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CONTENTS

INTRODUCTION

EDITORIAL

< New Media Arts, Technology and Education @ MAAP Singapore
2004, by Hock Soon Seah and Kim Machan >

FEATURES

< New Forms for 21st Century Conceptualism, by Dew Harrison >

< Virtual Campus - It is Fun and Educational, by Alexei Sourin,
Konstantin Levinski and Qi Liu >

< Astral Travel in Virtual Realms: Evaluating Conceptual
Understanding in Digital Reconstructions of Past Cultures, by
Erik Malcolm Champion >

< In Between Institution and Market - the Role of Media Art and
Infrastructure in the Era of Post-Regional Integration, by
Andrew H. K. Lam and Andy Tam T. K. >

< Digital Speculations, by Bharat Dave >

< Idensity®, by Elizabeth Sikiaridi and Frans Vogelaar >

ONE FROM THE VAULT: FROM THE LEA ARCHIVES

< Molten Media and the Infiltration of the Law, by Curtis E.A.
Karnow >

LEONARDO REVIEWS

< After Adorno: Rethinking Music Sociology, reviewed by David
Beer >

< The Transparent Body: A Cultural Analysis of Medical Imaging,
reviewed by Jan Baetens >

< Liminal Lives: Imagining the Human at the Frontiers of
Bioscience, reviewed by Eugene Thacker >

LEONARDO JOURNAL

< Contents and Abstracts: *Leonardo* Vol. 38, No. 4 >

ISAST NEWS

< *Leonardo* Editorial Office Moves to San Francisco Art
Institute >

< Brainstorming for *Leonardo's* 40th Anniversary >

< Leonardo@SIGGRAPH Town Hall Meeting >

< The Pacific Rim New Media Summit: A Pre-Symposium to ISEA2006 >

< PRNMS Working Group On Organizations/Symposia-Pacific Rim
Residencies >

BYTES

< CFP - Leonardo Music Journal 16 (2006) >

< CFP - Leonardo Abstracts Service >

< CFP - Digital '05: "EXQUISITE" >

< Jacques Mandelbrojt at the 17th Earagail Arts Festival,
Donegal, Ireland >

OBITUARY

< Inspired by the stars and earth: Joan Brassil, Artist,
teacher, mentor 1919-2005 >

INTRODUCTION

LEA's June - July double issue, guest edited by Dr Hock Soon Seah and Kim Machan, sees yet another special edition, this time about New Media Arts, Technology and Education. This reviewed international conference was organized as part of the Multimedia Art Asia Pacific Festival 2004 held in Singapore.

One From the Vault, the monthly dose of things past, looks at Curtis E. A. Karnow's Molten Media and the Infiltration of the Law, a piece which first appeared in June 1995.

For Leonardo Reviews, Michael Punt's selections include those of new panel member David Beer, with his reflections on Tia

DeNora's book, **After Adorno: Rethinking Music Sociology**. Also featured is **The Transparent Body: A Cultural Analysis of Medical Imaging**, reviewed by Jan Baetens, another of the newer members who has already made a significant contribution to this project. Eugene Thacker's review of **Liminal Lives: Imagining the Human at the Frontiers of Bioscience** completes this section.

In ISAST news, read about **Leonardo's** move to a new home, brainstorm with them for their upcoming 40th anniversary, and find out about the latest Leonardo@SIGGRAPH Town Hall Meeting in August. Also, keep updated with our series on **The Pacific Rim New Media Summit: A Pre-Symposium to ISEA2006**, where another working group chair shares the group's scope and objectives.

Bytes features two vastly different calls for papers/artwork that will surely be of interest to many. Also, find out more about current exhibitions by Jacques Mandelbrojt at the 17 Earagail Arts Festival in Donegal, Ireland.

Lastly, Jill Sykes mourns the passing of Australian Joan Brassil, 85, who was an artist of unique character and singular talents.

EDITORIAL

NEW MEDIA ARTS, TECHNOLOGY AND EDUCATION @ MAAP SINGAPORE 2004
by Hock Soon Seah and Kim Machan

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KEYWORDS

Multimedia Art Asia Pacific (MAAP) 2004, GRAVITY, 'MAAP in Singapore', New Media Arts, Technology And Education

ABSTRACT

Leonardo Electronic Almanac June - July 2005 (Vol 13, No 6-7) presents an eclectic mix of papers selected from the New Media Arts, Technology and Education 2004 conference. Held as part of

'MAAP in Singapore', the conference had seven strands, "Media Culture", "Southeast Asian Forum", "Artist Forum: The Gravity of Sound and Distance", "New Media Education in Singapore", "Connections", "Technical Art" and "Society and New Media".

In October 2004, Multimedia Art Asia Pacific (MAAP) [1], organized 'MAAP in Singapore' adopting as its theme, *GRAVITY* - the gravity of real and virtual space, social gravity, and the gravity of ideas referenced and linked the weightless code of digital media to the conceptual weight of art history in a concentrated examination of New Media Art.

A key Festival component was the international conference; 'New Media Arts, Technology and Education' [2] with Professor Trebor Scholz (State University of New York) and Professor José L. Encarnação (INI-GraphicsNet Foundation, Germany) delivering keynote addresses on "New Media Arts Education and its Discontent" [2] and "Computer Graphics Technologies for Art, Cultural Heritage and Edutainment" [2] respectively.

From the conference's seven strands, "Media Culture", "Southeast Asian Forum", "Artist Forum: The Gravity of Sound and Distance", "New Media Education in Singapore", "Connections", "Technical Art" and "Society and New Media", we offer an eclectic mix of papers selected for their fresh perspectives and contribution(s) to the Festival's theme.

In our first essay, Dew Harrison questions the teaching of digital media theory to new practitioners where it is understood as deriving from lens and screen-based media. It examines other routes through 20th century art history to current practice in digital art and determines the validity of Marcel Duchamp as influential on contemporary practice generally, and on Conceptual Art specifically.

In *Virtual Campus - It is Fun and Educational*, Alexei Sourin, with Konstantin Levinski and Qi Liu share with us the "great multimedia place for electronic education and fun, research and games, meeting new friends, and immersion in campus life" that is, a virtual model of Nanyang Technological University, and how it "teaches students how 3D shapes and their colors can be easily defined with parametric and implicit functions."

Erik Malcolm Champion's piece then deals with astral travel in virtual realms, where he evaluates conceptual understanding in digital reconstructions of past cultures. His paper discusses the case study of an ancient Mayan site, Palenque, to suggest ways of creating a platform conducive to cultural learning using virtual environment technology.

Next, a joint effort by Andrew H. K. Lam and Andy Tam T. K. explores how the conditions of media art have changed radically over the past few years. Their paper aims to project a vision in the relationship between the institution and the market, within the framework of the role of media art and infrastructure across the Asian continent.

In *Digital Speculations*, Bharat Dave describes selected projects that served as vehicles for critical investigation of interactive digital media and their potential for exploring different ways in which experiences can be imagined, constructed, and communicated.

Finally, Elizabeth Sikiaridi and Frans Vogelaar share their work, *Idensity®*, which develops scenarios for an interplay of the urban space and the media domain.

The Festival was supported by the Singapore National Arts Council, The Australia Council, Arts Queensland: with seventeen funding partners; seven galleries including The Singapore Art Museum; live broadband events between Singapore and Brisbane; and participation in global public artworks.

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1. MAAP (Multimedia Art Asia Pacific) is an organization and festival that explores New Media Art across a range of art forms and practices emphasizing interactive multimedia, Internet, digital media, animation and projects integrating new media. MAAP was established to bring focus to the "unmapped" cultural new media content emerging from Australia and the Asia Pacific regions and is now an Asia Pacific touring new media arts festival and web site resource, partnering with key organizations in our region. MAAP's inaugural festival in 1998 was based in Brisbane and Online and continued till 2001 when it extended its commitment to regional partnerships. MAAP stepped offshore to Beijing in 2002 and after the resounding success of 'MAAP in Beijing'; the festival was held in October 2004 in Singapore. For more information: <http://www.maap.org.au>

2. 'New Media Arts, Technology and Education' - International refereed conference jointly organized by the Nanyang Technological University's School of Art, Design and Media and the School of Computer Engineering in cooperation with the SIGGRAPH Singapore Chapter and the Southeast Asian Computer Graphics Society (SEAGRAPH). For information, abstracts and program: <http://www.ntu.edu.sg/sce/maap2004/>

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DR HOCK SOON SEAH is the Dean and an Associate Professor of the School of Computer Engineering at Nanyang Technological University, Singapore. He serves in the Editorial Boards of Computer & Graphics Journal published by Elsevier and the International Journal of IT published by the Singapore Computer Society. Seah is the Founding President of ACM SIGGRAPH Singapore and the South East Asian Computer Graphics Society (SEAGRAPH). He is also the Leader of Digital Media Virtual Grid Community under the Singapore National Grid Office. He was general co-chair for the International Conference on Cyberworld in December 2003 as well as the Multimedia Art Asia Pacific (MAAP) Conference on New Media Art, Technology and Education in October 2004. He holds a Bachelor degree in Electrical Engineering, a Master's degree in Computing and a Ph.D degree in Computer Graphics.

KIM MACHAN has worked in the area of contemporary art, nationally and internationally, for the past 18 years as curator, arts producer and consultant.

She pioneered art projects in free to air television broadcast

as producer and curator of *Art Rage: Artworks for Television* commissioning over 70 artists productions 1995-2000. She has spoken at numerous conferences and Chaired Online Art in Asia at the World Wide Web Conference, Hong Kong.

Machan is a founding member and Festival Director of MAAAP (Multimedia Art Asia Pacific) since 1998 and has researched new media art networks and projects in Australia and Asia Pacific regions over the past seven years. In 2002 she was Contributing Curator, *Media City Seoul* and Chief Curator *MAAP in Beijing*. Other major exhibitions included *Gravity* at the Singapore Art Museum as part of *MAAP in Singapore* 2004. Machan is currently a Ph.D candidate at QUT Brisbane in the area of New Media Art in Asia.

FEATURES

NEW FORMS FOR 21ST CENTURY CONCEPTUALISM

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KEYWORDS

Conceptual art, digital art, Duchamp, hypermedia technology, non-linearity, large glass

ABSTRACT

This paper questions the teaching of digital media theory to new practitioners where it is understood as deriving from lens and screen-based media. It examines other routes through 20th century art history to current practice in digital art and determines the validity of Marcel Duchamp as influential on contemporary practice generally, and on Conceptual Art specifically. A case is made for the merging of computer-mediated and Conceptual Art and compounded in the work *StarGlass*, the transposition of Duchamp's thoughts and ideas into a hypermedia art system. The piece was shown during the presentation of the paper at MAAAP 2004.

In the West, the economically privileged side of the North/South divide, we have a technocratic society where 21st century culture is digitally based and lives are largely computer-mediated. Artists here play with the materials and content of our culture and will cross territories in order to do this, to make the invisible visible and open our eyes and ears to what's going on around us. In this high-tech culture they can engage with unorthodox media, tools and ideas, they can use computers and new technologies to explore areas within and

around art practice and cultural theory.

This has not been an easy transition, from the Modernist specificity of orthodox art material to the Postmodern techno-scientific inquiry and there are a number of art history trails available to follow. Charlie Gere, a Digital Art historian, gives a convincing argument for current new media art practice as an outcome of our present Digital Culture, (2002) [1] which, in turn, has emerged from a synthesis of art, technology and science, the Cybernetic era of influential discourses including Information Theory, General Systems Theory, Molecular Biology, Artificial Intelligence and Structuralism. According to Gere, art practice reflecting these concerns began exploring questions of networking, telecommunications, information, and the use of generative techniques. By the mid-to-late 1960s artists were incorporating technical electronic objects in their work and beginning to employ video and computers as new media. In her book **Digital Art**, Christiane Paul (2003) suggests that contemporary artists are using new materials, as ever, to engage with established art concerns, in that there are currently old concepts being explored within new artistic practices using emerging digital technologies, she states that "Some of the concepts explored in Digital Art date back almost a century, and many others have been previously addressed in various 'traditional' arts" [2].

Art history books concerning art for the 21st century now, necessarily, include sections on digital and sci-art, in **art tomorrow**, Edward Lucie-Smith (2002) understands technology as linked to an enhanced representation in art, which therefore centres on video and, to a lesser extent, on digital still photography. Although he does determine a direct link between sci-art and Conceptual Art when he asserts that "The diagrams made by scientists in order to explain their ideas can be seen, and indeed have been seen, as direct forerunners of Conceptual Art" [3]. Margot Lovejoy (1990) [4] in her contribution to an **Art Journal** issue on computer art also makes a strong case for the importance of photography as the basis for the use of electronic media in art practice. Lev Manovich (2001) looks at any new digital media practice through the theory and history of the still and moving image "I draw upon the histories of art, photography, video, telecommunication, design, and, last but not least, the key cultural form of the 20th century - cinema" [5]. However, other theorists and practitioners relate connections between art and technology through an investment in Conceptual Art and refer to Marcel Duchamp as seminal in this approach.

It is generally accepted that a direct line can be established between current art practice and the ideas of Duchamp, whether new technologies are involved or not. Michael Rush (1999) in his book on new media practice asks, "What branch of contemporary art, for example, would not claim Marcel Duchamp as a predecessor?" [6]. Frank Popper (1993) [7] in his search for the roots of Electronic Art identifies seven different sources from which contemporary technological art has drawn its inspiration: Photography and Cinematography; Land Art; Light + Kinetic Art; Cybernetic Art; Installation Art; Performance; and Conceptual Art. All of which can call upon Duchamp as an initiator to some extent. In her search for an art-historical context for Internet Art, Rachel Greene (2004) states the "Many net artists feel a strong connection to the work of French artist Marcel Duchamp (1887-1968)" [8]. Joseph Kosuth (1969) [9] sited Duchamp as a historical pivot between the Modern and the post-modern condition releasing art from its physical embodiment with his

'Readymade', which led to a re-questioning of what 'art' might be. Its essential nature therefore became conceptual and pertinent in the critique of Modernism that followed.

This view is upheld but questioned when in relation to computer-art by Manovich who speaks of a distinction between 'Duchamp-land' and 'Turing-land'. Duchamp-land being the established art world and Turing-land being exemplified by ISEA, Ars Electronica and SIGGRAPH. Manovich asserts that the convergence of these two worlds will never happen where they have different agendas, with Turing-land being oriented towards state-of-the-art computer technology rather than content. He states that even though "Duchamp-land has finally discovered computers and begun to use them with its usual irony and sophistication" it will not accept practice from Turing-land, for it is only ever concerned with 'art' and not with "research into new aesthetic possibilities of new media" [10]. As Mark Rothko (1968) argued "Pictures must be miraculous... for anyone experiencing [them] later, a revelation" [11], Turing-land stops at the miraculous.

It is the 'discovery of computers' in Duchamp-land that is the concern of this paper. Although Duchamp is seen as impactive on so many aspects of 21st century art practice, and in particular for computer-mediated practice, it is his influence on Conceptual Art that is of significance here. My proposition is that computers are most efficiently engaged in contemporary practice through a symbiotic relationship with conceptualism and that this is most apparent where both computer-mediated art and Conceptual Art have been influenced by the work and ideas of Duchamp. This view is supported by Edward Shanken (2004) [12] who suggests a convergence of Art-and-Technology and Conceptual Art where both engage in discourse on indexing, information, and data storage and retrieval as witnessed in the early work of Art & Language and in the 'Software' exhibition 1970 curated by Jack Burnham (a known Duchampian).

The aptitude for the use of computers in Conceptual Art practice was initially voiced by Christine Tamblyn (1990) [13] in an article for *Art Journal*, where she stated that computers were designed to augment mental processes as opposed to being visual or manual aids. This understanding is in line with my own research and practice where I see both conceptual art and hypermedia dealing with the semantic association of ideas and thoughts in one interconnected narrative or artwork. Hypermedia being an evolving conception to facilitate the augmentation of human mental activity by emulating organic memory systems. My doctoral thesis (1998) [14] expounds this view and investigates conceptual art through Art & Language projects and Duchampian ideas supporting practice where the computer enables connected multimedia items in a manner which mimics human thought and memory retrieval. My work continues along this premise and the piece *Star Glass* is an exploration of the ideas of the forerunner of contemporary Conceptual Art, Duchamp, in that it transcodes the 'Large Glass' into a hypermedia art system.

STARGLASS

Duchamp is the 'star', the StarGlass his constellation, the StarGlass is a navigable star-chart of the 4D space of electronic memory in 2D form. The memory is the hypermedia database of the 'Large Glass' itself.

