sign "Sign" here, of course, refers to the fundamental concept of semiotics, as, e.g., in Peircean semiotics.

A semiotically grounded aesthetics not only opens to the discourse of postmodernism, it also links parts of aesthetics to informatics, which, in this view, turns out to be a technical semiotics. "sign" is central to informatics, it is central to aesthetics, and it is also central to postmodernism. Postmodernism is, of course, the times of enhanced artificiality.

5. Any formalistic approach to aesthetics is, of course, only capable of addressing the lower levels of aesthetics. In particular, if computers are to play a role in the game, whether analytically or generatively, only computable aspects of aesthetics can be addressed.

6. Treating any real process by computer pre-supposes three reductionistic steps: a semiotic transformation of things to signs, a syntactic transformation of signs to representamens (Peirce' concept), and an algorithmic transformation of representamens to computable structures

On the other hand, this very process of reductions opens up the field of aesthetic semioses for new algorithmic works, and thus for a new kind of aesthetic experience. The field of algorithmic semioses is still to be explored aesthetically, both on the analytical and generative levels. An aesthetics of algorithmic semioses is more likely to produce interesting results for sequences of objects than for individual objects. Its genuine realm is the small difference more than the grand gesture, the animated film sequence more than the great painting on the wall.

7. In a coarse simplification of computer art, we may identify two transformations that occupy the artists. The first type of transformation takes the world as it is given, and produces an aesthetic sign by abstraction. The second type of transformation takes the world as it is thought up, and produces an aesthetic sign by concretization. The first transformation takes our bodily experience of moving in time and space as its starting point. The second starts out from our experience of dreaming and thinking. The first type, the abstract one, is exemplified by Harold Cohen, the British in the West of America. The second type, the concrete one, is exemplified by Manfred Mohr, the German in the East of America

8. Virtuality is not the opposite of reality. It is part of reality! Virtual reality is the semiotic domain of reality. Actual reality is the corporeal domain of reality. We now encounter signs in the state of algorithmic semioses. This is a definitely new aspect of art, and of the sciences as well. It is the aspect that makes so many wonder. It is a fascinating, but grossly overrated, aspect. It is the cause of rather stupid speculation on the autonomy of the machine. For a normal human being it is wise to remain relaxed. We always tend to interpret the world by projecting our currently most beloved artifact onto it, and then to interpret the artifacts by projecting ourselves onto them I prefer to take the things, including myself, for what they are, and what I am.

WORLD, BODY, TIME AND SPACE

presentation by Maria N. Stukoff

Vanishing Presence Appropriating the virtual body

I must admit that I am very surprised to see you all here at this conference, present and in person. To be specific: Carrying your burdensome flesh all the way to this conference to be seen, heard and entertained. But it seems a little odd, if not perverse to attend this conference that is to evaluate and display a reality of Cyberspace and its surrounding applications, such as the Internet. Why are we not at home enjoying our own cooking and instead, connecting our brains into the computer matrix as it has been suggested at previous conferences. The truth of the matter is, that we are all still very much at home in our bodies, we like to show it off and collect a variety of feel good stimulation. The art of teleconferencing between international ports and exhibiting art work in virtual galleries still does not provide us with the same sense of experience as some may like to speculate upon.

Far too often it has been suggested that a physical body (I presume the Human Body is signified here) has no significance in this computer matrix only the mental body can travel along the wires. The body of flesh left outside while our "otherself" can travel the inner wonders of the computer space. Increasingly the old metaphor of the 'split body' exercise and announcements of transmuting and neo-evolutionary human beings are ambivalently adopted to describe a revolutionary evolution of Humans. A future of post human ethics and the neo human technocrats. And let me query at this point the assumption that we as Humans foster some infinity with technological appliances which propels the human evolutionary journey into the virtual domain?!

More often than not, the particular differences between real and imagined realities are fast becoming fantastic prophesies unsurpassed at this point by last years interactivity frenzy.

What I am trying to take hold off is that: In order to represent the human body as a different substance, like a more technologically suited form which has been undoubtedly expressed by many philosophical minds, then all aspects of an experience (such as the presence of a human body, the thought process, senses such as feeling & hearing as well as the computer hardware and constructed image) must all be present together to create an otherness, otherwise the differences between them can not be demonstrated.

How will you be able to re - invent yourself if you deny the self on which you are re-modelling yourself? You can not deny our instrumental need for physical motion to suddenly evoke only your inner liquids as the pure survivor of neo-human reconstruction

That human beings have a physical body, and a mental body which are independent of one another is something that I, as a performance artist find difficult to replica. Because fundamental to my work is my body and this is the underlying reason for my discussion. Without my body, my physical presence, I would not be able to perform my work and experiment with placing myself into a technologically created space. A space in which to experiment with movement and a projection of the body with technology

What is important: is my presence. My personal ability to experience and learn a space but still utilising technology in redefining my environments. I realise that this may sound too

personal for some but it is fundamental to my discussion. The debate, that the actual presence of the flesh of body (as in me talking to you in real time) is instrumental in exploring how we compose space and choose to move within it. Especially within a non-space. The research on the relationships and parameters between human movement and technological environments is simply a result from my own research working with a technological created environment.

