

Light and Dark Visions:

THE RELATIONSHIP OF CULTURAL THEORY TO ART THAT USES EMERGING TECHNOLOGIES

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Abstract

Critical theory and cultural studies are increasingly being used to understand the function of the arts in contemporary technology-dominated, postmodern culture. This essay examines the relevance of these analyses to the work of artists who use emerging technologies. The first section reviews core concepts that are useful for understanding art/technology linkages from post-modernist, post-industrialist, and post-structuralist writers. Concepts discussed include the rejection of the modernist idea of a single dominant cultural stream, the demarginalization of diverse voices, the increasing importance of information and the impact of mediated image and representation on ideology and behavior, and the emphasis on deconstructing the language systems and meta-narratives that shape culture.

The essay then identifies several limitations in these theories that become apparent in the consideration of art that uses emergent technologies. First discussed is the divergence of world view between postmodern, deconstructive sensibilities and the essentially modernist perspectives and self-representations of researchers and technologists who believe they are working on inventing the future. Next considered is the tension between the high value the arts have traditionally placed upon real things and immediate sensual experience and the postmodern emphasis on the primacy of mediated images and signs. Finally, the essay inspects the uncertain basis for validity and justification of artistic production in a deconstructed environment in which the art world is seen as one limited discourse, and individual genius and vision are seen as illusory.

The essay suggests that some of the critical confusion about the field of art and technology derives from the variety of stances an artist can take in regard to these issues. It describes three: a practice that

rejects much of this critique and seeks in a modernist sense to assimilate technological art to the mainstream art world as it was historically constituted; a deconstructionist practice that uses the skills, tools, and familiarity with the technology world to critically analyze the meta-narratives of contemporary life; and a practice that seeks to enter into the heart of the inventive process to help elaborate the culture-transforming possibilities of the new technologies.

Introduction: The Relationship of Critical Theory and Cultural Studies to Art that Focuses on Emerging Technologies

The impact of technology on contemporary life and culture is a vital issue in our age. Critical theory and cultural studies attempt to link the arts, literature, politics, sociology, anthropology, philosophy, and technology in an interdisciplinary search for relevant concepts and frameworks with which to understand the current world. Art practice and theory are being radically reshaped by this activity.

This hybrid world of culture/art criticism, which places great import on the impact of emerging technologies, has seemed unexpectedly disinterested in the work of artists who work with these very technologies. Similarly, the discourse in the art/technology world—and in the technical world in general—has not engaged deeply the concepts from cultural studies. This essay attempts to elucidate some reasons that might underlie this mutual lack of attention.

The essay has several objectives: first, it briefly reviews concepts and lines of inquiry from cultural theory that are useful for exploring the relationship of art and technology. Next, it uses some of these concepts as they are applied in mainstream art criticism to inspect the practice of artists working with new technologies, and identifies ways their practice

challenges these theoretical formulations. It then considers a range of theoretical stances artists can assume in relation to working with new technologies. Its goals are to help artists define for themselves a theoretical stance toward their work with technology and to advance the ability of art theory and art criticism to contend with new technologies.

Survey of Themes from Critical Theory and Cultural Studies:

This section briefly surveys some interrelated concepts and themes from critical theory and culture studies that can be applied to the consideration of relationships between art and emerging technology.

Post Industrialism

Many cultural theorists note that the contemporary era is radically different from its predecessor, the industrial era. More workers are involved with the production, organization, and distribution of information than with the production of things. We have an "information economy" in which increasingly smaller proportions of the populace generate food and artifacts.¹ Our political and cultural structures and ideologies are seen as lagging behind the realities.

Electronic Media and Other Technologies

The pervasiveness and consciousness-transforming potentials of electronic media and other technologies are seen as a critical feature of the post industrial landscape. Television, computer, telecommunication, medical, biological, and military technologies are not just isolated industries. McLuhan² early noted that media had impact beyond any particular message and transformed the way we saw ourselves and the world. Culture studies are most productive as they point out far-reach-

ing implication of technology—for example, Haraway³ on ideological impact of biological and medical technologies, Virilio⁴ on military technology, Foucault⁵ on surveillance and law enforcement technology, and Baudrillard⁶ on mass media, entertainment, and advertising technologies.