The hypermedia network - StarGlass - is not to be limited to the connectivity defined by the creator, but must enable the viewer to organise the exploration of the subject (Durham's Glass) in a way that makes the most sense to them.

This is not an electronic book, or document, or encyclopaedia emulation; there are no text and buttons in discrete blocks, no 'back', 'forward', 'next', 'quit'. It is night, we are asleep and dreaming, we can indulge in the free-association of thought, we are guided by the stars and the night sky.

Every star in the night sky is a node, all of Duchamp is in the Glass, the StarGlass is made of star-nodes, the nodes are all of Duchamp - notes, quotes, readymades, paintings/sketches, preliminary models for his Glass elements, initial ideas for the Glass, music...

The StarGlass is a game-like piece, playful, intriguing, talking to the individual, to you. The Glass is concerned with interpretation with the formulation of 'meaning' derived from the connection of thoughts and ideas into whole concepts. Hypermedia allows for the linkage of interrelated, multi-media ideas into a semantic network, a conceptual art work. It is the perfect vehicle for the contemporary version of Duchamp's work, which has much to offer to art practitioners in the new millennium, it is the thought-net for a new consciousness.

What factors influence our own understandings of concepts, our own connections of associated items from which we extract meanings? Are we influenced by our environment? Not just our cultural and social environment, but also our physical, material environment. Are we single elements linked into a global network, part of a solar network, a universal network? Does the association of planets at our moment of birth define our position in the life network, dictate aspects of our personality, affect our understandings of the life-net, our consciousness, colour our choices and shape our interpretations.

To find meaning in Duchamp's Glass, the StarGlass allows you as viewer to select your own birth star sign of nodes and see what meanings arise from this combination of astrological determinings.

StarGlass was created with the understanding that a way forward for contemporary art practice is through the merging of Conceptual Art and hypermedia technology. While showing this work it is prudent to explain, in linear narrative form, its reason for being as a non-linear art system. The linear narrative exists, as distinct from the non-sequential narrative, only in the telling. Stories are told orally in short strands of linear recital, segmented and juxtapositioned for improved telling by subsequent narrators. This is an essential process if we are to continually engage and delight the listener but where simultaneous events take place, how can they be told in linear form?

In oral storytelling the teller determines the linear sequence of events, in a hypermedia system, the reader/viewer (listener) takes this action. Hypermedia enables the viewer to connect short strands of information in ways which make sense and give meaning to the whole work be it a text story or a multimedia art piece. StarGlass is a hypermedia art system, it has no beginning, middle or end in the formal linear narrative sense, instead it has an interface, the navigation of the system itself

and the option to 'quit' whenever. Much the same as viewing a painting or the Large Glass itself, except that this Glass holds all Duchamp's ideas, texts, images plus the enlightening material from the boxes - as it was intended to be. The interactive, non-directive method of engagement with StarGlass makes the viewer work and think, it is neither a passive nor easy task making sense of Duchamp.

Hypertext has developed in parallel with Conceptual Art, they are both concerned with the linkage of associated ideas into concepts, with the structuring of text items into meaningful associations. Where hypertext has developed into hypermedia and the connectivity of multimedia items by semantic association, Conceptual Art has moved beyond discourse to incorporate materials other than language. Contemporary art with a conceptual base now incorporates cultural imagery and social narrative resulting in works of great complexity. Hypermedia is designed to manage complex systems in a web-like structure of interrelated items with electronic memory mirroring human memory. Arguably, the most complex piece of art to date has been Duchamp's 'Large Glass' entitled *La Mariée mise à nu par ses célibataires, même* or *The Bride stripped bare by her bachelors, even*. This piece, together with its accompanying 'Green Box' of notes and later work *Étant Données*, is generally regarded to be both the culmination and the summation of his work, occupying his thoughts between 1912-1923 when he abandoned it as finally unfinished leaving us with a seemingly unfathomable puzzle.

The Large Glass together with the boxes completes a corpus of non-linear, semantically associated ideas ripe for transposing into hypermedia. The Large Glass is the encasement of a plethora of non-sequentially inter-connected ideas and the transposition of these into a new media enables new readings of his work. When seen as a whole entity his work is riddled with cross-references and complex meanings generating different interpretations through its blatant ambiguity. The Large Glass and its semantic key, the Green Box, of 93 documents, sketches, calculations and notes together contain a wealth of association links proffering the conjunction of images and text ideal for hypermedia. The 'white box', "a l'infinitif", mostly refers to his thoughts on the fourth dimension. Duchamp's work can be taken as a richly endowed semantic network, which continues to inform contemporary conceptual artists.

The Large Glass was originally constructed in the form we know early last century, this glass encasement of connected ideas was the nearest Duchamp could get to his goal. The technology was not sophisticated enough at that time to support his interest in the 4th dimension. He wanted to portray his Bride in the 4th dimension and began with painterly abstractions of the figure culminating in the flatness of glass as a material nearing the state of no thickness or 'inframince' and therefore acting as a signifier to the 4th dimension. He replaced traditional (thick) paint and canvas as tools for picture making and renounced painting, declaring his Large Glass to be "a three-dimensional physical medium in a fourth dimensional perspective" [15]. From Duchamp's notes it would seem that his interest in the 4th dimension was not aligned to the, then contemporary, 'relativity theory' proposed by Einstein but to the idea that the 4th dimension could be understood through geometry progressing from the n-dimension and aligned to the mathematics of Poincaré.

A single point has no (n) dimensions, two points define a line

and have one dimension, two lines create a plane and have two dimensions, two planes create a volume or a three dimensional space or object, so what do two volumes create? Duchamp suggested that they should create a fourth dimensional space or object. Western art has been traditionally concerned with 2D representations of 3D spaces, Duchamp considered that if 2D images could stand for a world of 3D objects it would follow that 3D objects could represent things in a 4D world. He conceived the Bride as a 3D representation of a 4D being, as a "two-dimensional representation of a three-dimensional bride who herself would be the projection of a four-dimensional bride in the three-dimensional world" [16]. Painters are 2D artists working on a flat plane, sculptors are 3D artists working with material objects in real space and now, in the 21st century, we have digital artists working in the 4D of cyberspace concerned with the virtual space/object incorporating time.

As artists, technology is part of our everyday existence whether we take a utopian or dystopian view on this, our view may be the content of our practice, as also may be the interrogation of the medium we choose to use. We may follow a very Modernist practice of specificity, in this case new media for 4D art, and we may then uphold the autonomy of art through our engagement with new technologies and scientific advances. We have to contend with the issues inherent in new media of connectivity, narrativity, navigation, time, virtual/real space, non-linearity... but also to deal with those current art issues of content, meaning, presence, identity, gender, personality, place, performativity, context, object...and to re-question the meaning and function of art itself in this technocratic age of 21st century capitalism and culture. Altogether a very Techno-Conceptual practice of which StarGlass is a prime example.

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16. See [15].

AUTHOR BIOGRAPHY

Dew Harrison (BA Fine Art, MA, MSc, Ph.D [CAiiA]) is a Research Fellow at Gray's School of Art for the Robert Gordon University, Scotland, where her research concerns digital and computer mediated art practice. Prior to this she has lectured in interactive art, multimedia and new media theory and was the research fellow for the two yr AHRB funded project **Digital Art Curation & Practice: Aesthetics, Participation & Diversity** based at the University of the West of England. Her own practice concerns the territory where contemporary conceptual art engages with new media and presents non-linear narrative and the semantic association of thought and idea in multimedia form. Her work has been shown in the UK and abroad in Ireland, Spain, Finland, Thailand, Singapore, America and Australia.

She curates international online exhibitions such as the **Net_Working** show with the Watershed Media Centre, Bristol and works as a Director of PVA. MediaLab, an artist-led organisation which initiates and supports good practice in new media art, now renowned for its **Labculture Ltd** Residency Programme. Her papers have been published and presented at conferences as diverse as Art History, Museology and Consciousness Studies, and she continues to lecture, mentor artists and supervise Ph.D students in the field of computer-mediated art.

VIRTUAL CAMPUS - IT IS FUN AND EDUCATIONAL

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KEYWORDS

VRML, shared virtual worlds, electronic education, shape modeling, computer art

ABSTRACT

Virtual Campus is a shared virtual model of Nanyang Technological University. It is a great multimedia place for electronic education and fun, research and games, meeting new friends, and immersion in campus life. It can be accessed from any Internet connected computer running MS Windows. In this place you can be anything: choose a fancy look, or turn yourself into a sports car, spooky creature, insect, or sparkling cloud. Visitors may wander around or fly, go to offices or student hostels, attend electronic lectures, or just chat with other visitors or robots. One of the places of the Virtual Campus is Collaborative Shape Modeling Hands-On Experience. Being a part of the computer graphics course, it teaches students how 3D shapes and their colors can be easily defined with parametric and implicit functions.

VIRTUAL CAMPUS OF NTU

Virtual Campus of NTU is a shared virtual world built with Virtual Reality Modeling Language (VRML) [1] and blaxxun contact communication platform [2] . It is a virtual model of the real campus of Nanyang Technological University [3] . It is also a great multi-media space for cyber-education. The whole Virtual Campus (Figure 1) including VRML models of the land, buildings, interiors, avatars and textures images is stored in only about 15 Mb of files and can be accessed from any Internet-connected personal computer [4] . In this cyberspace, visitors can turn themselves into virtually anything. Some choose to look like fancy-dressed people, some turn themselves into sports cars, and some appear as sparkling clouds or fire-balls.

Many visitors to the Virtual Campus are computer graphics students, who either play virtual "hide-and-seeK" with their professor, or come to study concepts of virtual reality and shape modeling. There are also strangers from around the world meeting together on this hospitable land. Local students easily navigate the familiar 3D environment, go to their favorite places, or meet with friends in their hostel rooms. Foreign guests usually just wander around and chat, astonished by the size of what is probably the biggest shared cyberspace of this kind.

There are dusks and dawns in this cyberspace, which follow Singapore time, but the Virtual Campus never sleeps. Many bots (robots) populate it. These are avatars of students and professors who walk back and forth between lecture theatres, libraries, and student hostels. There are also birds hovering in the sky and cars moving on the roads.

The bots are programmed to behave realistically for the visitors. Some of these activities are stochastic, and some

follow the real class time-tables. The first bot, which the visitors meet, will greet them immediately upon arrival and invite them to chat with him. This bot is an avatar of one of the project students who contributed a lot to the Virtual Campus. The "brain" of this bot is developed using AIML language and ALICE files [5], and computer graphics terms from [6]. There are also a few other bots wandering around. They are also "clones" of the former project students. In fact, each of the project students has a personal avatar copy in the Virtual Campus.

Virtual Campus is not only for walking through and seeing other avatars or bots. The visitors can talk to them. Blaxxun Contact provides the communication platform for it. It also allows for text-to-voice synthesis so that the visitors can hear your computer-simulated voice as well as voices of other visitors. These chats may involve all the visitors or can be organized into private chat groups.

Virtual Campus is a place for research on crowd simulation and shared cyberspaces. Its content changes frequently. You can come across an avatar, which is in fact a bot, and it will take time before you understand it. Sometimes it may be a real person disguised as a bot to test human reaction on some avatar activities to be programmed.

CYBER-LEARNING ON THE VIRTUAL CAMPUS

Electronic education is one of the priority directions at NTU. The University's e-learning platform edveNTure is based on the BlackBoard software and several other companion software tools [7]. It is widely used by the NTU professors to enhance their lectures and achieve personal mentoring of the students. Since its introduction in 2001, edveNTure has developed from a rather exotic way of publishing lecture materials and occasional visits by the students to the present time when it has become a necessary and very important part of each course with hundreds of visits each day. Besides teaching materials such as lecture notes, slides, streaming audio/video presentations, and extra materials, it can be used for setting up on-line quizzes, discussion groups, and uploading assignments. However, edveNTure rather gives a "two-dimensional look" of the teaching process being based on html web pages. In contrast and in addition to it, on the Virtual Campus NTU professors are able to meet with their students in virtual 3D classrooms, "see" and communicate with each other, and so add more immersion and fun to education. Besides that, distant overseas students get a feeling of really being on the campus. Many features available in edveNTure are also available on the Virtual Campus. Thus, some of the virtual lecture theatres and other places are linked to streaming multimedia presentations of current and pre-recorded lectures and events.

Of course Virtual Campus is a learning tool for computer graphics students illustrating to them theoretical concepts of virtual reality, real time rendering and shape modeling. It is used during lectures, as well as after classes for consultations. One of the student assignments is *Implicit Fantasies*, which is to design sophisticated shapes using implicit functions and to make them available in their virtual homes in the Virtual Campus.

COLLABORATIVE SHAPE MODELING HANDS-ON EXPERIENCE

Another cyber-learning activity on the Virtual Campus is the

Collaborative Shape Modeling Hands-On Experience. This is a part of the curriculum for the students taking the "Computer Graphics and Application" course. The virtual laboratory where this hands-on shape modeling experience is running can be entered either from the lobby of the School of Computer Engineering of the Virtual Campus or by a direct link.

Before going there, the visitors have to install a small software plug-in. This plug-in is an extension of VRML, which allows for defining geometric shapes with analytical formulas. By "formulas" we understand analytical definitions with *parametric*, *implicit* [8], and explicit [9] functions. All these formulas are functions of three coordinates, which are either parametric or Cartesian coordinates of 3D shapes. These different representations are usually not used together in computer graphics. With our plug-in, they can be used concurrently for defining geometry and appearance of shapes.

The shape's geometry can be defined by some geometric shape and its geometric texture, each defined by analytical functions. The appearance of the shape can be defined by either function-defined or fixed colors. Similarly to the shape's geometry, parametric, implicit or explicit functions can be used for defining the shape's color on its surface and inside it. This approach helps the students to easier understand the concepts of function based shape modeling. Also, the synergy of using the three different types of functions results in the advance quality and efficient solutions, which are impossible to achieve when these representations are used on their own. The theoretical foundations and further details of this approach can be found in [10-11], as well as in the project web pages [12-13] .

After the plug-in is installed, besides the regular VRML objects, function-defined shapes will become visible as well. There will be one big shape hovering in the middle of the room, as well as a few smaller fancy shapes displayed in different parts of the room (FIGURE 2). The big shape is the one that the visitors can interactively modify. The smaller function-defined shapes are examples of the best works created in the previous sessions. The function-defined shapes can be placed to other part of the Virtual Campus, e.g. to the virtual shopping mall where the visitors can get them for their virtual homes.

Several visitors may discuss the design in the chat box, type individual shape modeling commands, command scripts, or provide links to their off-line designs, and immediately see how the shape changes accordingly. The VRML description of the shape being modeled can be displayed at any time and this shared among the visitors.

Besides this method of manual editing analytical formulas with an immediate visual feedback, more complex function-based shape modeling can be done with the interactive shape modeling program developed for this project. The screenshot of the modeling session with this tool is shown in FIGURE 3. The program offers an advanced set of interactive operations such as cutting, sculpting, embossing, engraving, and carving. It also allows for interactive painting both on the surface and inside the object. The colors become an integral part of the function-based model of the shape. As a result, the program allows for making realistically looking shapes, which are defined with very small function-defined models while can be rendered with any desired precision.

The initial basic shape for modeling can be either defined analytically, or created interactively with simple basic shapes. The initial shape is then gradually modified by applying different interactive shape modeling and painting operations. The result of the modeling can be either saved in the proprietary function-based data format or in the function-based VRML code for further use in the Collaborative Shape Modeling Hands-On Experience or in other shared virtual worlds.

Besides this cyber-learning application, function-based model extensions are used for making parts of other shared VRML worlds, with or without interactive features. The same formulae can be re-used with little modification for defining the geometries, the 3D textures, the transform operations and the appearances. The examples of this can be seen at the project's web page [12]. Since each shape is in fact defined by only several analytical formulae, these formulae can easily be edited and exchanged when building shared virtual worlds.

NEW FRONTIERS

The construction of the Virtual Campus never ends, just as it never ends on the real campus of NTU, which keeps expanding, renovating and upgrading constantly. Since the size of the model cannot be increased above a certain level currently acceptable for web visualization, Virtual Campus is expanding non-linearly. It is in fact a meta-cyberworld now, which consists of many smaller "parallel" shared cyberworlds. Each university school and student hall of residence has its own model and respective communication space. When you enter or leave these worlds, it looks like you are still in the same virtual environment, however these smaller worlds are different cyberspaces, which may be even physically located on different servers.

Function-based web visualization is another way of expanding the Virtual Campus. Many large VRML models, which require a big number of polygons, will be replaced with compact function-based models where shapes and their appearances are defined with small parametric and implicit formulae.

