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Breakout option: 400 words : this is intended as a related topic, to be placed in a panel within the body of the article, space permitting.

Introduction

Desktop CD-ROM burners capable of making individual ('gold') discs has attracted the attention of visual artists and, since the early-90s, has created the opportunity for multimedia artists to make their work more widely available. 'Microwave') is an exhibition that sets out to give visitors a glimpse of the work that has been published in editions since that time, and also includes 'gold discs' not previously exhibited anywhere else in the world.

"ARTISTS' BURNING ART"

Contemporary International CD-ROMs

This essay previews the range of strategies employed by the artists in designing the interface - that intimate space between the image on the monitor screen and the computer user; and some of the issues and ideas raised by the content of the artworks. The interactive and the immersive states of engagement are considered and also some of the innovations achieved by the artists that help to claim the CD-ROM as a creative medium.

Whilst the image from the video camera is an important

component of many of these works in this exhibition, the model worlds developed by the artists illuminate the significant difference between the image from a computer and the image from a videotape - the computer offers non-linear options for guiding or navigating the order and duration of events. In many of the selected works, the interaction is cathedral-like in complexity: blocks of images, movies, sounds and texts, assembled complete with nave, transept, choir, chapels and chapter house; and of course crypt, (not to say dungeons).

In Graham Ellard ;

Philip George and Ralph Wayment's Mnemonic Notations creates a two-dimensional space as complex as the paths of a Tantra painting;

Art and the Computer - the Cumbersome Tool

Since the 1940s visual artists have used the computer as a tool to perform more quickly the often mundane task of making something visible. Designers and architects have had much experience with computer-aided-design (CAD) software capable of producing drawings which can incorporate design changes and thus save hours of repetitive re-drawing. The publishing, printing and pre-press industries have been central to developing the word-processing, desktop publishing and photo-manipulation software, initially to make their businesses more competitive - now that the software is so ubiquitous it has led onto business opportunities never before envisaged.

The ability of the computing apparatus to respond

flexibly and rapidly to changes in a project, in a multitude of work applications, is a result of the design intuitions of artists skilled in the use of tools combining with the computer scientists' ability to develop potential tools.

CD-ROM: A MEDIUM REVEALED

As the availability and viability of CD-ROM as a storage and distribution medium began to be felt, various problems traditionally associated with making computer art were resolved. Quite rapidly the positive characteristics of the new medium emerged:

Plasticity and Permanence

The ephemeral and fugitive nature of much computer-based work has restricted its exhibition potential to one-off installations, or playout through video and film. The archival specifications of CD-ROM can more or less guarantee that a completed work as "art-on-disc" cannot be:

- erased, tampered with or altered;

- duplicated (if the correct safeguards are in place), thus preventing the unauthorised copying of artists work and its illicit commercial exploitation;

CD-ROM also has very good physical properties and archival specifications and therefore good prospects for financial return to artists through:

- purchase by collections both private and

public, of limited editions of a work;

- the editioning of multiple runs for wider distribution by niche publishers;

- the licensing of titles to networks via servers or linked CD-ROM players.

These advantages are capable of giving assurance to the artist concerning the time and material resources invested and offer better prospects for financial compensation than rentals on films and videotapes, or fees for installation.

Cost Effectiveness

The cost of transferring computer files from 'the studio' (the workstation with hard disc/server) to 'the gallery' (the Compact Disc) has been reduced, enabling a relatively low cost of 'casting' a copy. This can be as little as the cost of a 'raw' disc if a 'burner' is available. The relatively low cost of making test and 'artist proof' editions enables the work to be seen easily by other artists and researchers, curators and publishers. With a world-wide CD pressing industry now established, the cost of producing multiples and editions has reduced, further extending the potential for a financial return.