Poster describes the network of socio-technological impacts on ideology and everyday life:

Some analysts recognize that the study of electronic communication requires more than attention to new technologies or machines and signifies more than progressive increases in the efficiency of symbolic exchanges. In one such study, Carolyn Marvin argues that the history of electronic communication “is less the evolution of technical efficiencies in communication than a series of arenas for negotiating issues crucial to the conduct of social life; among them, who is inside and outside, who may speak, who may not, and who has authority and may be believed.” She is able to demonstrate, for example, that the introduction of the telephone did more than enable people to communicate over long distances: it threatened existing class relations by extending the boundary of who may speak to whom; it also altered modes of courtship and possibilities of romance. . .

With this thematic she recognizes the role of cultural and social forms in shaping new communication patterns at the point of technological innovation, but she does not question some of the broader, theoretical implications of these changes. In order to discern “new events” or new communications one must problematize the nature of communications in modern society by re-theorizing the relation between action and language, behavior and belief, and material reality and culture.⁷

Baudrillard suggests that the spread of media technologies have resulted in a mediated life situation where images take on lives of their own and most people conduct their lives based on “hyper-reality.” There is a bombardment of signs and an implosion of meaning. The masses respond by “reducing all articulate discourse to a single, irrational groundless dimension in which signs lose their meaning and subside into exhausted fascination.”⁸

Signs have become separated from their referents to such an extent that interactions with simulacra become the dominating experience for most people. In this dark vision

implosion announces the nullity of all opposition, the dissolution of history, the neutralization of difference, the erasure of any possible figuration of alternate actuality. At the cold superdense core of this

anti finale is not absolute knowledge, but rather the absolute dominion of digitized memory-storage banks, not even dimly fathomable through the aqueous screens of the video display terminals.⁹

Furthermore, all claims to universal truth dissolve when one realizes the potential lack of essentiality and authenticity of messages:

It is no longer possible to maintain the old economy of truth and representation in a world where ‘reality’ is entirely constructed through forms of mass-media feedback, where values are determined by consumer demand (itself brought about by the endless circulation of meanings, images, and advertising codes), and where nothing could serve as a means of distinguishing true from merely true-seeming (or ideological) habits of belief.¹⁰

Later sections will describe other theories—usually not considered part of critical theory—about the impact of present and future technologies that present more optimistic prognostications.

Postmodernism

Postmodernism is a theoretical approach that defines current cultural practice and ideology as being different than that of the “modern” era that preceded it. The term is being applied in a variety of fields, ranging from art to philosophy and politics, and the definition of “modern” may differ. This section divides the survey into postmodernism as a general philosophical approach and as it is applied to the arts.

Postmodernism (Philosophical Approach)

Modernism is most often defined as the period between the Enlightenment and the present. The belief in historical progress, rationalization of society, and univocal truths are seen as ideologies particular to modernity and now dysfunctional and outdated. A radical eclecticism, willingness to entertain and integrate diverse ideologies, and a wariness about truth claims have become part of the definition of postmodernism. Analysts note that the current era is marked by a lack of faith in the concept of progress and in the “truth” of ideologies, styles, and cultural forms. For example, life under both capitalist and Marxist systems is more appropriately characterized by multinational capitalism and media inter-fertilization than by ideology. Progress in science, ethics, and the arts is seen as dubious. The perspectives of third-world cultures and women are seen as offering powerful alternatives to hegemonic, male, Eurocentric views. Some see the present as the end of history (in the narrow Western sense of a unitary

dominant line of progress). Discourse requires “decentering,” a process that acknowledges that there is no longer one dominant cultural stream.

Postmodernism (Art and Architecture)

Progress in art is subjected to this same critical analysis. Most often modernism is defined as roughly the period of middle 19th to middle 20th century. The canons of abstraction as articulated by the international style in architecture and the works of Clement Greenberg are seen as the main line of development of modernism. The outcomes of this approach could be seen in painting, sculpture, and architecture. An intellectual base was offered by Kant, who stressed the specialized development of autonomous areas of refined practice in the fields of science, ethics, and art. The most developed art was seen as that which was self-referential, which pushed its medium to the fullest, and which resisted incursions from mass culture. Greenberg’s article “Modernist Painting” embodies this stance:

The arts could save themselves from this leveling down only by demonstrating that the kind of experience they provided was valuable in its own right and not to be obtained from any other kind of activity. Each art, it turned out, had to affect this demonstration on its own account. Each art had to determine, through operations peculiar to itself, the effects peculiar and exclusive to itself. By doing this, each art would, to be sure, narrow its area of competence, but at the same time it would make its possession of this area all the more secure. Each art would be rendered “pure” and in its “purity” find the guarantee of its standards of quality as well as its independence. “Purity” meant self-definition.¹¹

What were the origins of this breach of faith in this modernist view of progress in the arts? In part, new technologies such as printing, photography, and cinema made for changes in the ways art was viewed. Walter Benjamin in his article, “Art in the Age of Mechanical Reproduction”¹² noted the disappearance of the “aura” of works of art. These processes bred a disregard for tradition and demystified art works. They became easily and widely available in ways that subjected them to a wider range of audiences and critical perspectives.

Postmodern arts are characterized by “pastiche,” a layering and recontextualizing in which styles quote and comment on each other, a simultaneous use of traditional and contemporary styles, a willingness to use popular culture, and a resistance to making hierarchical judgments about the styles. Detractors note this eclecticism as casual, schizophrenic, and devoid

of artistry while others see the tension between tradition and innovation as purposeful juxtaposition.¹³

Structuralism, Semiotics, Post-Structuralism, and Deconstruction

Structuralism focuses on the underlying structures that explain belief and behavior in all cultures. Language is seen as one of the most significant indicators of the structures. Semiotics focuses specifically on linguistic and non-linguistic sign systems—for example, the relationships between signs, signifiers, and signified. Art and images are seen as important sign systems.

Analysts such as Barthes, Lyotard, Derrida have extended this framework, and look beyond language to the ways cultural exchange shapes thought and behavior. Linguistic analysis is seen as a metaphor for a more widely applicable process. In any situation individuals are acting on the basis of many “texts,” which they use for self representation and communication with others. Each individual constructs his or her reality from the conjunction of texts generated from past experience and the present situation. These texts derive from experience of gender, ethnicity, race, etc. Particular institutions, disciplines, and areas of practice can be characterized as “discourses” that shape conceptualization and behavior.

Often these discourses are subtle. Analysis of subtexts and the functioning of discourses is an essential element of critical theory. Assumptions traditionally assumed to be innocent are seen as powerful influences upon thought. Members of dominant cultural groups are unaware that language, image representation, and other cultural forms conspire to maintain their hegemony. Their “privileged” discourses culturally dominate and marginalize other possible discourses. Similarly, some “meta-narratives” are sanctioned, marginalizing others. This type of analysis has been applied in the art world, showing the role of museums, galleries, dealers, collectors, and critics in setting the boundaries of “valid” discourse.

Deconstruction is the term referring to the unravelling and unveiling of the interplay of discourses. It has been powerfully applied by groups outside the white, male, Eurocentric hegemony to reveal cultural politics, and by theorists to analyze other areas of culture where binary representational systems define particular world views—for example Foucault’s analysis of sick and well, insane and sane, criminal and law-abiding.¹⁴ Because of the importance of media, advertising, and photography in negotiating

cultural meanings, visual language needs to be subjected to deconstructive analysis.

Even the process of analysis itself must be subjected to deconstruction. Western analytical thought as it is usually practiced in academic, intellectual, and critical communities is based on its own assumptions and discourses. It assumes a centered, authoritative voice that seems unwarranted in the postmodern world of competing world views. For example, this essay itself in its patterns of reasoning, organization, voice, and appeals to authority can be deconstructed as part of the Eurocentric academic tradition. The academic approach is not exhaustive; alternative methods must be explored. Postmodern theorists urge an attitude of playful “jouissance” that violates analytical norms and opens up new ways of presenting ideas.

The Role of the Artist and the Disappearance of the Avant-garde

The implications for artists of these theories and analyses is profound. The vision of the artist as a creative genius who uses his or her special sensitivities to cultivate awareness of important cultural themes and to invent compelling expressions for these is deeply ingrained in the Western tradition. Artists and intellectuals have been important constituents of the avant-garde, which is seen as fulfilling the function of pointing the way toward the future.