* IMAGES ACCOMPANYING THIS ARTICLE CAN BE SEEN AT THE LEA WEBSITE: <<http://lea.mit.edu>>

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ASTRAL TRAVEL IN VIRTUAL REALMS: EVALUATING CONCEPTUAL UNDERSTANDING IN DIGITAL RECONSTRUCTIONS OF PAST CULTURES

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ABSTRACT

Attempts to provide for the intangible goals and benefits of real world travel has seldom been addressed or discussed in virtual environment research. This paper discusses the case study of an ancient Mayan site, Palenque, to suggest ways of creating a platform conducive to cultural learning using virtual environment technology.

Figure 1: Case study Travel Environment: A Mayan Village ('Milpas')

INTRODUCTION

Why develop virtual environments? Although they have their critics, especially for online learning [1], it can be argued that Virtual Environments have been used successfully for distance learning, for simulation, entertainment, medicine and education [2] .

Marsh Wright and Smith [3] define four general types of Virtual Reality environments (VR): work-related; informative; education and training; and entertainment. Extrapolating from this and Schroeder [4], virtual environments appear useful for the following:

- By promoting technology for the sake of technology (product showcases). Various examples are on the websites of Shout3d, Pulse3d, Adobe Atmosphere, Wild Tangent, Blaxxun, MindAxel, etc.
- Through enhancing motor-coordination and related physical skill, especially in games. Some of the best examples of Macromedia's Director Studio 8.5 are the three-dimensional shooter games.
- By synergising learning through the use of various multimedia, for example, Alias Wavefront's Maya has been used to create models of the human heart in action, as well as show how to service a car's engine.
- By preserving cultural artefacts via a three or even four-dimensional record of history. For example, UNESCO's World Heritage Site and the Virtual Heritage Society's site.
- In presenting ideas objects or techniques difficult to perceive or conceive of in real-world form, or in conventional media. This can range from Japanese timber construction details to electric waves transmitted through the human brain or even the formation of stars.
- By extending the perceptual experience or perceptual boundaries of observers. Various environmental art 'happenings' have been around for decades. A multimedia cinema was proposed as early as the 1950s.
- And by engendering social discussion in multi-user chat worlds like Activeworlds, Outerworlds, Vnet, Cybertown, Blaxxun

communities, iCity, and Galaxy Worlds.

Hence, if successful examples exist, why continue to research at a conceptual level rather than gradually improve on successful existing case studies? I suggest that one potentially profitable and useful purpose regularly overlooked is also the one that appears to be catered for at as a rudimentary requirement of virtual environments. That is, virtual travel.

LIVING IN REALITY REQUIRES MORE THAN A COMPASS

There are many research papers on the issues of virtual navigation, orientation, and wayfinding. There are also many websites that purport to offer virtual travel or virtual tourism. However, what they offer are generally static or moving pictures of foreign places, set music clips, information on timetables and prices, or at most, 360 degree panoramic images that are interactive insofar as one can spin the camera around, and zoom in and out of the panorama.

Orientation and wayfinding are important functional elements of travel information, but they are not the important components of travel experience. To enrich and encourage our understanding of a certain place, we need to gain a conceptual understanding of which elements (people, activities, events and objects) make it a significant and unique place. Only when tourists are intrigued by the prospect of travelling in and to a place (the 'travel experience') are they then interested in 'travel information'.

BEING NOT-THERE

A sense of being engaged with different local cultural perspectives is not always possible as a real-time tourist. Further, sometimes we wish to understand people who live far away or in distant times, not easily accessible to us. Virtual heritage monuments are now being overrun, the Lonely Planet guide of South America actually suggests that tourists do NOT visit Machu Picchu. Many ruins are bereft of their artefacts, which sit forlornly in the museums of past colonial powers. In that respect, Internet media may prove more immersive, useful and educational than actually standing at site where history once took place.

In this interpretative sense it may in fact be even more educational, as it can rely on asynchronous multimodal data. Virtual travel can also help lessen the impact of tourist erosion, the cost and fear of travelling, and help reach and educate the growing potential market of people who for whatever reason cannot leave the house.

Digitally mediated technology can attempt to reproduce existing data (archaeological impressions, extant ruins, the original condition of found artefacts, even typical weather patterns) but they can also make more or less accessible and more or less contextual (i.e., augment, filter, constrain or optimise) the user-experience. Virtual travel may not be like "being there"; it may offer more, "being Not-there". That is, it provides us with a portal into what could have been, not what still is.

The capability for integration of the real and the conjectural as well as synchronous and asynchronous data into conceptual user-specific information suggests that virtual environments may augment extends and "ground" (i.e. geographically and historically orient and contextualise) real-world travel and

tourism experiences rather than merely emulate them.

"...researchers and commentators have not yet begun to grapple with the question: What does it actually mean to describe something as *virtually* real? It is my contention that until they do the unique potential VR has to change the way we approach, study and think about the physical world will not be fully exploited." [5].

In augmenting real-world travel, successful virtual travel and heritage environments should then attempt to augment or extend reality. Through following contextual engagement rather than realism, they can allow people to travel across time and space in a way not possible in current reality in order to view what used to be there as opposed to what remains. One can experience first-hand important historical events as they relate to artefacts peoples and places as well as the full dramatic range of climate and topography not often possible to short-term visitors.

Unfortunately there is a shortage of research integrating theory and practice on how best to augment or invoke the user-experience of place via digital media. Concentrating on achieving photo-realism rather than understanding the unique capabilities for digital media to enrich the user-experience, means there are significant contextual questions still to be answered [6]. For example, we currently have little evidence as to whether virtual travel environments can afford useful and unique ways for augmenting and evoking awareness and understanding of distant places and foreign cultures.

Hence the need to evaluate the learning experiences possible through virtual environments, through their ability to augment narrative, conjecture, computer generated objects, real-time dynamic data, and user-based feedback; and not just through their ability to reproduce elements of the real-world.

Perhaps virtual representations cannot compete with actually visiting the site, but the point is surely whether such projects have a valid purpose and fit an important need, not whether they mirror reality. In fact, if we wish to understand how ancient people thought, believed and acted, we need a non-realistic world to understand them and their beliefs. They saw and imagined and related to things in a way a Westerner will not understand by merely travelling to the current remains of their past abode. In this sense virtual reality can augment rather than compete with reality.

POTENTIAL SOLUTION

I believe that certain criticisms of the technology and use of virtual environments have been indirectly addressed by entertainment software design [7]. Perhaps applying mechanisms used in games (social agents, maps, dynamic environments, levels of interaction constraint, and task-based artefactual use) to virtual environments will lead to increased engagement. Modifying game-style interaction to suit the virtual reconstruction of a cultural site may also allow for a more culturally immersive learning environment.

However the above proposal raises serious problems in designing virtual environments that in some way depict the values of past cultures or exotic places.

1. Place versus Cyberspace: What creates a sensation of place (as a cultural site) in a virtual environment in contradistinction to a sensation of a virtual environment as a collection of objects and spaces?

2. Cultural Presence versus Social Presence and Presence: Which factors help immerse people spatially and thematically into a cultural learning experience? Virtual Presence has been defined as 'being-there'. Is Presence in a Virtual Heritage Environment a sense of being 'there' or being 'somewhere other than here'? Do we even fully understand what 'being' means in this context?

3. Realism versus Interpretation: Does an attempt to perfect fidelity to sources and to realism improve or hinder the cultural learning experience?

4. Education versus Entertainment: Does an attempt to make the experience engaging improve or hinder the cultural learning experience?

The first problem is what cultural elements of a place are missing from virtual environments. Merely creating a reconstruction of a cultural site does not mean that one is creating a platform for understanding and transmitting locally specific cultural knowledge. We need to understand what distinguishes a cultural site from another site; and what are the features of place as a site of cultural learning. A game can create a background, an atmospheric setting, but that does not mean a background is a genuine place, imbued with cultural significance.

The second problem is how to create an appropriate feeling of immersion or of presence in a virtual environment -how we make the past come alive for people so that they feel they are transported 'there'. This has often been seen as a technical constraint to render realistic virtual scenes, (due to the speed of the Internet or network connection, limited processing power or the computer's capacity to render a large number of objects on the screen in real-time). This paper by contrast, proposes designers foster engagement not purely through realism but also through contextually appropriate interaction.

Culture understood from the distance of a hotel or guidebook is obviously not the same as the dominant culture that guides constrains and nourishes a local inhabitant. Yet even a virtual traveler is not the same as a virtual tourist. Despite or perhaps because they have a goal to solve, and have more constraints and more direct immersion in the local way of doing things, people who travel rather than tour arguably have richer and more interesting experiences.

Tourists want to share cultural perceptions and learn through doing, being told, observing, and asking. In a virtual travel environment visitors want to be able to travel through time and space, to explore. Tourism can lead to non-interaction, to being hermetically sealed in a sterile 'they lived like this' environment. Culture becomes high culture. It becomes non-invasive, non-impressive.

In the role of virtual heritage and virtual tourism, people

want to feel engaged in the activity, enjoy the spectacle, feel the pressure of time, (the relative cultural idea of time-place), and understand the 'embedded' meaning of local cultural activity based on artefacts. In a virtual travel environment one may want to be able to travel through time and space, to explore, and to interact with people, objects, and local goals.

Thirdly, our idea of what reality is may be at odds with understanding the past or a distant place from a local perspective. What does reality mean when we are trying to recreate and understand cultural perspectives? To what extent should our concept of reality be jettisoned or adhered to?

It is possible that attempting to create contextual affordances and constraints will create too heavy a cognitive load on the virtual traveller, or require a high degree of skill and a large amount of time immersed in a virtual environment. Is it useful, desirable or even possible to interact with digital reconstructions of different cultures in a meaningful way? Could interaction actually interfere with the learning process?

Fourthly, if we do manage to create an engaging and believable virtual environment, will the novelty or entertainment value actually interfere with the cultural understanding gained by the users? In virtual heritage environments this is particularly evident in the conflict between individual freedom to explore and the more pragmatic need to convey historical information. We may for example create an entertaining game but will that allow us to convey varying levels of historical accuracy in reconstructing the past?

CASE STUDY: PALENQUE

Such is the motivation for this research, cultural learning experiences available via virtual travel environments. It particularly attempts to isolate and evaluate the more effective and preferable types of interactivity and interactive elements available to three dimensional virtual heritage environments. The chosen site is the Classical Mayan city of Lakam Ha in Palenque Mexico, and the great majority of the artefacts of that city of inscriptions are simply no longer there. However the Internet can bring the landscape, the buildings, the artefacts, reasonably accurate reconstructions of the native music, representative animated avatars of the people, and past historical and environmental conditions all together in one multimodal interactive gestalt.

In the case study, there are three different interaction modes. One mode is action-based, and the participants had to push back slabs to find the hidden tomb (this was actually what happened in the discovery of the Tomb of Pakal under the Temple of Inscriptions). If they managed to push back the sarcophagus lid of Pakal when they reached the tomb, a portal appeared that took them to a reconstruction of Palenque's Ballcourt (the Mayan Ballcourt symbolized war, life and death, the growth of maize, and the victory of the Mayan ancestors over the Lords of the Underworld, Xibalba).

The second mode was observation-based only, and participants were asked to find artefacts located in the large and navigationally confusing Palace.

In the third mode, the three major temples of the Cross Group had scripted guides, representing a Mexican tour guide, King

Pakal, and his son. Their movements and speech were proximity-based, and they got angry or fell over if participants ran into them. The goal was also to click and read information relating to the giant inscribed tablets in each of the Temples. At the end of the experiment people were asked to answer six questions for each interaction mode, to see if they had learnt and were able to extrapolate information from what they had seen.

Evaluations were conducted using a first year archaeology class of 43 students, and in the second stage, 24 more experienced participants who were either virtual environment designers or cultural historians with an interest in virtual heritage. In the third stage 10 IT-experienced people from Lonely Planet Publications (a travel publications company with a strong web-based presence), were tested. I also created four more imaginative and less authentic 'worlds' based on the cultural perspectives of the ancient Mayans in Palenque, Mexico. As part of the evaluation, participants were asked to rank the imaginative worlds against the archaeological worlds in terms of a range of 'presence' criteria.

In the Mayan 'Primal Mountain' World, fog was used in one world to convey a mythical setting and in the more archaeological environments glare was used at regular intervals to indicate where spiritually valuable artefacts were located. They were asked to find the beginning of the world (the sacred Mayan Sky-Tree) and click on it for information. They were then asked to find any other people (there were two Mayan paddler gods paddling around the mountain). They were also asked if they noticed the mountain they were on was actually a giant crocodile (the Mayans believed the world was created from a crack in the back of a caiman or turtle). Not a single person said they had noticed unless it was pointed out to them or they had fallen off the mountain.

Figure 1: Mayan Primal Sea

In the Mayan Village world, a participant could select an avatar that was either one of four Western-style backpacking characters or an avatar in local Mayan dress. Photographs of real people available via the Lonely Planet Images database were mapped onto the face of the avatars. The Mayan avatars were also sized appropriately (less than five feet tall) and only by changing into that smaller avatar were participants able to explore the interior of the Mayan huts. The aim was to find the other participant by orientating their avatar via large Mayan carvings in the jungle and then find the village using the interface guides and the sound of music. If they walked straight into trees, their avatar slowed down and cried out in pain. Which objects they found and how quickly they found them was also automatically recorded. Participants were asked at the end the relative sizing of the avatars and the results are being statistically compared to how well the participants answered other questions.

In the Mayan Cave world, when the avatar walks into the water, they automatically start swimming under water, blue fog appears and the sound of bubbling water drowns out the ambient Mayan music. If the participant does not keep pressing the forward arrow they slowly ascend back to the surface of the water. By finding, collecting and then dropping artefacts at a hidden shrine, a Mayan sky-snake appears and so does a portal that takes them back to the start.

In the Mayan Ballcourt world, each participant turned into a Mayan ball player, and each was asked to try to get the rubber ball to touch the hoop. If they did so, thunder and lightning were triggered.

Participants were evaluated via inworld task performance, post-experience cultural understanding (knowledge recall), observation of time passed, speed of rendering, ranking of world against certain cultural presence criteria, and environmental observation.

In the third evaluation the 10 Lonely Planet employees were also asked which interaction mode they preferred for virtual travel environments. Four preferred game-style environments, four preferred exploration environments (where the visitor wanders freely), and only one preferred guide-led environments, and only one preferred a social chat-room style environment.

CONCLUSION

Problems with currently available virtual environment technology affect a sense of engagement in virtual heritage projects. While virtual environments can be used to simulate historically situated cultural perspectives, the issues of place, presence, realism and education first need to be solved.

The research case mentioned in this paper concentrated on evaluating which type of interactivity most aided cultural awareness and engagement in a virtual travel environment, in this case, a virtual heritage environment reconstruction of Palenque in Mexico.

The research utilized five evaluation methods, and found several methods produced undependable results, in particular questionnaires, and post-experience multi-choice questions on ability to extrapolate cultural learning. However, subjective records of time passed and speed of environment (frame-rate) compared to actual frame-rate, and actual time spent in world does seem a promising way of measuring engagement.

Game-style interaction may also be intuitive for navigation and task-performance, and reduce cognitive loading, but at the expense of understanding cultural significance.

Further, and this was learnt from bitter experience, advanced techniques that slow down the environment in order to create more realistic effects may not be noticed by participants engaged in solving tasks. In this case, the use of dynamic lighting (dynamic shadows) may appear highly immersive to the world designer, but have little or no effect on the actual participant's sense of immersion.

* IMAGES ACCOMPANYING THIS ARTICLE CAN BE SEEN AT THE LEA WEBSITE: <<http://lea.mit.edu>>

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IN BETWEEN INSTITUTION AND MARKET - THE ROLE OF MEDIA ART AND INFRASTRUCTURE IN THE ERA OF POST-REGIONAL INTEGRATION

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ABSTRACT

The conditions of media art have changed radically over the past few years. On the verge of urbanization in Asia, media art premieres new platforms, networks and other possibilities, which anticipate new modes of city narration, communication and consumption. Media art can be in any form from our daily living, e.g. television, digital newspaper and on-line magazine etc. It is not only the issues about media art as a new tool or as a new art form. It is also concerned about social betterment and scientific innovation. This was fully illustrated by General Electric's familiar "better living through technology" slogan in the 1950s.

As suggested by Trend (2001), technology extends individual subjectivity, social relations, and institutional power into increasingly ephemeral and elusive dimensions. In most common habits, people spend more time with their mobile, televisions, and computers, the physicality of experience will be finally diminished. These consequences change the nature of the commercial world, explicitly including the production and sale of goods and services, to move from the material to the immaterial (digital form). At the same time, this also provides huge benefits and millions in the market.