Independent Production

During the early development of the personal computer in the 1970s and 1980s, competing companies produced huge variations of computer components (hardware) and the coded instructions necessary to run them (software). The economical Amiga, Commodore and Atari brands were popular

with artists during this time, in spite of their crude imaging capacities. Computer labs and commercial companies around the world, using a myriad of other systems, would occasionally grant access to artists to experiment. However, this was usually during unsocial hours, in unsympathetic working conditions, often tolerated by artists with no income or professional support. Independence had its price. The range of computer systems and standards since then has streamlined. Now it is quite common for any single CD-ROM to be readable on both major but incompatible systems - Macintosh and Windows. Cross-platform developers' software can address 95% of the installed CD-ROM user-base, and has encouraged the artist to invest time and develop production resources.

Alongside the marketing of computers for the consumption of CD-ROM, the computer industry has developed software tools for production. Designed for specialist users rather than programmers these offer artists independence from commercial production companies. Nevertheless, the number of craft skills required of an individual to make a CD-ROM are considerable and include those of a photographer, film/video camera operator, lighting director, graphic designer, writer, picture and sound editor, typographer, sound recordist, computer programmer and line producer. While some artists are capable of undertaking all these skills to a high professional standard, most restrict their expertise to a few, and work within these limitations, or collaborate with other artists with different skills, or go out and raise funds to pay for the expertise required.

Developing a studio practice of techniques specific to

computer art is greatly aided by CD-ROM. For instance it facilitates the magpie approach of amassing working material. Having converted images, text and/or sound into digital form, artists can catalogue the stuff onto a CD-ROM and use discs as an archive, retrieving to the production computer as and when the need arises; no backups, no maintenance. Working experiments and 'sketches' can be economically stored for later reference.

Distribution and Exhibition

Art produced using computers can be reproduced using home or office equipment connected to a CD-ROM player - in the home or over lunch at the office. The computer-with-CD-ROM-drive, or multimedia computer, is the standard computer of 1997, capable of connection via a phone line to the Internet and other computer networks. It is being marketed in a way reminiscent of the selling of domestic video cameras - as a universal enfranchiser.

From 1995 onwards, the quantity of World Wide Web (WWW) sites expanded exponentially, continuing to define what the 'superhighway' might become, with artists setting the pace for works of imagination and depth. However, the arrival of data from many Web sites is sluggish, particularly where memory hungry images are concerned. For this reason, many regard the Web as primarily a publishing and distribution system with limited potential for fully interactive artworks, at least at its current stage of technical development. CD-ROM, by comparison, has to be regarded as the best compromise among computer technologies available to artists, because the full range of multimedia (text, images, movies and so on) is able to fully function. Over the next few years artists will also

begin to utilise the new format DVD (Digital Video Disc or Digital Versatile Disc) which has ten times the amount of storage space as a CD-ROM and is therefore capable of playing 60 minutes of full-screen movies at a quality of sound and image which exceeds VHS video cassette.

The technology will always be developing, (if not 'improving'). The works in this exhibition are not about the technology per se but about the aesthetic imagination. The imagination and its involvement with interface design and the kind of interaction possible with the 'audience' or 'user' or 'interactor', and the artists ability to use this tool to communicate and explore ideas about ourselves, our relation to others and our place in the world.

Interface

The interface is the conventional and pragmatic shorthand description that most users have inherited from computer scientists and the computer trade to describe the organisation of the screen, keyboard and mouse that enables the user to control the functioning of the computer, this functioning described most simply as Input/Output, or I/O to use the jargon. The 'interface' services the basic computer function: -input-process-output-.

In response to output, interaction occurs, resulting in further input, thus initiating a cyclical progression. Input is effected by the computer using the meta-language of computer code, or by the viewer interacting with the highly organised surface of the graphical user interface (GUI), which conceals the code by substituting images and icons. The term 'desktop' (adopted by Apple Macintosh

computers at an early stage in the development of the personal computer) equates the design of the interface with a well-ordered office.