As an artist working with my body I am naturally interested in the development of the body and its future. Allow me these few questions: What is actually meant when stating the BODY? When speaking about this body am I referring to the organic nature of my being (biologically speaking) or the identity, the exterior shield of my body which projects my being into the world? Do I have a body or am I body? What is the role and importance of the human body in relation to our developing techno-enhanced living environments? Are we now techo-sapiens rather than homo-sapiens? Have we developed into a new sensory human organism or merged into a technological icon, which no longer can be viewed under biological determinism and morality? It may be so.

If that is a true interpretation of events unfolding: the question of what kind of being might thrive in a world, in which nature, is becoming increasingly technocratic will need to be really understood as suggested by Paul Rabinow. The whole rhetoric surrounding the human/technological interface which has some of its roots implanted in cyborgian culture should be opened to new examinations and determined what it is that we are actually saying. Is this something we want to become? The answer will depend on how you view the inter-action between human and technology.

The Human is no longer visible by endless extensions and invasions of technological hardware. Why is there such an appetite to merge our bodies with technological gadgetry? Why do we need to motorise a vehicle, like a body in motion, that is naturally always in motion? The human spirit becomes submerged inside a hollow structure, reduced to a simple object, a tool. But on the other hand through the liberation of technological fairy floss human nature is elevated into a radical super - dooper - powered - shifting mirage in virtual space. To burst this bubble: The human mind is not like a god or a network of wires as a computer. The human mind is most like a chimpanzee to quote Edward Franklin

A humanly copied body in a virtual world is nothing more than a flat image. The urge in creating another self has been well examined and reversed in Psychiatric circles. Unfortunately such professionals do not seem to join us frequently at these art conferences to share in discussion their understanding and concerns about the pursuits of virtual selves and the killing of the living self. This phenomena in the killing of the self, has also been the central plot in many Hollywood new age Sci fi films such as Virtuosity and Ghost in the Machine. The Hollywood way to taste the matrix is to kill the self, the humanly body. "a serial killer in the Net...." But because of real time constraint of time for this panel I need to take this up another time.

Many artists and colleagues in this field, such as Simon Penny, have extensively written about representations of a virtual self and attitudes of the body in relation to virtual spaces. He talks about the customersation of the body, as a car, "where the external appearance can be adjusted to suit the taste of the owner." And goes on to pose questions about the cultural implications of inhabiting a virtual body. The importance of this critique is that Penny talks about the exterior, the skin, the outer architecture as the decisive instrument in the development of the body in a virtual space. The bodily human image re-newed and remodelled to be re-presented as Image in a virtual arena. The Marquis de Sade who would arguably support this in stating that, our humanly virtue is not taken, but only a mask in making the prostitution, seem more virtual than the actual surrender of the body.

But here the significance of inner and outer seem conflicting. Contrary to the alienation of the body apostles where the inside, the fluidity of humanity will shape your otherself, Penny talks about the exterior. The outer surface reflected as the image. He never questions or eliminates the humanly involvement in creating a fantasy self. Interpreting what exists outside ourselves is difficult enough. It involves a going beyond what is apparent to us, creating a meaningful context within which to place our imagination. Which ever way you bet your money one thing is however clear: Interpretations are never true or false.

The confusion surrounding an understanding of outer and inner paradigms has been thoroughly portrayed in Franz Kafka's novel "The Castle." The central figure in the book K is placed or submerged into a labyrinth, an environment with endless rooms, opening and closing doors, corridors, buildings, spaces that allow no escape than to be within them or held outside, not to be let in! An architectural framework not unlike the Internet suggesting a space of emptiness of no height, no depth, no oxygen. A non space. There is an extended experience of emptiness portrayed in "The Castle" and I believe that many virtual characters could complain of this symptom. They all suffer from emptiness, with no body of flesh, no soul or thought to their own. Their environment is too much of a constructed mechanical counterfeit of the real human experience.

K. himself never is able to see beyond himself and see the entire complexity of his situation. Like in the Moo or other forming typist groups and the Net: You log on, you are there on the screen talking, living, creating, but not present, not breathing. What is the colour of oxygen in Cyberspace? Cyberspace to a degree is like a black hole in space, attempting to absorb all. A conspiracy perhaps preceeded only by the clever intenetions by the Pied Piper from Hameln lurking the childen into his domain by suductive music. Yes ok, the web may not be created for physical insertions but do not be fooled: rather this non space is created to suck up the creative energies of our minds to do with it what it wants to later, once you have turned off the power. The blood flow sucked from us to feed the hunger of the machines. Once converted and absorbed.. the question of how are you?, will be surpassed by asking: Can you feel yourself today? .. No 1 don't. Sorry I forgot to turn on the power supply.