This paper aims to project a vision in the relationship between the institution and the market, within the framework of the role of media art and infrastructure across the Asian continent.

MEDIA ART/ FREE-MARKET/ MODERNIZATION, ETC

As a powerful creative and immense force in our daily culture, free market brings media art to the public and their living. Without an open free market, regional modernization could not be completed. To Asian media art, the international free market (Westernized) is the only/most/last legitimate system in the last phase of globalization. Castells (1993) coined this new economy as a global economy, in which capital, production, management, markets, labor, information, and technology are organized across national boundaries. And competition is played out globally, not only by the multi-national corporations, but also by small and medium-sized enterprises that connect directly and indirectly to the world market through their linkages in the networks that relate them to the large firms.

This also triggers the revolution in information technology. A global and informational economy, a new world order, and a new international division of labor are instrumental to groom a new space that accelerates inter-city synchronization, acculturation and finally, revision.

Stepping into the new millennium of post-colonialism, regional integration surpasses the speed of globalization in Asia. On the mid-ground of dichotomies between war and peace, liberation and post-liberation, independence and inter-dependence, cities like Quezon, HoChiMinh, Hanoi, Phnom Penh, Bandar Seri Begawan, Macau, Hong Kong, Shenzhen, Guangzhou, Shanghai, Singapore, Taipei, Kaohsiung, and Okinawa, etc. have been confronting the ambivalent (conflicting) crises of epidemic disease, diasporic displacement, wreaking havoc, privatized war, ethnic wiping, religious persecution, habitation congestion, drug addiction,

sex and child abuses, freedom and economic exploitation, and disappearance of cultural identity, etc.

The military tension and volatile (changing) disputes between China and Taiwan, North and South Korea, India and Pakistan, and Indonesia and East Timor remain unresolved in the Post-Cold War era. To tackle the situation, a new creative sphere has been mirrored in the trajectories between traditional and modern, past and future, east and west, globalization and localization, free market and programmed economy, also will be gradually emerged and resolved finally. The diversified and alternative media art movements in China, Vietnam, Laos, Singapore, Myanmar, and Indonesia shift their landscape to a disguised form, or take a resistant aesthetic in whatever means for clandestine existence.

GLOBALIZATION VERSUS LOCALIZATION

"Think Globally, Act Locally" is a worldwide intellectual strategy. There are sample evidences that the Asians at this post-integration era, by acting locally, might affect the Eurocentric "global" ideal. In the new digital era, the Asian spirit, which is self-expressive, bold, direct, D-I-Y, efficient and adaptive, is rampant everywhere. Japanese' 'karaoke culture' has swept through American bar culture.

On the contrary, Hollywood, as an icon for commercial world culture, has co-opted the "alternative look" of Hong Kong cinema in its eclecticism. The acclaimed Pushan Film Festival, Tokyo Film Festival and Hong Kong International Film Festival are international enchantments. Media entertainment in Korea and Japan restructures the global market with a market-oriented approach by introducing popular icons and fancy designs with budgeted prices. Since 1988 Taipei has attempted to pursue the status of a Media Center in Asia, in view of the growing economic development in China and Asia. In mainland China, the Great Wall is no longer an empty and historic fortress: the avant-garde media art in the rising China is well-known. The New Media College in Hangzhou as well as the alternative space LOFT in Beijing becomes the cradle of media talents. They are searching for the emergence of in-between local culture and traditional values, western ideology, and revolutionary information technology. The works of Korean and Japanese artists like Yoko Ono, Nam June Paik, and Meiko Shiomi are now in the pages of contemporary art history. They all exemplified Asian identity and values a decade ago. Geographically, East and South-East Asian art also offers the frame for global interrogation and perpetual interaction.

LASTING ASIA: SOMETHING IS ALWAYS ON

The disappearance of regional identity in the post-integration era is a crucial phenomenon of the rise of "Extreme-Individualism" in Asian cities. They commonly desire political freedom and economic independence; individual lifestyles are natural outcomes of this extreme, which is well represented by the outburst of youth culture and experimental media art. In Sai Yeung Choi Street South, Hong Kong Media Power of Hong Kong organized a social documentary to address social inequalities in Hong Kong. In Art-Gu, Dongdaemun-Gu (Seoul), Dong Men (Shenzhen), Lan Kwai Fong (Macau), Xin Tian Di (Shanghai), San Li Tun (Beijing), Si Mun Ding (Taipei), Boat Quay (Singapore), Petronas Twin Towers (Kuala Lumpur), Green Belt (Manila), RCA (Bangkok) as well as other areas in Asia, a new creative motive

between commercial market and media system is emerging. Similar to a conglomerate into greater networking, dynamic art villages, suburban districts, open cultural spaces, avant-garde art and design shops, alternative galleries, renovated industrial plants, on-line teahouses, art cafes, D-I-Y forever-beauty photography shops, internet check-points, video-on-screening shops, TV art channels, on-line cyber war spaces, electronic publications, artists' columns on homepages, alternative leisure, and education centers as well as other creative spaces of entertainments are being developed and settled in recent years. The aesthetics of futuristic cities hinges on openness, fluidity, density, diversity, dialogue, noises, D-I-Y, etc., and is defined as plastic, pluralistic, eclectic, versatile, and technology-oriented.

During the post-integration era, the distinction between center and marginal, software and hardware, permanence and temporality, working and leisure are all beginning to break down. The synchronization of Asian cities thus opens up new media spaces and dimensions for everything, including production, commerce, transformation of information, art activities, and daily life. History does not seem to repeat itself under globalization, yet it narrates an incessant story in a local context. The next beta-version of "World Alternative Cities" in Asia is an endless, timeless, and action-like in a "non-stop" real time entity, as witnessed in a Hong Kong to-be-built 24-hour commercial complex.

POST-MODERN ASIAN AESTHETICS AND MEDIA PUBLICATIONS

One of the lasting effects of the era of post-regional integration is the furthering criticism of modernism. As a global product of conceptual idea, Asian media art contributes theory-building to modernism [3] and post-modern paradigms in particular. In dialogical opposition to Manhattan Modernism, a statement of East and South-East Asia media ideology is or could be to expose the concealed fractured lines of each respective city. The global information flow also contributes to the progressive and aggressive growth in media publications in most Asian cities. Media and cultural periodicals like CINELINK (Hong Kong), Videotape (Hong Kong), E+E (Hong Kong), TOFU (Hong Kong), Hong Kong Film Archive Newsletter (Hong Kong), NEXT WAVE (Chengdu), Transit (Manila), Vehicle (Singapore), Dandai (Taipei), Real Tokyo (<http://www.realtokyo.co.jp>), Art-it (<http://www.artit.jp/>), and Reportage (Sydney) are eminent examples, which well illustrate the superficial successes of the modern era. For June's special issue, *Leonardo Electronic Almanac* invited artists, musicians, academics, researchers, practitioners, curators and critics in the field of new media, electronic music and digital art practices to submit contributions addressing regional strategies, networking competence problems and realities in the Asia Pacific cultures. These Asian media publications further develop and provide critical criticism and new aesthetics through networking global culture in a new digital age.

In the networking age, as Lovejoy (2004) coined, the world is increasingly polycentred (translocal, transcultural, and transnational). By the 1990s, social, political, and economic infrastructures became reorganized around electronic networks. It suggested that media art is not only an art form, but also deals with the meaning of cultural confrontations. The new Asian aesthetics is independent from modernism and post-modernism. It is more dependent on society - dependent on relationships between people and not the sole product of any one person - and

is becoming increasingly important in the shaping of future culture. The divestment of authorship is seen as more relevant to an emerging culture founded on networks of exchange, fluidity, transience, and mutually, as it ultimately offers us the prospect of self-organization in personal and interpersonal ways (Willats, 2000). It is becoming more invisible in nature.

POTENTIAL OF EXISTING FORUMS

Current conferences like Asian Art Net, City to City Cultural Exchange Forum, Conference of Asian Foundation and Organization, World Culture Forum Alliance, Asian Pacific Performing Arts Network, International Network of Cultural Diversity and Asia Europe Cultural Net, and Engaged Art Practice Conference have occasionally worked on a different agenda. But they have the potential of becoming media networks in Asia.

M E D I A A S I A

One of the results of post-regional integration is the re-formatting of our media platform. For Asia, the media market is now linking up with the new 3G system, 4-channel GSM network, GPRS, PC/TV/Net station, satellite transmission and the PDA/WAP/WTLS-based, gameboard-MP3 TV Mobile, etc. New transmission forms of bluetooth, infrared communication, interactive personal, and collective digital media have been fully developed in the Asian region. Artists have tried to use their domains and contexts to create innovative environments. From traditional industrial theatre to institution-based on-line cinemas, 3-D cinema, IMAX, OMNIMAX as well as other independent film, video and avant-garde Cinerama.

ARTISTS AND WORKS OF ART

NEW CINEMATOGRAPHY

With respect to artists' work, there is variegated expansion of video-cinematography and creative application of post-production software and digital technique as one can see in Chen Chien Jen's works, a Taiwan-based artist.

CROSS-DISCIPLINARY AND CULTURAL APPROACH

In Bui Cong Khanh and some other Vietnam artists' work, cross-disciplinary approach is adopted in diverse art forms and exemplifies the deep-rooted Vietnamese traditional culture.

NON-MATERIAL DISPLAY OF LANGUAGE

In some videos or film installations, the conventional material display of language is converted with a new visual dimension and technology to convert a traditional and formalistic art concept. One can be seen in the *Body Bush* project of Hay Young (Hong Kong) and the City University of Hong Kong, which exemplified an action painter's art idea, Jackson Pollard, into a three-dimensional and virtual space. Phoebe Man (Hong Kong) applied on-line configurations with a virtual reality, interactive narration and synchronized multi-sharing technique, and there is repetitive mourning of the deaths in the Nanjing Massacre through a small video-monitor in a home-like installation by James Wong (Hong Kong).

Apart from using video-photographic conventional format by May

Fung (Hong Kong), there are experiments on CCTV space-travel like the internet online projects in Shanghai Biennale 2000, in Guangju Biennale 2003, and in Guangdong Triennale 2003 by Chinese Artist Xu Tan.

In **Treasure Hunt**, Yau Ching (Hong Kong) used an interactive media installation by using zero monitors, one surveillance camera, sensors, and a laser disk player to create a site-specific interactive digital media game where the audience could see many little images of their own in a very dark space and shoot at the monitors with two toy guns.

VIRTUAL REALITY

Some others like Anthony Yau (Hong Kong) tried the recreation of a virtual space from Hong Kong Historic site, a walled village, in terms of an interactive game.

MULTIPLE SCREENING

Hung Keung (Hong Kong) used software Director to juxtapose or multiple screen in his video in some Hong Kong or international shows.

VIDEO INSTALLATION: 40-MINUTE PROGRAM VIDEO CIRCLE SERIES

In this media project curated by Zuni's Danny Yung (Hong Kong), eight video artists were invited to produce 3-5 minute videos, which were screened on 36 monitors and faced inward in a form of circle in 1996. Viewers could walk inside the circle or stay outside. In either case, it was not possible to see all the screens at one time. The artists were asked to explore the relationship between time, space and message.

SYNCHRONIZED VIRTUAL WORLDS

In some cases, artists like Kwan Ng (Hong Kong) enlarges the communication basis of our global consciousness by configuring multi-level, 8-channel synchronized virtual worlds, or by converting the materiality of the displayed images in a given site for installation project. His recent engagement with a commercial project by transferring technical media dexterity extends the possibility of partnership between the art and commercial sectors.

MEDIA-BASED VIRTUAL THEATRE

Zuni is the most avant-garde theater company in Hong Kong. Their recent project also attempted media-based virtual theatre in their MIES project.

MULTI-LEVEL INTERACTION

Eric Van Hove's project activates multi-level interaction and intervention in different public spaces through photographic mobile devices in different platforms and points of views, capturing the virtual phenomena in such a diversified plural city as Tokyo.

REVERSION OF MEDIA ENVIRONMENT

With the advent of new technology, the character of media art practices transforms tremendously. Their visual display, in turn, would reverse the production and presentation of

paradigmatic film and the media environment around the globe.

MEDIA-BASED HAPPENING

The Hong Kong based art group, Happening Group, has searched any possibilities in between media, happening, and site-specific installation. It tries to explore the very fundamental issues about the human body, aesthetics, local cultures, and technology. Its works have exemplified and extended the potentiality from materiality to immaterial or even spirituality.

ADAPTATION OF LOCAL MEDIA TECHNOLOGIES IN A GLOBAL BUILDING

Recently, the Hong Kong Bank Headquarters installed hi-tech lighting on its 'outskirt', signifying the new era of this world local banks' adaptation of new creative media to its late modernist building.

CREATIVE INDUSTRY: THE NEW INSTITUTION AND MARKET FORCE

The creative industry, as an integral fabric of urban reality, should be crucial for a sustainable development of the creative environment. The drastic emergence of no fewer than 120 artist-run independent spaces in East and South-east Asia, are converted from commercial showrooms, café bars cum galleries, abandoned industrial warehouses, heritage buildings, studio spaces and university cultural centers, etc. They all become new city service centers and futuristic sites of cultural significance, which help to re-define the local and regional media art landscape.

More spectacular is the phenomenon of artists beginning to cluster around powerful art communities in order to join creative forces and make things happen! Taiwan (Taipei Art Village, Whashang Art District, Nantou International Art Village, Warehouse by Railway Scheme, Kio-ATuo Art Village, Nam Ying Tsung Yeh Arts & Cultural Center), Hong Kong (Oil Street Art Village/Cattle Depot Artist Village; Fotanian), Singapore (Singapore Art Village), Quezon City (Big Sky Mind and the former Surrounded by Water), Kobe (CAP House). Cultural planners strategically incorporate these art villages into their patronage systems, thereby diminishing reactive power and shaping a more comprehensive cultural policy affecting the region. The former Oil Street Art Village, now known as Cattle Depot Artist Village (CDAV), which houses five alternative spaces and 14 studios, is now prepared to collaborate with the Hong Kong Arts Development Council in making this cluster a strategic model of global village to experiment creative industry.

In East and South-East Asia, media art and market forces do not form formal alliances, but there are noted models or strategies of co-existence:

BIG BUSINESS + ART CLUSTER: A NEW ALLIANCE

The overall characteristic of a new Asia is its pluralism and eclecticism. The Videotape in the CDAV will become eclectic, as its creative power being alternative will be made adaptive to the marketing strategy of enterprises and funding body. On the other hand, the official art establishments are obliged to form new alliances with media artists and alternative spaces to achieve better program support. The conventional top-down

approach of cultural planning would be scrutinized. In Whashang Art District, they brought in rental revenue and broadened the audience base by renting its venue to NIKE's NBA Basketball Night in 2001 and some media groups for presentations.

SPACE RE-LOCATION

Apart from the café bars cum showrooms, some alternative spaces like Space Contemporary Art/Gallery 253 in Bangkok are strategically located on the adjacent side of a commercial gallery. The Pottery Workshop has a space in the Fringe Club and the Para/Site Central is a borrowed space from the commercial gallery Hanzart II in Hong Kong. Alternative Space Bluespace Contemporary Art Centre in HoChiMinh City co-exists as a commercial gallery and uses the HoChiMinh Fine Art Museum a strategic base for presentation of avant-garde performances and installations. The Tadu Contemporary Art is located within the bar area of the Royal City Avenue (R.C.A.; Bangkok). Commercial galleries, Singapore Art Council, Singapore Heritage Board, as well as other cultural organizations in Singapore, also cluster in MITA for interdependent development.

METAMORPHOSIS IN OPERATION

For political or other reasons, a growing number of alternative spaces in the region are being renovated to spaces like commercial galleries to disguise their avant-garde programs. Key examples such as PKW (Singapore), Top Floor Gallery (Shanghai), and Café@National Gallery (Kuala Lumpur) are integral to the commercial fabric. While a great many alternative spaces have to be self-supporting, or result in closing down their businesses, many art groups run their spaces by selling artists' work, loaning their premises, or collaborating with the big business sector on project basis for rental income or for mutual benefits. The trend of metamorphosis could be seen from how Whashang Art Village is now being run by Hua Shan Cultural and Creative Industry Center, instead of the former artists' alliance chaired by Margaret Shu Tan. LOFT, Top Floor Gallery, Courtyard Gallery in China also take up commercial strategies to support their continued display of political art.