The interface paradigm is central to the explorations of artists represented in this exhibition. In a paper 'Down the photoslope in syncopanc pulses': Thinking Electronically' the writer Darren Tofts asks:

"What, or more specifically when, is an interface? [The assumption is]... it only exists in the cybernetic domain, when someone sits in front of a pc and clicks a mouse. An interface, on the contrary, is any act of conjunction which results in a new or unexpected event. A door-handle, as Brenda Laurel reminds us, is an interface. So too is the "chance encounter, on an operating table, of a sewing machine and an umbrella." James Joyce didn't write books. Marcel Duchamp didn't create works of art. John Cage didn't compose music. They created interfaces, instances into which someone, (you), intervened to make choices and judgements that they were not willing to make. ... You are empowered, you are in control. Cough during a John Cage recital and you are part of the performance. That's an interface."#

Artists like the three cited above are much less concerned with the details of technology when it comes to employing the tools that technologists invent, whether a typewriter, a urinal, a piano - or a computer. Tools simply enable the material evidence, the artwork, to be presented to the viewer. The active response of the viewer, either through internal reflection, or a more innate and reflexive external gesture, such as physically walking around a three-dimensional object (or coughing

during a John Cage performance), completes the meaning of the work. The CD-ROM interface includes a physical link between the viewer and the artwork -- the Mouse -- making response necessary rather than optional.

Many works in the exhibition explore the potential of the interface, by navigating through the various 'screen spaces' that make up the whole work.

Interact/Immerse

The terms 'interactive' and 'immersive' describe the primary responses to the options of progression through a CD-ROM interface.

Immersion follows a tradition within art history of contemplation, exploring the work through a reflective and cerebral process based on the perceiver's response to the actions of the artist. Interaction often follows innate responses more closely related to the hunter's instinct or, in less primitive terms, the existential experience, where reflection is subordinated to action.

Encountering a work's interface for the first time involves establishing a modus operandi: first, find the way in; then determine a system for movement through the work. Most works in the exhibition require quite attentive interaction but the actual method of progressing through a piece is different in each one. It could be by simply clicking on the image of a labelled button that one is led on to further options. Less obvious opportunities for interaction need to be determined by trial and error - very often without recourse to rational deduction!

A Digital Rhizome by Brad Miller (not included in this exhibition), has been seen extensively around the world in the last four years. It was the first interactive computer piece I encountered and the notes I made then I feel apply as a general strategy for many other works which place the emphasis on interaction rather than immersion, and use the mouse click intensively - on buttons, labelled or unlabelled, and zones, concealed or indicated with an image. By contrast the anti-button attitude is represented by work in this exhibition Urban Feedback by Sophie Greenfield and Giles Rolleston, where the Mouse is employed as a tool to participate in the making of a work of collage, based on the images and sounds which bombard us everyday through all kinds of media.

The printed book is one interactive model used frequently in popular retail CD-ROM titles. The interacting subject, by definition, is in the same kind of close proximity to a work as the reader of a book. Even the various genres are repeated: the reference book, the tutorial, the travelogue, the biography, the salacious peepshow and the novel. Some artists have experimented with this model. John Colette commences with three options for exploring the collected data on his disc 30 Words for the City: a random selection plays a loop of the entire work; the entire work plays in a loop until Quit; or the work can be viewed in 'a book format'. The clues provided in Colette's 'book' as to 'content' are not found through a contents or index page but simply through combining the two processes of interaction and immersion sequentially. Having selected an item, the linking feature particular to interactive multimedia computer work, hyperlinking,

takes the 'reader' straight to the text, sound and images, without pages to thumb. You select from one of the button images, you watch until the sequence ends, then you decide what to watch next. The equation with a physical book is thus only partial.

Similar processes of interaction and immersion, which function together to produce electronic catalogues of discrete 'movies', occur in works such as The Encyclopedia of Clamps by the group De-Lux'O, a work which like their earlier Barminski - Consumer Product, addresses the absurdities of North American urban existence and its blend of ephemeral cultural perspectives.

Peter de Lorenzo's Reflections, Abstractions and Memory Structures RAMS - which goes to the 'extreme' of using interaction to simply start-stop-start the entirely linear image progression - a videotape on CD-ROM.

