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

Introduction

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

It is clear that the development of one-point perspective by Brunelleschi and Masaccio in the early 15th century marks the emergence of a system for envisioning space that remains paradigmatic to this day. What may be less evident is that perspective is a form of perceptual technology, a tool for

measuring and representing the visual world. The technology of perspective has itself been adopted and further reified by another visual technology: photography, and by the status of that medium as a representational norm. The result is that perspective has become such a powerful and pervasive paradigm that it is difficult to imagine perceiving the world without it. At the same time, its effects on human consciousness are so subtle and insidious that one is rarely aware of it. Perspective is like part of an invisible operating system running in the background of the brain's perceptual program. My reason for referring to perspective as a technology is because I want to emphasize its status as a tool, while at the same time denaturalize it by pointing out its embeddedness in a genealogy of human ideas.

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

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

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

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

Quadri Riportati Versus Quadratura:

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

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

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

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

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

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

Miroslaw Rogala

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

— Miroslaw Rogala, in collaboration with Joe MacGregory, 1994



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

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

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

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

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

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

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

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

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

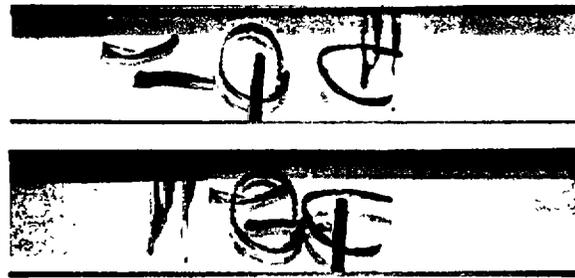
"[A]s a consequence of the reconfiguration of the experience of perspective as interactive... *Lovers Leap* posits the image as a challenge to the objective history of linear projective geometry as it considers the encounter with the random and subjective juxtapositions of experience... A new understanding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

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

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

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

Roy Ascott



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

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

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

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

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

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

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

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

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

Moreover, online rape, pornography, terrorism, and viruses are part of the economy and structure of the global village.

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

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

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

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

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

I think that one of the misunderstandings about telematics arises from the expectation that it correspond with either an object- or process-oriented approach to art. While certainly the process of interactive, collaborative artistic exchange and the files created as a result of networking constitute key components of it, there is also a conceptual component to the medium which, though it rarely goes unnoticed, infrequently is recognized as fundamental to the work. Consider the proposition that telematic art is a form of conceptual art. What I mean by that is that the work is embodied in its own idea.⁶¹

It was, in fact Penny's article that helped call my attention to it. He missed this point because he disapproves of the "techno-utopian rhetoric" of telematic art. But what he refers to as "rhetoric" is a basic material of the medium. That is, the conceptual idea of telematic art (that electronic telecommunications technology either do, or have the potential to, contribute to the creation of a networked consciousness that is greater than the sum of its parts) is an integral part of the work.

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

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

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

References

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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