INFRASTRUCTURAL CHANGE

With poor educational back-up, the overall art and commercial infrastructures in support of art remain fragile in East and South-East Asia. Recently, there were organized participations in international media events such as World Wide Video Festival, well-planned presentation of city-based media festivals (MICROWAVE 96-2004-HONGKONG), biennales (MEDIA-CITY Gwangju Biennale 2000) and triennials, together with the introduction of a well-accountable public funding system to Singapore, Hong Kong, Macau, Taiwan, Indonesia and South Korea by the respective public bodies. They are not simply results of city synchronization. What is spectacular is rather the phenomenal outcome of the trans-national and cross-regional competitions in the post-integration era especially in the delta zones (the Pearl River Delta, the Long River Delta, the Mekong Delta, the Yalu Delta, etc.). Another common scene is the systematic devolution of power and resource by the central governments to the community or the media sector (Video Power HONG KONG), in the nurturing of a new working relationship with big businesses. This reviews the shift of the European top-down socialist system to the American bottom-up market-based operational model of media art patronage.

IN A NUTSHELL

Regional integration across the region provides grounds for a happy marriage of media art and market. The future of such a marriage not only consolidates the position of "creative industry", it opens up the possibility of fostering a mega power - "media arts economy", in which case cultural professionals such as developers, planners, architects, art educators, environmental designers, web masters, industrialists, entrepreneurs, and other media practitioners might take a prominent position in the "World Political-Culture", where our media art market is one of the envisioning and gearing tools on the same pace as socio-economic progression in Asia.

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AUTHOR BIOGRAPHIES

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DIGITAL SPECULATIONS

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ABSTRACT

The advent of interactive digital media poses opportunities and issues that cannot be explored or analyzed using traditional canons of artistic production or aesthetic experiences. The digital media implicate techniques, tools, authors, and audiences in a complex web of production and appreciation of art works. As a result, most work in digital media remains speculative in nature, offering only partial glimpses of this new creative landscape. This paper describes selected projects that served as vehicles for critical investigation of interactive digital media and their potential for exploring different ways in which experiences can be imagined, constructed, and communicated.

INTRODUCTION

Interactive digital multimedia projects implicate techniques, tools, authors and audiences in ways that are hard to disentangle and discuss in isolation. The closest expressive form to what multimedia technologies have to offer may be the Wagnerian *gesamtkunstwerk* [1] or the symbolic theatre projects of Ervin Piscator and Meyerhold in which boundaries between performers and audiences were erased. When sounds and images freely criss-cross the boundary between discrete and continuous states, when temporal or spatial representations can be fractured and recombined at will, and when authorial intentions get subsumed under the interactive control of audiences, traditional canons of artistic production, appreciation and criticism may not be adequate [2] . Navigating without shared signposts in digital media landscape, each step is a tentative speculation into the realm of possibilities. And it is precisely for that reason a reflective record of work assumes all the more importance.

To explore the possibilities and pedagogic questions opened up by interactive digital media we have undertaken a number of experimental projects in the last few years. The projects described in the following sought to bring together realms of architectural design, computer modeling, and visualization. The underlying purpose was to challenge the traditional spatial representations in architecture and investigate different ways in which spaces can be imagined, constructed, communicated and

felt.

Traditionally architectural compositions have been conceived through a multitude of media and representations: sketches, diagrams, planar and perspective projections, analog models, collages, etc. While the use of such media and representations has informed different traditions of spatial thinking, we also come across works that break free of accepted traditions and continuities of expression [3]. For example, Giambattista Piranesi, an Italian draftsman drew not only the existing ruins of Rome but turned them into fantastic, visionary spaces populated with fragments of disparate elements from many archaeological sites. Piranesi's imaginary collages are the hallmarks of spatial displacements. A different kind of conceptual break from traditions is witnessed in projects of the mathematician Iannis Xenakis [4] who sought to translate musical harmonies into spatial configurations. In fact, this line of investigation combining sound and space has been a recurrent theme in architecture ranging from the Greek concepts of proportion to the 20th century works of Le Corbusier. The most drastic change in architecture in pedagogical terms occurred early in the 20th century with the establishment of Bauhaus and its curriculum. In the face of industrialized means of production and new materials, the new design curriculum called for experimental projects using new materials and techniques that resulted in a new aesthetic.

With the introduction of digital media, we are faced with new opportunities to (re)question the nature of creative design, how it is conceptualized and representations that fluctuate between discrete and continuous states [5]. The following describes some opportunities we have explored in the use of interactive digital media to imagine experiences ranging from abstract to spatially concrete.

TELLING STORIES

Primarily our projects revolve around using either literary references or computational procedures for narrating a concept or experience. The former projects are aimed at evoking a sense of place based on some literary reference- a poem, travelogue, memoir, song or prose. The motivation in these projects was to explore ways in which linear, textual narrative can be expressed using non-textual and non-linear representations and interactivity. An additional goal of these projects was going beyond literal translation of words to evoking the experiences conveyed in the original source.

In one project, the verses of a popular song (*Stairway to Heaven* by Led Zeppelin) provided the starting point. However, upon further exploration words took on new and different associations appropriate to the media. The stairway became not a path connecting levels separated in vertical dimension but a path of metaphorical journey through a landscape littered with memories. A landscape that is smooth and rough at the same time, and in which the cracks open up over which one steps moving towards a climactic moment. This project was conceived and rendered as a linear narrative in which visuals, background audio and motion come together to communicate what was originally represented in lyrics.

In another project (based on description of the Walled City by William Gibson), the linear narrative was replaced with non-linear unfolding. Moving through constricted spaces bounded by

reflections of signs and spaces (Figure 1), there is a sense of being trapped within a walled environment. The boundaries are permeable though never completely opaque or completely transparent. Although there is directional movement between nodes, the nodes themselves can be traversed in any order. There are spaces of congestion and spaces of solitude, spaces for watching and being watched, complemented with visuals and background music that signify different transitions and moods.

Figure 1. Walled City: Idoru (Andrew Hayne)

The non-linear narratives were explored further in the third project (based on the City, a short story by Ray Bradbury). It is inviting yet forcefully empty and desolate. The scale of spaces and textures of surfaces generate a sense of wistfulness, a kind of place that may be deserted after a catastrophic accident (Figure 2). There are shadows lurking and machines at work behind facades. The labyrinthine environment appears to invite and then trap the visitor as every fork in the path offers a different orientation to the spaces than what was encountered before. The eye moves at a non-uniform pace - sometimes slow, at other times flying, occasionally squeezing past narrow passages and under menacing archways and doors.

Figure 2. The City: Illustrated Man (Cameron Lacy)

In other projects, instead of literary references we drew upon abstract concepts that were to be expressed through computable procedures. One such project revolved around the notion of *rhythm* - how does one explain what is rhythm as a visual or aural experience using digital media instead of a linear definition put in words? The project resulted in an interactive composition in which space, color, shapes, temporal sequence and audio notes constitute the elements through which the concept of rhythm is illustrated.

Similarly in the next project, the concept of *entropy* was explored. Entropy can be thought of as a measure of how close (or far) a system is to equilibrium and disorder. The system may begin at a zero level of entropy (totally stable) and increase in entropy as the user interacts. The user interaction with various elements increases or decreases the entropy in the system, which affects other elements in composition. The state of an element (its color, shape, sound, form) is affected by and affects the level of entropy of the system.

The final project described here is shaped by diverse beginnings (Figure 3). Different elements in the project make references to different sources such as the Australian outback, the tracks of the emus and kangaroos, the paddy fields of South East Asia, the weaves and wafts of carpets and tracks made through their fibres by those who trod upon it or scurry among that fibrous surface. At a later point, these references coalesced into the worlds of critters, flighty yet seductive, and how they draw the reader into their flat yet playful world of hide and seek.

Figure 3. Desert Swamp (Gemma Cooke)

In the last three projects described above, the worlds being explored become increasingly unpredictable, dependent on the user interaction for their coming into being in the first place, and then engaging the user into an ongoing dialogue for their subsequent development. These are procedural [6], non-

determinate worlds that contain only a code of possibilities at the start, never a singular form right from the beginning.

The interactive projects described above are part of a series of digital speculations developed by those students of architecture with a keen sense of spatial imagination. The projects were developed as part of an advanced workshop in interactive digital multimedia, in a finite amount of time. While the projects can be appreciated purely as standalone objects, it is worth recounting and reflecting on the process that led to their development.

PEDAGOGIC FRAMEWORK

The increasing adoption of digital media in design education leads to subtle changes in design objectives, means, and outcomes in that process. Such changes are due to the peculiar nature of digital representations and operations that allow us to manipulate representations. With only a few decades of collective developments and experiences in digitally supported design education, it is not surprising that we still frame and reflect on these changes in a provisional fashion only.

The rapid pace of developments in digital technologies and new experimentation they afford in design conception engender a context in which provisional explorations take the place of sustained theoretical reflections. We are too intimately close to evolving digital technologies and that makes it difficult to select vantage points from which to better articulate development of a new expressive and communicative medium and to understand its ramifications. In such a climate, design educators stand on shifting grounds. Caught among design discourse, development of new digital tools, and cultivating design sensibilities among students, design educators have responded with different pedagogic frameworks to incorporate digital media in design education.

In our case, we explore both pedagogic and critical issues with digital media in a design workshop offered as an elective subject in the design curriculum. The workshop is aimed at developing a critical understanding of interactive digital media and their potential for imaginative design explorations. It revolves around structured thematic discussions that become more concrete in the form of three speculative projects. The speculations are structured so that students, on the one hand, get exposed to new possibilities for design exploration and learn to develop a critical and reflective attitude. On the other hand, students also learn to explore and use new media authoring tools. The content of speculations is consciously designed not to faithfully build or rely upon traditional architectural or spatial expressions. In fact, students are encouraged to reassess their pre-conceived notions by way of being critical and reflective in all the speculations.

Critical analysis requires students to critically analyze and review an interactive project sourced from the literature, exhibitions and installations. The student reviews focus on both the content and form of the original interactive project. The reviews analyze and reflect the efficacy of media types, their structure and presentation in the interactive project. In a sense, this speculation exposes students to a palette of interactive media elements from which they can draw upon in subsequent speculations.

Experimental project is concerned with exercising the vocabulary of interactive media elements (i.e., what students have extracted in the preceding critical analysis phase) through a selected theme. Over the years, some of the themes explored in this project have ranged from representation of tangible and ephemeral places (e.g. war memorial, train station) to abstract concepts like rhythm, contrast, pattern, proportion, symmetry, etc. The emphasis of this speculation is on evocation of a selected context or abstract concept and not literal replication of traditional representations. In other words, students are encouraged to express a selected place or concept using interactive media in ways that cannot be done or may be difficult to do using traditional media and representations.

Creative expression offers an opportunity for students to bring their creative imagination and technical competence together in the form of a major interactive project. Students are asked to select a 'text' as a reference (e.g. The Walled City by Gibson, color music) and render it as an interactive multimedia project. The emphasis of this speculative project is on expressing interpretive dimensions of the theme and not on simply reconstructing or reproducing the original text into another form.

ISSUES

As witnessed in the projects over the years, the pedagogic structure of this elective has served its original purpose of providing an experimental context to explore interactive digital multimedia. At the same time, we are acutely aware of a number of critical issues that remain to be properly addressed. The following are three major concerns especially in pedagogic settings.

Framing objectives is essential to ensure that the work produced is not just a consequence of accidental choices. It is especially important when students are learning to master the skills in the use of digital media while also discovering their expressive potential. In this respect it may be useful to have a high-level statement of what the work aims to accomplish (before the seduction of media takes over) and which can be used as a measure or reflective mirror against which subsequent media choices can be evaluated.

Challenging conventions needs to be framed as one of the prime objectives while using new media so that leads to better appreciation of even traditional media and concepts that we normally take for granted. This is not easy or self-evident and requires conscious effort. Just as it took a while to conceptualize temporal shifts in cinema (e.g., flashback in which temporal sequences are disrupted or multiple viewpoints through which one sees parallel events unfolding), it requires special effort to design around shifting space and time [7], around elements that may at one moment be corporeal and at another moment ephemeral, when sound turns into material, or material turns into light.

Judging interactive media works produced by students is all the more difficult because of a number of overlapping and often external factors. Sometimes the technology gets in the way of the best of works (e.g. when real-time refresh turns into a slow-motion parody). At other times, the open-ended interaction results in more noise than signal. To what should we hold the authors accountable rather than the audiences in such cases? How

shall we know that the work actually advances experiential propositions rather than simply delivering stupefying visual or aural sublime that overwhelms the senses?

The questions posed above are intentionally rhetorical at one level but at another they are pragmatic concerns for those of us who teach the use of interactive multimedia in any discipline. They become all the more critical if we are to impart skills not only in the use of media but also a discerning and critical attitude about what the use of such media can afford.

SUMMARY

The advent of interactive digital media poses opportunities and issues that cannot be explored or analyzed using traditional canons of artistic production or aesthetic experiences. Unlike the traditional artistic practices that can be understood in terms of, to borrow Goodman's terms, autographic or allographic notations and performances, the new media implicate techniques, tools, authors, audiences in a complex web of production and appreciation of art works. As a result, most work in digital media remains speculative in nature, offering only partial glimpses of this new landscape. This paper described selected projects aimed at developing a critical understanding of interactive digital media and their potential for imaginative design explorations to investigate different ways in which spaces can be imagined, constructed, communicated and felt. What we sorely need are conceptual terms and reflective accounts in production and appreciation of such works through which a shared discourse in interactive media works can evolve in future.

ACKNOWLEDGEMENTS

The work of students who participated in the Digital Speculations elective is gratefully acknowledged.

* IMAGES ACCOMPANYING THIS ARTICLE CAN BE SEEN AT THE LEA WEBSITE: <<http://lea.mit.edu>>

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IDENSITY® / SOFT URBANISM

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KEYWORDS

hybrid space, networked architecture, 'Soft Urbanism', mobility networks, public space, public domain, new spatial paradigms, idensity®

ABSTRACT

The presentation develops scenarios for an interplay of the urban space and the media domain. New interdisciplinary fields of planning and design are introduced: Soft Urbanism, exploring the interaction of urbanism and the space of mass media and communication networks, and Hybrid Space Design, developing fused analog-digital / architectural-media spaces. Within this framework, "idensity®" is proposed as a conceptual tool for developing space in the information-communication age. A

theoretical introduction is illustrated by projects.

"The new city presupposes that the cables of the interhuman relations are switched reversibly, not in bundles as with television, but in real networks, respons(e)ibly, as in the telephone network. These are technical questions; and they are to be solved by urbanists and architects." - Vilém Flusser 1990.

To reinforce the significance of public space we have to deal with at least two "publics", the global and the local public, by creating spheres where local and global public space can fuse and interchange.

Bridging the gap and connecting the global media spheres with local content and place, an architecture of communication spaces proposes a combined analog-digital infrastructure: publicly accessible interfaces between the global media space and the local urban place. 'Public Media Urban Interfaces' is an alternative scenario for the interplay of mass media in order to reinforce the function of public (urban) space. This project develops a hybrid urban network-space, a fusion of media space and urban space. It emphasizes the role of the public in an increasingly privatized society and occupies the vacuum in between the local and the global. The products of this alliance of urban and media networks are "hybrid" spaces that are at the same time analog and digital, virtual and material, local and global.

This project represents a prototype for a new interdisciplinary field of design and planning ('Soft Urbanism'), researching the transformations of architectural/urban space of the emerging "information/communication age", exploring the dynamic interaction of urbanism and the space of mass media and communication networks. 'Soft Urbanism', dealing with the "soft" aspects of the city, not only intervenes in the realm of infrastructures, but also adopts their concept and paradigm: by supplying networks, 'Soft Urbanism' creates new fields of possibilities and frameworks for self-organizational processes.

Today, the communicational paradigm, with its "network-cities", "nodes" and "terminal architectures" is infiltrating and transforming the architectural/urban discourse and practice. Within this framework, 'identity®' is proposed as a conceptual tool for developing space in the information/communication age. This composite term consists of the combination/fusion of the word "density" of real/urban and "virtual"/media communication spaces (density of connections) and of the word "identity".

PUBLIC MEDIA URBAN INTERFACES

The local-based public 'tele-feeder facility (at your neighborhood's launderette)', the primary unit of Public Media Urban Interfaces, enables the public to produce messages and to narrow-broadcast and receive them in a dynamic communication environment. Creating a locally-based dynamic media network from the bottom up, local events can be accelerated and reinforced to temporarily invade the glocal media space.

This link between global media space and local place having its interfaces in public space makes it possible to broadcast, access, influence the global media environment from the (urban) local neighborhood.

A demo project, exploiting London's urban tensions and structure unfolds strategies and visualizes aspects of these investigations, confronting a working hypothesis with the idiosyncrasies of a specific urban situation.