Postmodernism suggests there is no use for an “avant-garde” since there is no single dominant cultural trend in front of which to be. The succession of avant-garde art movements was a consequence of modernism’s endless search for the next step on the path of progress. Octavio Paz describes the situation:

Today... modern art is beginning to lose its power of negation. For some years now its rejections have been repetitious: rebellion has turned into procedure, criticism into rhetoric, transgression into ceremony. Negation is no longer creative. I am not saying that we are living the end of art: we are living the end of the idea of modern art.¹⁵

The art world showed an amazing ability to appropriate, assimilate, absorb, neutralize, and commodify gestures of rebellion into the mainstream. The high art/low art distinction is being questioned. New technologies have eroded the traditional aura of the artists, and their productions must find a place in the context of greatly expanded cultural production of mass media.

Post structuralism suggests that artists, like everyone else, bring their own set of discourses to their

work. Jameson suggests that the modernist, romantic notion of the great individual artist is outdated or may have never really been accurate:

The great modernisms were... predicated on the invention of a personal, private style, as unmistakable as your fingerprint, as incomparable as your own body. But this means that the modernist aesthetic is linked to the conception of a unique self and private identity, a unique personality and individuality, which can be expected to generate its own unique vision of the world and to forge its own unique, unmistakable style.

Yet today... the social theorists, the psychoanalysts, even the linguists, not to speak of those of us who work in the area of culture and cultural and formal change, are all exploring the notion that kind of individualism and personal identity is a thing of the past; that the old individual or individualist subject is “dead” and that one might even describe the concept of the unique individual and the theoretical basis of individualism as ideological.¹⁶

Indeed, the art world is one among many of the sets of discourses with its own blindneses and limited conceptualizations. Truly original production is unlikely as each person is a “screen” on which various texts are received and recombined. Roland Barthes expressed this view in his article, “Death of the Author”:

We know now that a text is not a line of words releasing a single “theological” meaning (the message of the Author-God) but a multi-dimensional space in which a variety of writings, none of them original, blend and clash. The text is a tissue of quotations drawn from the innumerable centers of culture.¹⁷

In the contemporary era of bombardment by mediated visual and other messages, the concept of original vision is doubtful and possibly an example of hubris.

II. Issues in Applying Cultural Theory to High-tech Art

Critical theory and cultural studies are a powerful methodology. Their perspectives are being fruitfully employed in a wide array of disciplines, including anthropology, psychiatry, politics, literature, art, media studies, and philosophy. The analyses are robust, and revolutionize the understanding of things often taken for granted.

Epistemological analyses of this sort have been fruitful when applied to the art world because it is a culture industry relatively unselfconscious about the

meta-narratives it assumes and the limited sets of interests it has represented. In addition, art makes heavy use of images and representation and thus can benefit from awareness of the representational systems in which it participates. Finally, to fulfill its function, art needs to understand the challenges posed by features of contemporary culture such as mass media, popular culture, and new technologies.

Although these analyses are gaining widespread attention in the world of art theory and criticism, they have not yet been widely used to understand the work of artists who work with emerging technologies, despite the fact that high-tech art is situated in a junction of culture and technology potentially rich for insights. The technologies explored by artists are the very ones some analysts see as key to structuring postmodern, postindustrial society. These technologies are essential components in creating the mediated vortex of free-floating significations and the implosion of meaning. They are also crucial in the creation of new cultural niches in which issues such as control, the body, and war become prominent. Many of these artists have feet in both the art world and popular culture.

Later sections will suggest that some kinds of high tech artistic practice challenge assumptions of cultural theory and thus serve as a useful source for reconsideration of these theories. As compelling as critical theory and cultural analysis are, it is essential to stop to question and inspect the claims they make.

Assumptions in the Theories and Alternative Views

How much of this analysis should one accept? Can the analytical strategies and insights be used without total acceptance of the theories? What world views and emotional tones color interpretation of the observations regarding the nature of the postmodern world and what other interpretations are possible?

Significant questions and alternative theories and interpretations have been advanced. Some germane to the issues of technological art are treated in more detail below. For example, Habermas¹⁸ suggests that the project of modernity that was started in the Enlightenment is not exhausted, although it needs adjustment: there are still processes of increasing knowledge and empowerment that can make valid claims to universality. Also, specialized areas of discourse such as science still manifest faith in the truth claims of their operations.