Celebration of the intimacy of the interacting process is enacted in Flora Pentriinsularis by Jean-Louis Boissier (after Jean-Jacques Rousseau), where the smallest of physical movements or a click of the Mouse is reflected by movement on the screen. This gentle and sensuous correspondence, requiring the responding gesture, places the interacting subject clearly in the frame of the screen.

The question of motivation remains - why should I want to interact?

The established protocols of screen culture are questioned to greater and lesser degree by work on CD-

ROM. The promise of more to see (the scopophilic drive), and more to follow (the narrative drive) both propel the interacting navigator forward. Like multi-channel television, they may simply encourage the obsessive searching for something else - 'clickoritis' as one observer memorably described it. For meaning to be made however, the kind of interaction anticipated by most artist developers, is that which takes risks, on the part of the interactor, with the material presented.

Exploration and experimentation are the keys to this process, responses which are present in the appreciation of art in history but responses which, for the most part, involve a wholly cerebral experience - 'art of the mind'. The possibility of 'pulling the art apart' (without damaging it), becomes a reality when it is placed on the computer. Venetian Deer by the German group Die Veteranen, (as in their earlier work Die Veteranen), encourages us to recompose their offerings and even to make images and mix sounds using the tools they provide. Once saved as a file (and if the computer has a suitable internet connection), these can then be added to the virtual gallery the artists have established on the internet at a site in Germany to which the CD-ROM will automatically take you.

Interface to Paradise?

The cultural shift that comes about with the advent of a new medium marks a movement away from the 'private universe of mind to the public world of the cathode ray tube', as Derrick de Kerkhove has suggested. # CD-ROM anticipates the computer networks that in their initial stages propose a collective intelligence of hyperlinked human activity. It is where modes of 'listening' are being re-defined and where the oral tradition is being

redeveloped.

Engaging the audience in a productive relationship is the Interface we are currently seeking to imagine and create. Though somewhat eclipsed by the current fashion for things on the Web, the CD-ROM combines the potential to create complex model worlds with material immutability -- its major advantage. At this transitional stage of movement towards multimedia computer networks, the CD-ROM also enables the most sophisticated development of the interface, and, besides affirming aspects of an art-historical tradition, reveals opportunities for extensive research by artists to create interfaces of the future.

BREAKOUT PAGE/PANEL

387 words

NAVIGATING LEVELS OF MEANING

The title screen for a work in this exhibition may present multiple options for beginning the interactive process. Often no clue is given as to the consequence of making one choice or another. A first level of meaning is thus quickly established: that whilst sequence will have significance, a specified order will not - hence the narrative encountered will be the unique result of how an

individual interacts with the work.

The process of interacting by clicking on images or words is quickly learnt to influence progress, but is recognised as not being a process of 'control'. This becomes the second level of meaning.

Now a process commences whereby the interacting subject attempts to delineate the furthest extent of each section of the work, clicking outwards in a conceptual circle, attempting to plot 'landmark' images along the way, before returning through the maze to the starting point, to then set out to test the path again before beginning again from another point.

With so little to go on, the 'mazing' process itself offers the third level of meaning as the motivational drive changes into a pleasurable era of reflexivity. Without knowing the consequences of taking options (as opposed to making choices), the form of the exploration is accepted as being purely aleatory - a result of chance not choice. But the interacting subject's memory of images, text clusters, button slogans etc., is severely stretched in an effort to map the topography. The work may suddenly subvert a viewer's imagined game-plan. As mazing continues 'control' is not wrested by the interactor but is at best shared.

A fourth level of meaning comes as the interactor invokes that familiar defuser of subversive strategies - interpretation. On what basis were these images/sounds/texts selected, created and combined? Does the interactive construction create space in the mind of the viewer to interrogate the images? What is the

relationship between the structure of the work and its overt content?

Whilst CD-ROMs may confront us with what appear to be over determined images, the interactive process can enable us to comprehend the narrative process to which the media often subjects us. We know that constant repetition can render words and images meaningless, but to be in a position to determine for oneself the number of repetitions returns the formation of meaning to the perceiver.