MEDIA BABIES

128 feeder houses (Media Babies) distributed evenly over the sprawling London towns and interconnected by means of a digital network supply eight Bridge Clubs located on the Thames with a continuous stream of (non-)events. The Media Baby at your neighborhood laundrette consists of a Catching Gallery, two Intro Booths, a Debutantes' Booth, a Connector Platform and a Microwave Transmitter. The Catching Gallery is the area where the public can view the narrow/broadcasting activities of eight other Media Babies and one Bridge Club. Interactive technology enables the public to intervene in those narrow/broadcasts but also creates the possibility to establish direct contacts, thus forming endless smaller networks within the larger framework of Public Media Urban Interfaces.

BRIDGE CLUBS

The Bridge Club, providing the space for public events on an urban scale, bridges the gap between programs meant for local distribution and those that deserve a larger audience. Using the larger broadcast facilities available to the Club, the selected programs are experienced and transformed to suit a mass audience. The Bridge Club, being a knot in the net of translocalities, also serves the function of bridging programmatic events related to the site where the club is located.

REPLACE THE RIGHT TO VOTE WITH THE RIGHT TO BROADCAST

The publicly distributed 'Air Time for All' Smart Card allows you to produce and narrow/broadcast and also gives you the opportunity to adopt a message (not your own) by giving it extra air time. At the Media Baby in the neighborhood, you will find the necessary programming facilities to make your program and the means to monitor it as it goes on the air. You can also accelerate messages (not your own) by giving them extra broadcasting time with the help of the special Smart Card. And as a message gains strength, its chances of reaching a much larger audience increase, reaching more Media Babies, a Bridge Club, the city or even the whole country, Europe and the rest of the world.

SOFT URBANISM

In architecture's role of defining and materializing the spaces for social interaction, designing the relationship between the physical and digital public domain is becoming more and more of a challenge: investigating the relation and interconnection of the "soft" city with its finite material counterpart, the living environment, speculating about interfaces between the "virtual" and the material (urban) world and designing hybrid (analog-digital) communicational spaces.

Soft Urbanism deals with information/communication processes in public space, the soft aspects overlying the urban sprawl and modifying it: the invisible networks acting as attractors, transforming the traditional urban structure, interweaving,

ripping open and cutting through the urban tissue, demanding interfaces.

Soft Urbanism not only intervenes in the realm of infrastructures, but also adopts their concept and follows their paradigm. It brings an inherently flexible approach by expanding the field of possibilities of social interaction and opening new paths of urban development. Soft Urbanism is therefore not about determining places, but about creating frameworks for processes of self-organization. Not accepting being powerless in the face of the forces of the market, Soft Urbanism rethinks the strategies of interventions to reintroduce programmatic speculations about the public domain in urbanism.

The interventions will not be about control and determination, but about expanding infrastructures, frameworks for processes of self-organization. "Soft" strategies will be "bottom-up" strategies: rather than defining first the global result of the interaction and then determining the necessary relation between the elements in order to produce that interaction (which would be a "top-down" approach), simple rules for a set of independent elements will be developed and what emerges from the interaction of these elements is aleatory. According to biological models, these fields of interaction of plural forces could serve as a reservoir for the selection processes needed for the urban transformations.

MOBILE (CONTAINER) INFRASTRUCTURE

The Public Media Urban Interfaces and the Bridge Clubs together with a fleet of container-boats, caravans, rickshaws, taxis, trucks and limousines (equipped with transmitters/receivers and interactive life jackets) form a transportation/communication infrastructure servicing the users of the network and also commuters, nomads, migrants and tourists. The traditional translocal (mobility/communication) networks are thus knitted to the new glocal media networks (Internet/TV).

These capsules containing (from rudimentary to more sophisticated) media units are mobile nodes in the translocal networked environments, "vessels" within the complex multilayerings of the space of flows. They serve as spaces of exchange (export/import trade), as laboratories of glocal cultural bastardization. With this (container) mobile infrastructure new hybrid urbanity emerges, that is no longer tied to any one specific location but rather is the result of their interconnection.

URBAN IDENSITY®

Within these new hybrid ("real" and media) landscapes, these interconnected networks, traditional categories for analyzing space are becoming obsolete. A new field of planning and design, combining urbanism and architecture with information/communication networks and media spaces is emerging. It is a field that requires new tools and new research categories in order to develop the new hybrid network urbanities.

In the contradictory dynamics of today's urban environment with its antithetical tendencies of concentration and decentralization, of functional mix and segregation, traditional terms of spatial distinction lose their validity. In this fragmented urban landscape, categories like "centre" versus

"periphery", "landscape" versus "city" and "functional zoning" (such as living, working and recreation), are becoming obsolete.

The polarity between private and public space is disintegrating. Public and private environments are becoming intermingled and blurring in the fusion of media and "real" space. We see this in the hybrid spaces of the publicly broadcasted (inverted) privacies of reality TV and the "Big Brothers," in the media presence of war intruding on our living rooms and in the private (communication) space of mobile telephony within public urban space.

To understand this fusion, this superimposition and the interaction of media and "real" urban spaces, the new term 'idensity®' is introduced, replacing the obsolete conventional terms of spatial distinction. Idensity® does not differentiate between information/communication networks and urban/architectural environments. It thereby offers an integrated model for dealing with hybrid (media and "real") space in the information/communication age and incorporates a wide range of future (communication) spaces.

It is a composite term, combining the word "density" - of real (urban) and "virtual" (media) communication spaces (density of connections) - and the word "identity." 'Idensity®' integrates the concept of "density" (density of connections, density of physical and digital infrastructure, density of communication-spaces, etc.) with the concept of "identity" (image policies, urban brands, etc.). It can, for example, help in understanding the processes of spatial segregation and distinction between urban fragments that have qualities of 'global' performance and that can be seen as part of a "global urban condition" and those other, sometimes neighboring (parts of) cities that lose in relevance and disappear from (global) mental maps. It can therefore be implemented as an operative tool to steer the processes of urban development.

But it is not a mere summation of the concepts of "density" and "identity." It is instead a fusion, as it inverts "identity," linking it to communication, "identity" being defined by connectivity.

Therefore, it does not just address the "clear-cut identity, the particularity, the individuality of the traditional places or sites" but also the layered 'idensities' of the "non-lieux" ("non-places") [1] of today's generic cities, which are to be found especially in the realms of mobility and consumption (airports, hotels, shopping malls, motorway rest areas, etc.). It does not refer only to object-qualities but describes a field of superimposed (communication) spaces: the branded space of the chain-shop, the symbolic space of the traditional building the shop is located in, the media space of teleshopping, the communication space of the GSM..

This new term is implemented to describe and analyze the communication spaces of the coming "network society", a society not so much based on the traditional, relatively static structures of belonging in the family, the corporation or the state, but on flexible, dynamic, ever-changing networks of exchange and communication. It carries the discussion on the urban from the morphological level of a formal description of the network patterns of the "network city" to a more integrated structural understanding of the networks of spaces for social communication.

According to the traditional (bourgeois) concept of privacy, identity is based on private individuality. It is, however, important to be aware of the historicity of such a concept. As John Lucaks writes "Domesticity, privacy, comfort, the concept of the home and of the family [...] are, literally, principal achievements of the Bourgeois Age." [2] The notion of the "privy chamber" emerged in 17th century English literature at the same time as new private physical spaces came into being, when the introduction of the corridor layout in English interiors of the 17th century enabled the development of "private quarters." But the expression "privy chamber" is also used metaphorically for the soul. The "privy chamber" is the container of (private) identity.

In the last year of the 20th century, "Big Brother," the notorious reality-soap (with its networked container) was launched in Holland and was cloned and copied all over the planet. "Big Brother" shocked people profoundly and became a prime topic of debate in the media, from popular talk shows to scholarly journals ("Is this the End of Our Civilization?").

What was shocking in "Big Brother" was the broadcasting (the invasion) of privacy. The participants of the soap defined their identity not in the "privy chamber" but in the public networked environment of the broadcasting-container. The ENDEMOL soap was an interactive environment (the television audience had democratic rights, influencing the sequels). The captives in the container/networks witnessed their existence in the "Real Virtuality" [3] of their media presence. They experienced their identity within the 'idensities' of the (communication) channels.

In the same year, 1999, a big campaign was launched in Holland. On most billboards in major and minor cities, men and women, youngsters and the elderly - in short, the average Dutch person - were declaring "ik ben Ben." This was not the mass expression of an identity crisis, but an advertising campaign for the launch of the new GSM company called "Ben," targeting the public at large. The slogan was based on a simple play on words, "ben" meaning in Dutch "I am" and "Ben" being a common man's name as well as the name of the mobile phone company.

But what makes this slogan such an interesting expression of our times is its definition of identity (I am: Ik ben) as connectivity ("Ben" being the network provider) with the 'identity@' of the urbanite being defined as the density of the (superimposed media/"real") communication spaces.

In February 2000 it was announced: "Ik Ben een jaar".

This advertising slogan expresses in a very direct way nothing other than a new view of subjectivity and identity. Villém Flusser, the philosopher of communication, would write: "The new image of man looks roughly like this: we have to imagine a network of interhuman relations, a 'field of intersubjective relations.' The strands of this web must be conceived as channels through which information (ideas, feelings, intentions and knowledge, etc.) flows. These strands get temporarily knotted and form what we call 'human subjects.' The totality of the threads constitutes the concrete sphere of life and the knots are abstract extrapolations. [...] The density of the webs of interhuman relations differs from place to place within the

network. The greater the density, the more 'concrete' the relations. These dense points form wave troughs in the field [...] The wave troughs exert an 'attractive' force on the surrounding field (pulling it into their gravitational field) so that more and more interhuman relations are drawn in from the periphery. [...] These wave troughs shall be called 'cities'." [4]

The term 'idensity' is a conceptual tool for researching and developing (social) space in the information/communication age.

* IMAGES ACCOMPANYING THIS ARTICLE CAN BE SEEN AT THE LEA WEBSITE: <http://lea.mit.edu>

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He has lectured and published broadly internationally (Austria, Canada, Germany, Finland, France, Greece, Italy, Latvia, Pakistan, Switzerland, Singapore, Spain, The Netherlands, UK, USA) and serves as a consultant to the Dutch government on the use of space in the information-communication age (See: http://www.infodrome.nl/publicaties/domeinen/07_rui_vog_essay.htm 1)

ONE FROM THE VAULT: FROM THE LEA ARCHIVES

MOLTEN MEDIA AND THE INFILTRATION OF THE LAW

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http://mitpress2.mit.edu/e-journals/LEA/TEXT/Vol_2/lea_v3_n06.txt

by Curtis E.A. Karnow

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The legal system infiltrates technology, like a thin mist seeping under the door, staining it and turning technology into a different animal. Programmers wonder if the code they write was patented by someone else. Graphics lose their innocence, and look like trademarks, trade names, and logos; they have that old "look and feel" of someone else's product. Trademark law reaches out its sticky hand to embrace color, sound, the overall appearance of every product and packaging on the market. Copyright law hovers like a specter, infecting every line of code, every data structure, every animation, every sound, graphic and screen layout.

And while this law spreads, it thins out, too. The types of properties that the law protects now were unknown just a few decades ago. There is an unreality to the transient audio-visual image, an insubstantiality to a user interface. There is something very peculiar about patenting a three dimensional cursor or a software retrieval system. Surely these are created things, to be protected from theft, but most judges are reluctant to tread too heavily here. These judges remember "property" as tangible land, gold, cattle; this new stuff looks ephemeral. Judges have a hard time giving a user interface the same absolute, exclusive, protection provided to a house, a car, or money.

So the law expands its reach to govern the development of advanced technologies, but at the same time its touch grows more hesitant and uncertain. It is like an omnipotent Imperium in

nominal control of vast territories - every movement of the inhabitants may be the subject of Imperial decree, but none knows which actions, precisely, will invoke the Imperial attention.

This note discusses the apparent paradox of comprehensive but uncertain protection for intellectual property, and the consequences for companies engaged in high tech development.

[THIS TEXT CAN BE VIEWED IN ITS ENTIRETY BY LEA/LEONARDO SUBSCRIBERS AT: <http://mitpress2.mit.edu/e-journals/LEA/archive.html>]

LEONARDO REVIEWS
2005.6

This month Leonardo Reviews introduces a new panel member, David Beer with his reflections on Tia DeNora's book, *After Adorno: Rethinking Music Sociology*. Currently researching in the University of York, UK, Beer has published on social aspects of digital technology. Jan Baetens is also featured here this month as another of our newer members who has already made a significant contribution to the Leonardo Reviews project. His review of Jose van Dijk's book on medical imaging based on an advance copy sent to Leonardo Reviews means we are able to synchronise with the publication date. Staying with the biological, Eugene Thacker's review of *Liminal Lives: Imagining the Human at the Frontiers of Bioscience* completes the featured reviews.

On-line of course is the complete posting for the month as well as the archive (<http://leonardoreviews.mit.edu>). If you would like to receive advance notice of our upcoming postings please contact me and I will make sure that you are added to our monthly mailing list.

Michael Punt
Editor-in-Chief
Leonardo Reviews

REVIEWS POSTED MAY 2005

After Adorno: Rethinking Music Sociology
by Tia DeNora
Reviewed by David Beer

Charlotte: Life or Theatre
by Richard Dindo
Reviewed by Andrea Dahlberg

Collapse: How Societies Choose to Fail or Succeed
by Jared Diamond
Reviewed by George Gessert

2nd Filmmuseum Biennale
Digital Technologies Meet Early Cinema
Reviewed by Martha Blassnigg

Hoover: The Fishing President
by Hal Elliott Wert
Reviewed by Wilfred Niels Arnold

Keeping It Real
by Sunny Bergman
Reviewed by Stefaan Van Ryssen

Liminal Lives: Imagining the Human at the Frontiers of Bioscience
by Susan Merrill Squier
Reviewed by Eugene Thacker

Looking Into Pictures: An Interdisciplinary Approach to
Pictorial Space
by Heiko Hecht, Robert Schwartz, and Margaret Atherton (Eds.)
Reviewed by Fred Andersson

La planète hyper. De la pensée linéaire à la pensée en arabesque
by Hervé Fischer
Reviewed by Stefaan Van Ryssen

The Rise of Fashion: A Reader
by Daniel Leonhard Purdy (Ed.)
Reviewed by Michael R. (Mike) Mosher

Robert Smithson
by Eugenie Tsai (Ed.)
and
Robert Smithson: Learning from New Jersey and Elsewhere
by Ann Reynolds
Reviewed by Amy Ione

Stuff It: The Video Essay in the Digital Age
by Ursula Biemann (Ed.)
Reviewed by Dene Grigar

Technoetic Arts: A Journal of Speculative Research; V. 1, N. 1,
2, & 3
by Roy Ascott (Ed.)
Reviewed by Jan Baetens

Three Philosophical Filmmakers: Hitchcock, Wells, Renoir
by Irving Singer
Reviewed by Andrea Dahlberg

The Transparent Body: A Cultural Analysis of Medical Imaging
by Jose Van Dijck
Reviewed by Jan Baetens

AFTER ADORNO: RETHINKING MUSIC SOCIOLOGY

by Tia DeNora
Cambridge University Press, Cambridge, 2003
192 pp. illus. 12 b/w. Trade, £42.50; Paper, £15.99
ISBN:0-521-53724-X; ISBN: 0-521-83025-7.

Reviewed by David Beer
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The writings of Theodor Adorno often attract fairly firm

criticism. His work is often dismissed on the grounds of its deterministic, curmudgeonly, or elitist nature. This criticism has perhaps snowballed as these dominant critical readings have become increasingly ingrained in contemporary social theory. With this in mind, it is perhaps surprising to find that in much of the recent literature on popular music, music technology, and, in the case of DeNora's work, music in everyday life, the critique and application of Adorno's work has taken centre stage in the development of new approaches and theoretical frameworks. We have now reached a point, as foreseen by DeNora, where a reappraisal of Adorno's legacy has become near essential for the future of the sociology of music, and, more broadly, I would argue, for a sociology of technology and culture.

Often, close readings of Adorno's work uncover new dimensions and new intricacies that contradict both his own writings and these dominant readings of his work. The contradictions inherent within Adorno's work, and between dominant readings of his work, make the construction of monological or totalising interpretations extremely problematic.