The postmodern decentering and diversification of ideology and styles can be seen as an enrichment

of possibilities rather than the decay of meaning. For example, Collins suggests that one response individuals can make to the diversity is to simultaneously valorize multiple centers of meaning, rather than to declare meaning dead.¹⁹ Christopher Jencks proposes that cultural productions can be “double coded” so they can be read by both specialized professional and vernacular discourses.²⁰ Previously marginalized voices can be incorporated into a revitalized mainstream.

The impact of media and new technologies may not necessarily lead to these theorists’ characteristically dark visions of panoptical control, superficiality, and loose signifiers; other interpreters see an expansion of access, personal control, and enhanced life possibilities. Semiotic and deconstructive strategies for analyzing texts and discourses, and unveiling the unacknowledged cultural impact of representation and ideology, can expand the understanding of theorists and practitioners without totally undermining the operational integrity of these discourses.

Disjunctions Between Scientific World Views and Critical Theory

Many who work in science and technology still maintain faith in progress, the universality claims of their operations, and the independent status of the phenomena they work with outside of their discourse. They can point to an impressive record of ideas tested by methods of verification that approach objectivity, and to new knowledge, understanding, investigative tools, and technologies that have transformed life in almost every corner of the earth.

The enterprise of science and technology is by no means pure. Phenomena such as uncertainty and chaos theory have shaken some of its epistemological assumptions. Lyotard in *The Postmodern Condition*²¹ notes that science’s fundamental narratives of legitimization are in crisis, and that many of its statements can be described as “performative” utterances—i.e., they express commitment to action rather than description of external realities. The sociology of science has shown that research is rarely disinterested; it is influenced by ideology and political, military, commercial, and other interests. Grants are awarded and publications approved for ideas that fall within ideologically defined discourses. Seemingly benign knowledge and technologies are perverted to ends never intended by their creators. Gender, race and nationality influence who can do science and whose opinions have weight. Post-structuralist analysis has shown that

the conceptualization of scientific research questions and professional communication are shaped by meta-narratives, just as in other fields. Thomas Kuhn in *The Structure of Scientific Revolutions*²² has shown that scientific paradigms act as meta-narratives that profoundly shape theorization and research; they change slowly through a combination of ideology and experimental results. Still, it is important to note that most practitioners believe in their enterprise and do not embrace the postmodern and deconstructive self-questioning typical in the humanities and social sciences.²³

In the fields of theoretical and applied sciences, there is an optimism very different from the skepticism that marks deconstructive thought. Scientists believe they can refine theory and make universally valid discoveries, and technologists believe they can create technologies that better human life and transform culture in positive ways.

The role of computers and information technologies is one area where views of cultural critics and scientists diverge. Many critical theorists emphasize the insidious nature of pervasive, smoothly functioning information technologies that control and promote superficial thought and life. For example, Constance Penny and Andrew Ross note in *Technoculture* that technology is so much a part of the basic structure of society that innovations are immediately co-opted by the mainstream; thus, they dismiss the liberatory fantasies of the new technologies.²⁴ Jonathan Crary notes the self-delusion of those who believe in positive revolutionary effects:

The charade of technological “revolution” is founded on the myth of the rationality and inevitability of a computer-centered world. From all sides a postindustrial society is depicted that renders invisible the very unworkability and disorder of present “industrial” systems of distribution and circulation.

Most often advocacy of “alternative” uses of telecommunications and computers goes hand-in-hand with a naive belief in the neutrality of digital languages and a blindness to the immanence of binary notation with a specific system of technocratic domination.²⁵

Negative analyses from some not usually considered critical theorists include Theodore Roszak, who in *The Cult of Information*²⁶ notes that fascination with information often works against real knowledge and deep thought, and Jerry Mander, in *Absence of the Sacred*,²⁷ who describes the ways in which technology distances people from essential human experience.

