Mapping A Sensibility:
Computer Imaging
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"The work of art," as the surrealist André Breton said, "is valuable only so far as it is vibrated by the reflexes of the future." These "reflexes of the future" have introduced, since the early 1900s, increasingly powerful visual technologies. To rephrase André Breton — in certain critical epochs, art anticipates effects that are only fully realized by newly emerging technology and new art forms.

It is often stated that our "new information society" or "the electronic age" is now at a critical time of societal transformation. In this transformation new visualization tools are predicted to play an increasing role.

How can we gain an insight into the characteristics of the emerging visual media? According to André Breton's perspective, contemporary art concerns can anticipate those of the new visual technology. Therefore, by mapping one to the other we can locate clues pointing towards a changed visual sensibility.

The following text maps contemporary art concerns to computer imaging in three major aspects of image making. First, the techniques of forming an image are called, in the text, "image formulation." Second, the image's relationship with the viewer (and/or creator) is called "interaction" (after the person/machine relationship in computer science). The last aspect, the image's relationship with its subject matter, is called "Reality." It is these three sensitive areas that begin to subtly shift as new technology forces adjustment in human perception.

Image Formulation

Many computer graphics techniques are modeled from existing techniques in other visual media. Computer graphics demonstrates startling facility in perspective, texture, as well as another obsession of the arts in the fifteenth century, modeling with light. Ray tracing algorithms, for example, produce subtle displays in mirrors, lenses or glass. "Paint systems" model two dimensional painting by hand. Key frame computer animation is transposed from cel animation in film. Fades, dissolves, zooms and other grammatical transitions of film and television are also available. This brief number of examples indicates the ability of computer graphics to easily absorb many imaging techniques proven effective by earlier media. What we can now suggest are the following unexpected capabilities.

Integration Of Visual Techniques — First there are new combinations of known imaging techniques. The moving point of view is a simple example. This technique combines the advantages of three-dimensional drawing with the camera's freedom of movement. Thus, motion dynamics allow the viewer to "fly" around drawn buildings or molecules. One can expect that future developments will combine visual techniques with other disciplines such as digital sound.

New Description Systems — A second unexpected capability is the arrival of a new visual description system such as fractals. Fractals are based on a different geometry than that which underlies most three-dimensional form making. This geometry offers new ways for artists to think about forms — such as intervals of dimension, "roughness dimension" and its ability to produce infinite detail. Its power to describe detailed natural forms such as grass, plants or terrain is proving to be an image breakthrough in computer graphics.

Windows — A third unexpected capability is a change in visual format. Max Ernst described his collages in 1936 as "a meeting of two distinct realities in a plane foreign to them both." This statement describes a visual environment very different from the consistent spatial unity of a perspective image. It also describes the overlapping windows of progressive activities in the Smalltalk programming environment or spatial data management systems. Within the history of collage and multi-screen video and film, these window frames are unique. They are user directed viewports into ever-receding depths or around ever-expanding horizons of information.

Automation And Creativity — One fascinating aspect which can only be suggested here is contemporary art's exploration of levels of artistic decision-making. Both art's compositional techniques, as well as chance and random procedures are now being automated through computers. Perhaps it is for this reason we see more emphasis on the creative process itself. Ironically it may be no accident that music is a case study in artificial intelligence. Marvin Minsky said in the New York Times, "you have to make a . . . composer (program) . . . that means your attention is drawn not so much to the rules of the surface (of the music) but to the rules of how the composer decides what to do next." Similarly, we will likely see an increased interest in the mental procedures of image-making.

Interaction

Pulling back from the image technique itself, we find a person in relation to that image — he/she interacts. In the language of film, TV, theatre or painting, this position is occupied by the viewer, the spectator, the audience. It is significant that in computer graphics, this person is always referred to as the "user." This may be obvious to the world of computer graphics but a radical change for most visual production. But again there has been anticipatory art. The 60s happenings, theatrical improvisation, the 70s performance art tried to stretch, dissolve, reform, destroy the formidable spectator-object boundary. "Guerilla" TV encouraged "talk back to your TV set" through social action video and community TV. All awkwardly anticipated the powerful and natural interactive relationship between user and machine/program. This work has put such a strain on art language that the best, but inadequate, word to describe the new role of spectator is "participant." In terms of the historical image-making world, this change demands a fundamental reorientation of subject-object relationship.

Mental Shelter — Architectural structure may present a better analogy than film, TV, painting or photography to re-think the subject-object relationship. A building creates an environment for movement. Unless it is a prison, the architecture does not attempt to precisely control persons. "Tamara," a play in Toronto, anticipated this sense of dramatic spatial design by attaching audience members to actors as they played a drama throughout a house. Similarly one plays an adventure game, flies a plane through a desert and branches through an information space. The twist to this situation occurs, for example, in teaching programs designed to track the individual weaknesses and strengths of the user and adapt its response. The mental shelter has become an adaptive organism.

Reality

At last we arrive in the trickiest terrain — so apparently innocent. The core of visual art is the ever-questioned link between the image and . . . something. Since no serious art can avoid this issue, artists generally have a healthy cynicism for visual conventions that lay sole claim to "reality." This had not always been the case. Photography introduced an indelible trauma into western art's smug acceptance of visual conventions they believed truly depicted "nature."

In the mid 1800s, for instance, picturing such things as a horse in gallop was a perplexing problem. The photographer, Muybridge, took up the challenge and produced a series of photos that contradicted all previous representations made by artists. The meaning of "true to nature" lost its force. What was true could not always be seen and what could be seen was not always true. No artists would then dare to paint a horse in the old position without risking public ridicule. Photography had won a powerful victory in its correct role as "evidence" in our culture.

Reality links — Updated computer graphics makes a direct link between changing measurements and corresponding changes in visual representation. In the past, complex charts have attempted to picture large patterns and abstract relationships. Animation has attempted to illustrate processes. But to directly and dynamically link measurable changes in the world to changes in visual representation is a dramatic step in the history of images. It appears that not since the invention of perspective (and its descendents in the optics of photography and film) or the appearance of movement in film through persistence of vision have we added such a powerful new imaging tool to our culture. Perspective offered the analysis of space, film the analysis of motion and updated dynamic images the analysis of abstract relationships.

We began by looking for signposts to a changing sensibility in our image environment. We characterized the common terrain of contemporary art concerns and computer imaging. What we found was an increasing integration of visual techniques and conventions, a close embrace of participant (user) and object, (machine/environment) and a close-knit bond between dynamic images and measurements of abstracted relationships in "reality." These are generally integrative impulses. It is likely they will be furthered by computer graphics' chameleon-like ability to simulate both mental and physical processes.