In this text DeNora is concerned with reconsidering Adorno's work by formulating a detailed critique of his theoretical conceptualisations and then attempting to apply these within empirical research practices. The objective of which is to overcome the problems that DeNora identifies in Adorno's work, which are, first, that he theorises on a level that is too general, and, second, that his work is abstract and does not attempt to access music in the everyday day lives of the listener. The angle that DeNora is adopting here could well have descended into an unconstrained celebration of Adorno's failings. However, DeNora treats Adorno's work with a great deal of care. Her critical evaluations of his work do not overly dwell upon the perceived problems. Rather Adorno's work is used here as a point of departure for a reassessment of DeNora's own research projects. The problem that DeNora inevitably encounters is that as she moves toward an analysis of her own data she tends to leave Adorno behind. As a result the text feels like it is constructed around two poles. On one side, we find the abstract, the theory, and the concept; on the other, we find the microscopic analysis, the case study, and the analysis of music in people's everyday lives. I would suggest that this is an almost insurmountable problem, because, as it seems clear from a reading of DeNora's text, Adorno did not intend for his writings to be used in this type of research. DeNora must, therefore, be offered a good deal of credit for facilitating such a successful empirical application of Adorno's work, a practice that is tantamount to inserting a square peg in a round hole.

With this aside, and perhaps ignoring Adorno's own attempts at empirical research - in his analysis of the symphony on the radio or the opera on the long playing record - DeNora has constructed a valuable text that, through the critical evaluation of Adorno's writings, has created a pragmatic reference point for the study of music, and for the study of the ways in which music effects, either passively or actively, people's everyday lives. This is not an easily obtainable objective. Music is one of those black boxes, those hidden elements, those concealed practices and cultural forms, that cannot be illuminated without small scale case studies of the type used by DeNora.

Overall, this is an interesting text that creates a variety of opportunities for future research. The development of further

understandings of the ways in which music is appropriated in the reflexive stimulation of memory and emotions is one amongst a set of opportunities that emerge from a reading of this text. However, I would like to suggest that the next step requires a detailed critique of DeNora's approach, and of the empirical techniques that form the foundation of the text, so that the strategy of *critique and application* adopted by DeNora is reflected back upon *After Adorno: Rethinking Music Sociology*.

THE TRANSPARENT BODY: A CULTURAL ANALYSIS OF MEDICAL IMAGING

by Jose Van Dijck
University of Washington Press, Seattle, WA, 2005
208 pp., 20 illus. Paper, \$24.95
ISBN: 0-295-98490-2.

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In the endlessly growing field of studies on the representation of the body, Jose Van Dijck's book on medical imaging should be welcomed for more than one reason. Written from the triple background of literary studies, cultural studies, and science studies (more specifically the SCOT or social construction of technology-approach), *The Transparent Body* offers in a sense the best of both worlds: on the one hand a series of seducing and astute close readings of very concrete and highly diverse cultural artefacts such as Thomas Mann's *Magic Mountain*, the classic science fiction film *The Fantastic Voyage*, or the plastinated cadavers of the touring exhibition *Bodyworlds*, and on the other hand an over-all theory of the way medical imaging techniques such as X rays, endoscopy, or ultrasound imaging of fetuses interact with cultural interpretations and reuses of these techniques outside the medical world.

In seven concise and well-illustrated chapters, Jose Van Dijck accomplishes the tour de force, first, to introduce her readers to the (pre)history of the most currently applied technical of medical imaging and their social representations; second, to explain their main issues and stakes on a technical as well as on an ethical and ideological level; third, to relate these techniques to a broad set of cultural longing, hopes, fears, (mis)understandings, and reconstructions. Following the basic claims of the SCOT-approach, which already informed her two previous books (*Imagination: Popular Genetics and Manufacturing Babies* and *Public Consent: Debating the New Reproductive Technologies*), Van Dijck demonstrates the dialectical relationship of society and technology, each of them constructing, misconstruing, and reconstructing each other.

The major qualities of this book are rooted first of all in its acute awareness of the very historicity of representation. If *The Transparent Body* is much more than a work of cultural studies, it is not only because it exhibits through a thorough knowledge of the technologies involved in medical imaging, but also because of the attention paid to the historical frameworks that surround the invention and the use of specific techniques. *The Transparent Body* is, hence, also a media history of medical

imaging, and the reader can only feel grateful for the clarity of the author's journey through modern Western representational techniques inside and outside medicine.

In order to avoid information overkill as well as the temptation of overwhelming generalizations, Van Dijck has rightly decided not to propose one single history, however. Each chapter focuses neatly on one specific medical imaging technique, following a simple but very efficient triadic scheme: a historical introduction, a close reading of a particularly well-chosen case study, a political reflection on the contemporary cultural interpretations and implications of the given technique. Although not necessarily presented in this order, this schema provides the reader with an exemplarily didactic framework that does never prevent the author from giving many original insights on the phenomena studied.

The real pleasure the reader takes from this book is yet not only intellectual. It should be stressed that Van Dijck's style has a kind of elegance that has become too rare in current scholarship. The *Transparent Body* displays from its very first to its very last sentence a real sense of rhythm, of wit, of rhetorical devices, a perfect balance of theory and anecdote, a sound feeling of how to dispatch information without ever giving the impression of being too slow or too fast, and finally a strong moral and political commitment (yes, this is style too!).

Together with the wonderfully rich range of objects treated, all these qualities make **The Transparent Body** a fascinating book for all readers eager to learn about a crucial aspect of their daily life and the technological culture that is impregnating their body.

LIMINAL LIVES: IMAGINING THE HUMAN AT THE FRONTIERS OF BIOSCIENCE

by Susan Merrill Squier
Duke University Press, Durham, NC, 2004
368 pp., illus. 41 b/w. Trade, \$84.95; paper, \$23.95
ISBN 0-8223-3381-3; ISBN: 0-8223-3366-X.

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"Biotechnology" is a strange term. Does it denote a set of scientific practices (e.g. cloning, genetic engineering), an array of new technologies (e.g. gene sequencing machines, artificial wombs), a research field that produces particular kinds of knowledge (e.g. including genomics, proteomics), a discipline linked to institutions and industry, or is it simply something that is, in the most relativistic way (e.g. farming, breeding, fermentation), isomorphic with human civilization itself? Today, in an era in which "twice dead" human beings kept alive by medical technologies make news headlines, an era in which individual cells with the capacity for regeneration polemicize political elections - biotechnology seems to be at once the most visible and yet the least legible aspects of technologically-advanced cultures. We "see" biotechnology everywhere, even in science fiction, cartoons, and TV

commercials, and yet its pervasive visibility always seems to point to its inherent illegibility as a specialised discourse. In a nutshell: You, the average consumer, are free to try Celebrex, but this is always on the condition that you first "ask your doctor" for more information.

Susan Merrill Squier's book **Liminal Lives** is a welcome intervention in this cultural landscape. Her book takes a look at the inescapably biocultural aspects of new medical technologies, from stem cell research, to new reproductive technologies, to regenerative medicine. But, Squier does not simply take these scientific fields as self-evident; her method is to consider how a multiplicity of narratives, metaphors, and imagery are an inseparable part of how "life itself" is recontextualized and redefined. Squier's book combines approaches from literary studies, feminist science studies, the history of medicine, and cultural analyses of gender, age, and the practice of science fiction. Her analyses are not simply the scientific fields in themselves, but the variable lenses through which science co-emergence with culture. Thus biotechnology cartoons, poem-writing scientists, science fiction from **Amazing Stories**, anatomical art, and a storytelling seminar for those living with Alzheimer's are all part of her "biomedical imaginary". The focus of **Liminal Lives** is, as Squier notes, "in the ways literature and science collaborate on, and contest, a new vision of human life" (p. 3). Squier's approach is welcome because it asks us to carefully not distinguish between "narrative" as a practice exclusive to literature or film. **Liminal Lives** prompts us to consider the ways in which "science fiction" is a verb, and not simply a literary or film genre. "Science fictioning" would therefore be a way of understanding a practice in which the very relation between medicine and culture, science and fiction is constantly expressed, reflected, distorted, and worked through. This science fictioning is, by turns, melodramatic, ironic, critical, playful, and above all performative.

The concept Squier develops to describe this negotiated zone is the "liminal life": "those beings marginal to human life who hold rich potential for our ongoing biomedical negotiations with, and interventions in, the paradigmatic life crises: birth, growth, aging, and death" (p. 9). The liminal life is the life that is at once biological and more-than-biological (legal, ethical, cultural, economic), the life that is at once unmoored from the determinism of age and death and yet redetermined via a host of medical interventions, the life that hovers between being unbelievable and yet everyday. Squier's chapters consider a kind of "liminal life span," ranging from stem cells, to tissue cultures, to hybrid embryos, to organ transplantation, to the 'rejuvenate' and finally to the idea of "regenerative medicine" and renewable life. Above all, the concept of the liminal life points to the way in which we are all liminal lives, and this is indeed one of the broader effects of Squier's book. Certainly there is a sense in which "biotechnology" is inevitably abstract, surreal, and "science fictional." Yet, at the same time, biotechnology is also narrated in many different ways outside of the so-called specialist discourses, and popular culture is one domain in which this is especially true. Furthermore, each of us is also a "virtual" patient, a medical subject in potentiality, and we exist in some relation to the everyday, even banal, reality of health insurance, diet, fitness, visits to the doctor, reproduction, aging, prescription drugs, "medical" TV shows, and a broader "care of the self" contextualized by this intersection between medicine and culture.

LEONARDO, VOL. 38, NO. 4 (AUGUST 2005) -
TABLE OF CONTENTS AND SELECTED ABSTRACTS

EDITORIAL

< Sheila Pinkel: Expanding the Mandate >

ARTISTS' STATEMENTS

< Leo Contini: The Anasculpture - An Alternative to Visual Perception >

< Wayne Dunkley: Creating Space: Web Art Practice >

SPECIAL SECTION

< College Art Association Papers >

< Edward A. Shanken: Special Section Introduction: Artists in Industry and the Academy: Interdisciplinary Research Collaborations >

< Julio Bermúdez, Jim Agutter, Stefano Foresti, Dwayne Westenskow, Noah Syroid, Frank Drews and Elizabeth Tashjian: Between Art, Science and Technology: Data Representation Architecture >

< Ruth West, Jeff Burke, Cheryl Kerfeld, Eitan Mendelowitz, Thomas Holton, J.P. Lewis, Ethan Drucker and Weihong Yan: Both and Neither: *in silico* v1.0, *Ecce Homology* >

< Dana Plautz: New Ideas Emerge When Collaboration Occurs >

< Rebecca Allen: The Emergence Project: *The Bush Soul* >

< Greg Niemeyer: *PING*: Poetic Charge and Technical Implementation >

< Bill Seaman: The Hybrid Invention Generator >

< Victoria Vesna and James Gimzewski: *NANO*: An Exhibition of Scale and Senses >

< Vibeke Sorensen: Global Visual Music Jam Project >

SPECIAL SECTION

< ArtScience: The Essential Connection >

< Robert Root-Bernstein: Desmond Morris's Two Spheres >

< Tamar Schlick: The Critical Collaboration Between Art and Science: *An Experiment on a Bird in the Air Pump* and the Ramifications of Genomics for Society >

GENERAL ARTICLE

< Eduardo Reck Miranda and Andrew Brouse: Interfacing the Brain Directly with Musical Systems: On Developing Systems for Making Music with Brain Signals >

GENERAL NOTE

< Norbert Krüger and Florentin Wörgötter: Symbolic Pointillism: Computer Art Motivated by Human Brain Structures >

THEORETICAL PERSPECTIVE

< Elisa Giaccardi: Metadesign as an Emergent Design Culture >

LEONARDO REVIEWS

Reviews by René Beekman, Roy R. Behrens, Andrea Dahlberg, Dene Grigar, Rob Harle, Coral Houtman, Amy Ione, Mike Leggett, Robert Pepperell, Michael Punt, Stefaan Van Ryssen

COMMENTARY

< Bulat Galejev: Are "Cognitive Fossils" Significant for Art Studies of Synesthesia in Normal and Abnormal Cases >

LEONARDO NETWORK NEWS

LEONARDO 38:4 - ABSTRACTS

SPECIAL SECTION

BETWEEN ART, SCIENCE AND TECHNOLOGY: DATA REPRESENTATION ARCHITECTURE

by Julio Bermúdez, Jim Agutter, Stefano Foresti, Dwayne Westenskow, Noah Syroid, Frank Drews and Elizabeth Tashjian

As our civilization continues to dive deeper into the information age, making sense of complex data becomes critical. This work takes on this challenge by means of a novel method based on complete interdisciplinarity, design process and built-in evaluations. The result is the design, construction, testing and deployment of data environments supporting real-time decision-making in such diverse domains as anesthesiology and live art performance. Fundraising success, technology licensing, market implementation and many live art performances provide evidence of the great potential of committed interdisciplinary work for advancing science, art and technology while benefiting society at large.

SPECIAL SECTION

BOTH AND NEITHER: *IN SILICO* V1.0, ECCE HOMOLOGU

by Ruth West, Jeff Burke, Cheryl Kerfeld, Eitan Mendelowitz,
Thomas Holton, J.P. Lewis, Ethan Drucker and Weihong Yan

Ecce Homology, a physically interactive new-media work, visualizes genetic data as calligraphic forms. A novel computer-vision user interface allows multiple participants, through their movement in the installation space, to select genes from the human genome for visualizing the Basic Local Alignment Search Tool (BLAST), a primary algorithm in comparative genomics. *Ecce Homology* was successfully installed in the UCLA Fowler Museum, 6 November 2003 - 4 January 2004. *in silico v1.0* is a collaboration composed of eight artists and scientists representing bioinformatics, computer science, engineering, molecular biology, performance, proteomics and new media. The authors are developing *Ecce Homology* through this collaboration.

SPECIAL SECTION

NEW IDEAS EMERGE WHEN COLLABORATION OCCURS

by Dana Plautz

This paper provides some examples demonstrating the value for industry of funding and working with artists on research projects. It discusses how art research and industry can mutually benefit from working together at the research and development level. While artistic practice has long been recognized for its innovation and creativity, the potential of artistic research and the collaborative nature of artistic practice are currently underutilized by high-tech industry.

SPECIAL SECTION

THE CRITICAL COLLABORATION BETWEEN ART AND SCIENCE: *AN EXPERIMENT ON A BIRD IN THE AIR PUMP* AND THE RAMIFICATIONS OF GENOMICS FOR SOCIETY

by Tamar Schlick

Inspired by a famous 18th century painting by Joseph Wright, the author discerns similarities between issues relevant then and the public's current reception of scientific ideas from modern biology in the wake of the Human Genome Project. She proposes educational and scientific initiatives and advocates more positive and balanced portrayals of scientific themes in the arts to help engage the public in a discourse about the ramifications of genomics science and technology for our lives.

GENERAL ARTICLE

INTERFACING THE BRAIN DIRECTLY WITH MUSICAL SYSTEMS: ON DEVELOPING SYSTEMS FOR MAKING MUSIC WITH BRAIN SIGNALS

by Eduardo Reck Miranda and Andrew Brouse

The authors discuss their work on developing technology to

interface the brain directly with music systems, a field of research generally known as Brain-Computer Interfacing (BCI). The paper gives a brief background of BCI in general and surveys various attempts at musical BCI, or Brain-Computer Music Interface (BCMI) - systems designed to make music from brain signals, or *brainwaves*. The authors present a technical introduction to the electroencephalogram (EEG), which measures brainwaves detected by electrodes placed directly on the scalp. They introduce approaches to the design of BCI and BCMI systems and present two case study systems of their own design: the BCMI-Piano and the InterHarmonium.

GENERAL NOTE

SYMBOLIC POINTILLISM: COMPUTER ART MOTIVATED BY HUMAN BRAIN STRUCTURES

by Norbert Krüger and Florentin Wörgötter

The authors introduce a new kind of computer art motivated by cortical structures in the human visual system. This type of computer art is related to the sub-group of the impressionist art movement called pointillism. However, while pointillism visualizes and makes use of processes that have been associated with the human eye, Symbolic Pointillism also makes cortical processes explicit. The visual representations underlying this art have been developed during a project that aims at the transfer of functional aspects of human vision to artificial systems. The authors have applied their findings in such an artificial vision system and in a sound/vision installation.

THEORETICAL PERSPECTIVE

METADESIGN AS AN EMERGENT DESIGN CULTURE

by Elisa Giaccardi

The concept of metadesign was adopted in the 1980s regarding the use of information technologies in relation to art, cultural theories and design practices (from interactive art to biotechnological design). This article introduces theories and practices of metadesign and contributes to the unfolding of metadesign as an emergent design culture, calling for an expansion of the creative process in the new design space engendered by information technologies.