Other visions see the technology not running so smoothly, but nonetheless promoting a nightmare world. For example, Crary comments that Baudrillard's analysis assumes a level of functioning that is unlikely:

What his text exclude is any sense of breakdown, of faulty circuits, of systemic malfunction; or of a body that cannot be fully colonized or pacified, of disease, and of the colossal dilapidation of everything that claims infallibility and sleekness.²⁸

The movie, "Blade Runner" is often cited as an example of this cyberpunk dystopia in which technology has helped to erode order and a sense of history. It is a place exemplifying Frederick Jameson's critical characteristics of postmodernism—pastiche (simultaneous juxtaposition and mutual quotation of styles from multiple eras) and schizophrenia (the breakdown of the referents of signifiers):

the city of Blade Runner is not the ultra-modern, but the post-modern city. It is not an orderly layout of skyscrapers and ultra-comfortable, hypermechanized interiors. Rather, it creates an aesthetic of decay, exposing the dark side of technology, the process of disintegration, postindustrialization, and quick wearing out.²⁹

Others, however, see information technologies as democratizing access to information, humanizing labor, increasing productivity, deepening thought, building community, and generally empowering increasing numbers of people throughout the world.³⁰ Stuart Brand propounds some of these beliefs in his account of MIT's Media Lab, one of the preeminent new technology research centers:

Is there any reason to believe that Personal Television, Personal Newspaper, Conversational Desktop, access to an infinite library of Electronic Publishing, a Vivarium of one's own and a fiber optic connection to a Connection Machine would encourage Personal Renaissance?

There is. We have already seen the arrival of personal computers make multitudes broader in their skills and interests, less passive less traditionally role-bound. That's renaissance. We've seen people use VCRs to stop being jerked around by the vagaries of network scheduling, build libraries of well-loved films, and make their own videos. We've seen satellite dishes by the quasi-legal million employed to break the urban monopoly on full-range entertainment. . .

Each violated what was known about audiences. No wonder. Each made audiences into something else—less "a group of spectators, listen-

ers, or readers" and more a society of selectors, changers, makers.³¹

John Sculley of Apple Computer describes a related vision of the technologically enabled future in the book, *Interactive Multimedia*:

The book you are holding is a beacon illuminating an exciting future for American education. Technologies described in this book will give us the ability to explore, convey, and create knowledge as never before. Teachers and students will command a rich learning environment that, had you described it to me when I was in school, would have seemed entirely magical.

Imagine a classroom with a window on all the world's knowledge. Imagine a teacher with the capability to bring to life any image, any sound, any event. Imagine a student with the power to visit any place on earth at any time in history. Imagine a screen that can display in vivid color the inner workings of a cell, the births, and deaths of stars. And then imagine that you have access to all of this and more by exerting little more effort than simply asking that it appear. They are the tools of a near tomorrow and, like the printing press, they will empower individuals, unlock worlds of knowledge, and forge a new community of ideas.³²

Those who work in any number of emerging technologies—robotics, artificial intelligence, simulation, telecommunications, virtual reality, materials science, nanotechnology, and biotechnology—would describe the probable implications of their work in similar terms. Conferences, trade shows, and journals burn white hot with intellectual foment, excitement, and eagerness to invent the future.

Do these scientists and technologists live in the same world as the culture analysts? The discordance between the world views of those who work with new technologies and culture theoreticians may be an essential issue for understanding the contemporary era. One conceptualization is that one group is wrong because it lacks information. For example, a critical theorist might note that technologists delude themselves about the amount of autonomy they have in their research, the underlying meta-narratives that shape their behavior, and the ultimate cultural ramifications of technology. Or perhaps the difference is more like the proverbial cup—half full to some and half empty to others, based on experience and reference culture.

Artists working with emerging technologies are often caught in this discordance, which results in some of the critical confusion concerning their work.

In the 1960s C.P. Snow identified the "two-culture problem."³³ He noted that those in the sciences and humanities were living in different worlds with different languages and norms and that the gulf was growing. It is possible that the dark interpretative tone of culture theorists stems from their experience of being acted upon by new technologies, while the optimism of scientists and technologists reflects their engagement in the processes of imagining, inventing, developing, and enabling the new technologies.

Artists who work with emerging technologies face a dilemma. They stand with feet in both worlds. On one side they are invited to help create the new technologies and elaborate new cultural possibilities; on the other, they are asked to stand back and use their knowledge of the technology to critically comment on the underrepresented implications of the technology. It is no wonder that there is critical confusion in regard to the work of these artists because of the different stances they can assume. It is easy to see why the critical community might ignore or consider naive work that entertains the world views of the technologists. The section below on artist stances details different responses artists can make to this confrontation of zeitgeists.