Finally, to finish my assault and move on with my scepticism: I wonder if we as artists and theorists etc.. still claim to be redesigning or re-focusing the intention of the usage of Military gadgetry which is primarily designed to destroy bodies in war activities? It seems that more and more we are almost too eager to give our body freely to the Big Daddy Machine to be wired up and controlled by future networks. At this point I would like to propose that instead of focusing on the technological advances which will benefit/effect the human evolutionary process, why not reverse the experience and focus on what effects humans have on the development of technological hardware?

Unless we are more critical and pay more attention to what is actually being suggested and focus on the development of the self and the de-formation of the self, in relation to technological advancements, we will only have succeeded in performing thoughtless, academic papers to foster our own independent ego, in which no moment of critique is even possible.

So if we are to live in a space of new ... what will be the



colour of oxygen?

Maria N. Stukoff

Footnotes:

1 Grassmuck, Volker. Helsinki, paper given at ISEA 1994

2 What is a Human Being, Olafson, Frederik A, Cambridge University Press1995

3 An adaptation of a quote by The Marque de Sade, Dr. Iwan Bloch. Castle Books NY, p 109

4 Art & Cyberculture Media Information Australia, Aug 1993, Penny, Simon Virtual Body Building

5 An adaptation of a quote by: The Marque de Sade, Dr. Iwan Bloch, Castle Books NY, p 91
Index

Alcala, José R. 137 Apple, Michael W. 74 Ascott, Roy 33,60,61,145,147 Barglow, Raymond 11 Barth, John 41,42 Bense, Max 154 Bielicky, Michael 101 Boccioni, Umberto 25 Cage, John 44 Callesen, Jfrgen 67 Castigilia, Clilly 79 Chardin, Teilhard de 34 Cheddie, Janice 145 Chomsky, Noam 17 Coleridge, Samuel 46 Courchesne, Luc 41 Cubitt, Sean 17 Davies, Char 32 Díaz, Lily 69 Douglas, Stan 40 Ende, Gerrit v.d. 28 Foucault, Michel 12,13 Gibson, William 33,77 Gigliotti, Carol 73 Gingrich, Newt 74 Gluck, Louise 49 Gold, Rich 21 Goldberg, Athomas 79 Grundmann, Heidi 101 Halaby, Samia A. 24 Hall, Lane 102 Hill, Gary 44,48 Hitchcock, Alfred 43 Hoberman, Perry 23 Huybers, Pieter 28 Jones, Matthew 103 Kafka, Franz 156 Kant, Emmanuel 11,17, Kempadoo, Roshini 145 Khan, Pervaiz 20 King, Mike 31 Klee, Paul 25 Kluszczynski, Richard W. 36 Law, John 76 LeBlanc, Michael 105 Leggett, Mike 148 Liao, Sabrina 79 Lipsey, Roger 31,32 Locke, John 12 London, Barbara 40 Lord, Roberta 46 Lowengard, Henry 107 Lunenfeld, Peter 108 Martino, Jacquelyn A. 110 McDowell, David 77 McLuhan, Marshall 58 Minsky, Marvin 152 Miranda, Eduardo Rick 49 Mohr, Manfred 27,154 Moline, Lisa 102 Mul, Jos de 11 Musafar, Fakir 32 Muzhwsky, Vladimir 138 Naoko, Tosa 126 Nauman, Bruce 42 O'Grady Elizabeth 139 Oast, Jon van 55 Paik, Nam June 41,45

Parsons, David 48 Penny, Simon 61,155 Penrose, Roger 34 Perlin, Ken 79 Pinker, Steven 17 Pollock, lan 112 Poster, Mark 12 Poyall, Richard 149 Rajah, Nirjan 116 Rappoport, Sonya 114 Rheingold, Howard 14 Rieser, Martin 117 Rimington, Andrew Wallace 24 Roberts, Oral 47 Rogala, Miroslaw 59 Rooy, Felix de 20 Rubin, Cynthia Beth 151 Ryohei, Nakatsu 126 Search, Patricia 122 Shanken, Edward A. 57 Silk, Janet 112 Simpson, OJ 40 Singer, Eric 79 Sperka, Martin 152 Stastny, Ed 55 Stelarc 16,32 Stenger, Nicole 14 Stukoff, Maria N. 155 Terry, Brett 91 Tipler, Frank 33.34 Ueno, Toshiya 94 Verostko, Roman 26,27 Waesche, Niko 131 Walker, James Faure 129 Weinbren, Grahame 40 Weisbeck, Markus 131 Wennekes, Léon 133 Whitney, John 27 Wollensack, Andrea 105 Wortzel, Adrianne 96