ISAST NEWS

LEONARDO EDITORIAL OFFICE MOVES TO SAN FRANCISCO ART INSTITUTE

Leonardo's San Francisco editorial office is moving! The new office space, on the main campus of the San Francisco Art Institute (SFAI) in the North Beach neighborhood of San Francisco, is part of a partnership secured this spring between *Leonardo* and SFAI.

The partnership includes internships for Art Institute students, collaborations on lecture series and symposia, and other joint endeavors still under consideration.

As of 9 July 2005 the new address for the *Leonardo* editorial office will be:

Leonardo/ISAST
c/o SFAI
800 Chestnut Street
San Francisco, CA 94133
U.S.A.

BRAINSTORMING FOR *LEONARDO'S* 40TH ANNIVERSARY

Leonardo was conceived in Paris in 1966 and the first issue was born in 1968. The rest is history - or rather the rest is future!

The *Leonardo* team is interested in ideas and input on how best to celebrate its 40th anniversary in 2006/2007/2008.

Celebrations will begin around ISEA 2006 in San Jose, California as they are co-organizing the Pacific Rim New Media Summit that will take place there.

The Leonardo/ISAST Governing Board of Directors will begin thinking and discussing at the Board of Directors meeting in August 2005. Please email your ideas or proposals by 2 August 2005 to:

isast [@] leonardo [dot] info.

LEONARDO@SIGGRAPH TOWN HALL MEETING

Roger Malina, Leonardo/ISAST chair, and Pamela Grant-Ryan, *Leonardo* Managing Editor, invite all members of the *Leonardo* organization and all those interested in the intersection of the arts, sciences and technology to join us for an open meeting to discuss current *Leonardo* projects and future directions. The meeting will take place at SIGGRAPH, on Wednesday, 3 August 2005, from 4 to 6 p.m. This meeting is open to anyone interested in meeting with members of *Leonardo* boards, committees and projects.

We will also officially award the 2005 Frank J. Malina Leonardo Lifetime Achievement Award to pioneering Brazilian artist Abraham Palatnik. Beginning in the 1940s, Palatnik played a key role in the Brazilian art scene by bringing to pictorial art the potential of light and motion in time and space. Since that time, Palatnik has continued to explore the fusion of art, science and technology in creative ways, and he is still actively working on the conception and production of new art forms.

LEONARDO NETWORK NEWS COORDINATOR: Kathleen Quillian
isast [@] leonardo [dot] info

THE PACIFIC RIM NEW MEDIA SUMMIT (PRNMS)
A PRE-SYMPOSIUM TO ISEA2006
7-8 August 2006, San Jose, California

The ISEA2006 Symposium is being held in conjunction with the first biennial ZeroOne San Jose Global Festival for Art on the Edge in San Jose, California, 5--13 August 2006. As part of the ISEA2006 Symposium, the CADRE Laboratory for New Media at San Jose State University will host a 2-day pre-symposium entitled the *Pacific Rim New Media Summit*, co-sponsored by Leonardo.

With a purview encompassing all states and nations that border the Pacific Ocean, the Pacific Rim New Media Summit is intended to explore and build interpretive bridges between institutional, corporate, social and cultural enterprises, with an emphasis on the emergence of new media arts programs.

In preparation for the summit, seven working groups are currently laying the groundwork for the main areas of investigation to be pursued in depth at the summit: Creative Community, Curatorial, Education, Directory, Eco-Social Activism, Mobile Computing and Urbanity, and Latin American-Pacific/Asia New Media.

Following is another statement from one of the working group chairs, in the continuation of our ongoing series as a build-up to the conference.

PRNMS WORKING GROUP ON ORGANIZATIONS/SYMPOSIA-PACIFIC RIM
RESIDENCIES

by Julianne Pierce, Organizations Chair
Executive Director
Australian Network for Art and Technology (ANAT)
julianne [@] anat [dot] org [dot] au

SCOPE AND OBJECTIVES

Residency and exchange programs, networks and formal structures support the ability for practitioners, curators, writers and academics to meet with each other, create new work and develop new ideas. This panel aims to research and gather data on what programs are in place across the Pacific Rim region. To what extent are these networks, organizations and programs already in dialogue with each other? What possibilities are there to create new connections and forge new relationships? This international working group looks at shared programming, residencies, exhibition and research opportunities.

GROUP MEMBERS

Julianne Pierce (Australia)- julianne [@] anat [dot] org [dot] au
Executive Director
Australian Network for Art and Technology (ANAT)

Kim Machan (Australia) - kim [@] maap [dot] org [dot] au

She has worked in the area of contemporary art, nationally and internationally, for the past 18 years as curator, arts producer and consultant. She is the founding Director of MAAP (Multimedia Art Asia Pacific).

Zhang Ga (USA) - z [@] apiece [dot] net >

He is an artist and director of the Netart Initiative, a loosely knit, open source-based, hub-styled, forum-oriented, action-enabled consortium. In 2004, he was the Artistic Director of the First Beijing International New Media Arts Exhibition and Symposium, a two-year-long project he initiated and co-organized with Prof. Lu Xiaobo, vice dean of the Academy of Arts and Design, Tsinghua University.

Shuddha Sengupta (India) - shuddha [@] sarai [dot] net >

Shuddha is a member of the RAQs Collective and is a founder of Sarai, a space for research, practice and conversation about the contemporary media and urban constellations in New Delhi.

Gridthiya 'Jeab' Gaweewong (Thailand) - gg304 [@] yahoo [dot] com >

She received her MA in Arts Administration from the School of the Art Institute of Chicago in 1996. She is co-founder and director of "Project 304", a non-profit art space based in Bangkok, focusing on multidisciplinary and cross-cultural contemporary art projects by local and international artists. Gridthiya Gaweewong's is very much interested in working with regional and international networking and on collaborative art projects.

BYTES

***** CALL FOR PAPERS *****

LEONARDO MUSIC JOURNAL 16 (2006)
NOISES OFF - SOUND BEYOND MUSIC

These days sound is more than just music. Museums, galleries and artists' studios are getting noisier: it's not that there is so much more "Sound Art," but rather that so much more art has sound. Cellphone ringtones generated four billion dollars in sales worldwide in 2004. Incoming email and outgoing popcorn announce themselves with plops and gongs and boops and beeps - the emerging field of "sonification" addresses this proliferation of all these "earcons" and other representational uses of sound. Sound design is a vital part of Hollywood films and computer games. While CD sales shrink with the proliferation of peer-to-peer file exchange, the creative use of sound is expanding in almost every other part of our lives.

For the next issue of Leonardo Music Journal we invite papers on the expanded role of sound in art, science, business and everyday life. Topics could include (but are not limited to): audio art, radio art, phonography; sound design for video, film, and gaming; the role of sound in performance art, theatre, dance; sonification; architectural acoustics; instrument design.

DEADLINES

15 October 2005 - Rough proposals, queries

1 January 2006 - Submission of finished article

Address inquiries to Nicolas Collins, Editor-in-Chief, at:
ncollins [@] artic [dot] edu.

Finished articles should be sent to the LMJ Editorial Office at
lmj [@] leonardo [dot] info.

Editorial guidelines and information for authors can be found
on our Information for Authors page.

Note: LMJ is a peer-reviewed journal. All manuscripts are
reviewed by LMJ editors, editorial board members and/or members
of the LMJ community prior to acceptance.

***** CALL FOR PAPERS *****

LEONARDO ABSTRACT SERVICE (LABS)

LABS is seeking PhD, Masters and MFA thesis abstracts for its
next publication cycle. Authors of theses interested in having
their thesis abstract considered for publication should fill out
the Thesis Abstract Submittal form at:

<http://leonardolabs.pomona.edu>

Deadline for submission is 15 June 2005.

What is LABS? LABS is a comprehensive database of Ph.D, Masters
and MFA thesis abstracts in the emerging intersection between
art, science and technology. Individuals receiving advanced
degrees in the arts (visual, sound, performance, text), computer
sciences, the sciences and/or technology, which in some way
investigate philosophical, historical, or critical applications
of science or technology to the arts, are invited to submit an
abstract of their thesis for publication consideration in this
database.

The LABS project does not seek to duplicate existing thesis
databases but rather to give visibility to interdisciplinary
work that is often hard to retrieve from existing databases. The
abstracts are available online at Pomona College,
Claremont, California, so that interested persons can access
them at no cost.

The English language peer review panel for 2004/2005 are Pau
Alcina, Jody Berland, Sean Cubitt, Frieder Nake, Sheila Pinkel
and Stephen Petersen.

INTERNATIONAL OPEN CALL - DIGITAL PRINTS

New York Hall of Science Juried Exhibition - DIGITAL' 05: "E X
Q U I S I T E" is the 7th Annual International Digital Print
Competition & Exhibition organized by Art & Science
Collaborations. It will be held from 1 October 2005 - 15 January
2006 at The New York Hall of Science, NYC.

Digital' 05 invites an examination of the nature of "exquisite"
in all of its ramifications. This year's juror is Lynn Gamwell,
Director of the Binghamton University Art Museum, Binghamton,

New York, and Curator of the Gallery of Art and Science at the New York Academy of Sciences, New York City.

There will be a fee of \$5.00 per image submission. The online entry form can be found at <http://www.asci.org/artikel685.html>

Deadline: 1 August 2005

JACQUES MANDELBROJT AT THE 17TH ANNUAL EARAGAIL ARTS FESTIVAL

With Letterkenny Arts Centre and the Glebe Gallery, Earagail Arts Festival in Donegal, Ireland presents a series of unique exhibitions on the theme of "Time" exploring the relationship between art and science in the Centenary of Einstein's Theory of Relativity, and coinciding with the United Nations Year of Science.

Instigated by Jacques Mandelbrojt, a highly regarded Marseille-based painter and physicist in collaboration with Roger Malina, editor *Leonardo* magazine and chair of Berkeley's Physics Department it presents arts/science explorations in several locations, and is the first retrospective exhibition of Mandelbrojt's work.

This exhibition covers two distinct periods in Mandelbrojt's artistic career. The first covers the years 1943 - 1970 and traces his development from figurative landscape paintings of Brittany and Provence inspired by Cézanne, to more abstract works. The second exhibition focuses on Mandelbrojt's more recent work from 1989 - 2005.

He conceives his paintings as mental images and then paints swiftly with no going back (just as time doesn't reverse). "Time is an essential element of my paintings hence a natural encounter with music, the art of time."

TIME

Paintings by Jacques Mandelbrojt (1943- 1970)

Date: 4 July - 12 August 2005

Time: Mon - Fri 10am - 4.30pm Sat 1 - 4.30pm

Also open on 10 and 17 July 2pm - 4.30pm

Venue: Donegal County Museum Letterkenny

FREE ENTRY

Paintings by Jacques Mandelbrojt (1989 - 2005)

Date: 4 July - 19 August 2005

Time: Tues - Fri 10.30am - 5pm, Sat 10.30am - 1pm

(Also open 4-17 July every day 10.30am - 5.30pm)

Venue: Letterkenny Arts Centre Central Library

FREE ENTRY

The Festival proper runs from 4-17 July 2005.

For more information, visit <http://www.mandelbrojt.com> and <http://www.eaf.ie>

OBITUARY

by Jill Sykes

KEYWORDS

Joan Brassil, The Breath of Psyche, Australian artist

ABSTRACT

Australian Joan Brassil passes away. Her exhibition history is impressive, spanning over three decades but most notably in 1981, she participated in the first Australian Sculpture Triennale in Melbourne, as well as participating in Perspecta, Art Gallery of NSW, Sydney in 1985. More recently the Museum of Contemporary Art, Sydney curated a retrospective exhibition of her work, "Liquid Sea" in 2003. Joan also has a Doctorate of Creative Arts from Wollongong University, Australia.

Joan Brassil, who has died at 85, was an artist of unique character and singular talents. She was enigmatic about some things, unequivocally direct about others. She could seem detached yet her focus was always sharp, intellectually and emotionally.

Her art was not the sort that hangs on walls and brings high prices at auction. She created sculptures and installations that explored many ideas. Leaf litter - collected from her bush studio in the artists' colony at Wedderburn, on the fringe of Sydney - rocks and moss might be lined up with cores of diorite rock from the depths of the Earth and a sophisticated array of electronic equipment to express esoteric concepts.

"Deceptively simple and yet utterly confounding" was the description given to one of her installations, *The Breath of Psyche*, by Dr Susan Best, senior lecturer in art at the University of NSW. It sums up Brassil's work: its physical elements accessible but its meaning an invigorating intellectual challenge.

Brassil embraced technology as she sought the help of scientists to capture the sound of dead stars singing - pulsars recorded at the Parkes radio telescope - and the sound of whistlers picked up by satellite. Her research involved mathematicians, musicians, farmers and dancers.

In an interview for the *Herald* in 1995, she said: "You always know a lot of remarkable people. If you are working holistically, you must consult a wide range of people in varying disciplines. All you have to say is, 'What are you doing?' and they always tell me and I like to continue the song. We all leave our voices in the minds of others."

One of the scientists who worked on projects with Brassil, Stewart Whittlestone, had been in her art class at high school. "Utterly hopeless," he says of his artistic skills. But as an adult who had "a long association with radio activity", he was ideally qualified to help her when she ventured into the cosmos in the early 1980s.

"It was great to work with an artist who wanted to understand science," he says. "It was my task to get the scientific integrity into it. This was an installation about cosmic rays, so we said, let's have some real cosmic rays. I got some obsolete Geiger tubes." It was the start of Brassil's fascination for randomness and a long association with Whittlestone.

Another scientific collaborator, the late Brian Robinson, wrote of her in 1999: "There are similarities between Joan's creative process and my own as an astronomer. There is a common link in sharp observation, imaginative interpretation, leaps beyond established dogma. She grasps the underlying significance of some new idea, while I am still groping around for understanding." He referred to her "insatiable curiosity" and a comment from her about the process of research: "It's good fun, isn't it? Deeply resonant fun."

"Why not?" was one of Brassil's characteristic remarks. It answered suggestions as different as meeting for a coffee, launching into a new project or going into the Australian desert, which she loved to do - taking a video camera and gathering thoughts for the poems that accompanied her installations. She was a treasured travelling companion for her clarity of observations and opinions.

Perhaps the most extraordinary thing about Brassil's career as an artist was that she didn't take it up as a full-time occupation until she was 55. As a young widow, she had brought up her two sons by teaching art, mostly at Campbelltown High School. She always talked about serendipity in her life: one of those moments was when the school told her with immense regret that new regulations meant she wasn't fully qualified for her job - the same week she was offered a studio to work in.

She exhibited at the Bonython Gallery, the Sculpture Centre and the Roslyn Oxley9 Gallery, plus venues from Tokyo and Tuscany to Wollongong and Orange. Her work has been featured in the Biennale of Sydney, Perspecta, the Adelaide Festival, in Melbourne, at the Art Gallery of NSW and Museum of Contemporary Art.

The Campbelltown Arts Centre was her beloved local gallery, venue for temporary installations and a permanent work.

By the end of her life, Brassil had added the qualifications of a doctorate in creative arts from Wollongong University, an honorary doctorate from the College of Fine Arts, University of NSW, and an Order of Australia honour (AM), art awards and grants, as well as high esteem from the top echelons of art in Australia.

The head curator of international art at the Art Gallery of NSW, Tony Bond, recalls how she "leapt from sophisticated craft objects to high technology. Although she was fascinated by the technology, she was always poetic in her application of it. There was that mysterious quality about her: she sort of wafted through the world. But in creating work, she was fiercely in control."

She never lost her exceptional ability to nurture people's talents. The actress Heather Mitchell, whose family was close to hers, recalls "her incredible insight into people's gifts. It didn't have to have anything to do with the arts. She knew how

to pinpoint it and how to celebrate it, reminding people of their strengths. She once wrote me a card saying 'You have a gift of unstinted giving' - at the age of 11. I still have that card."

Russell Dumas, choreographer and director of Dance Exchange, would discuss ideas and concepts with Brassil. "She was very fair. It wasn't that she avoided saying difficult things. Somehow she managed to get you to think you had thought about it yourself."

Artist Robyn Backen says: "Joan was a really great inspirational colleague. She was always there, always thinking and always interested. She was always able to find the positive - but also a great criticality. 'I like your work, we must talk,' she would say in these floaty tones, as if she was hovering above Earth. And the way she answered the phone, her 'Good morning' meant 'I am here and I am here for you.'"

Brassil is survived by her son Greg, an art teacher, and his sons Liam - who has a fine arts degree - and Owen, who has taken up the skills of his great-grandfather as trumpet player and stonemason. Her other grandchildren are Patrick, a chef, and Tony, who works in the mining industry; their father, Peter, predeceased her.

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