The Status of Substantive Things and Organisms in a World Dominated by Image and Media

A basic theme explored by critical theory is the relative importance of information, codes, images, and representations versus the material world. In a post-industrial, information economy most people are seen as working with mediated abstractions rather than with real things. Because of the power of computer representations, workers in many businesses don't see the real objects of their business during the work day. Telecommunication substitutions of mediated presence for physical presence highlight these trends. Baudrillard's conceptualization of a hyper-reality dominated by media images and by circulating signifiers and codes increasingly disconnected from their referents speaks to the questionable status of things and organisms. Virtual reality technology, which combines visual, auditory, haptic, and kinesthetic senses, promises to increase the power of representation to substitute for material experience. Some ecologists suggest that a mediated world might be good because endless production and consumption of things is suicidal. Donna Haraway's "Cyborg Manifesto"³⁴ points toward a future where bodies themselves might be irrelevant.

The perception and meaning of even fundamental “realities” such as disease and sex are profoundly shaped by ideology and discourse.

The assessment of the decline of the importance of the material world is a critical issue for the arts and culture at large. On a basic level the diminished importance of the physical seems overstated. Birth, death, health, disease, and the everyday realities of eating, moving, and sex still seem important parts of most people’s experience. Many of the world’s peoples still struggle to survive and spend their days struggling with the physical world. Even in the developed world there is a growing uneasiness about incompleteness in even the most advanced computer simulations and representations of reality.³⁵ Eugene S. Ferguson comments in his article, “How Engineers Lose Touch”:

Despite the enormous effort and money that have been poured into creating analytical tools to add rigor and precision to the design of complex systems, a paradox remains. There has been a harrowing succession of flawed designs with fatal results—the Challenger, the Stark, the Aegis system in the Vincennes, and so on. Those failures exude a strong scent of inexperience or hubris or both and reflect an apparent ignorance of the limits of stress in materials and people under chaotic conditions. Successful design still requires expert tacit knowledge and intuitive “feel” based on experience.³⁶

Historically, the arts have spanned both the material and the representational—working with image at the same time as they celebrated the substantiality and sensuality of real things as in sculpture and architecture. As Walter Benjamin noted in “Works of Art in the Age of Mechanical Representation” technologies such as photography and cinema decreased the importance of presence and “aura.”

Questions of materiality are especially critical for artists working with new technologies. The imaging, communications, and information technologies they work with are key facilitators of this mediated world. The work they do helps to explore and settle new worlds of representation. Yet, it is not inevitable that new technologies only work with representation. The technologies that manipulate physical things—for example, robotics, nanotechnology, material sciences, alternative energy research, and biotechnology—have been less accessible to artists and the general public. These technologies will be increasingly important, and point toward futures where technologically mediated material things have increasing importance.

Artists need not accept the inevitability of a vision in which materiality becomes unimportant.

The Difficulties of Locating a Rationale for Action in a Deconstructed Milieu

Postmodernism and deconstruction can lead to a classic double bind. If all claims to truth are invalid then why should one author’s vision be privileged over any others? If every work is a recombination of texts received from elsewhere and bounded by a limited discourse community, then why should it have meaning outside that community? If originality, genius, and avant-garde status are outdated, then what is the role of the intellectual, critic, or artist? What is the origin and justification of their need to create and what is the motivation of anyone else to listen?

Norris notes in *What’s Wrong with Postmodernism?* that some post-structuralists used deconstruction in a way that was much more epistemologically radical than intended:

For Saussure, this exclusion (of referential aspects) was strictly a matter of methodological convenience, a heuristic device adopted for the purpose of describing the structural economy of language, that is, the network of relationships and differences that exist at the level of the signifier and the signified. For his followers, conversely, it became a high point of principle, a belief—as derived from the writing of theorists like Althusser, Barthes, and Lacan—that ‘the real’ was a construct of intralinguistic processes and structures that allowed no access to a world outside the prison-house of discourse.³⁷

He further states that the validity of a writer’s arguments depends on assumptions of truth and value even though their assumptions of validity would seem to contradict their theories. He quotes Derrida explaining this need:

(writers must) invoke rules of competence, criteria of discussion and of consensus, good faith, lucidity, rigor, criticism, and pedagogy . . . without these strictly indispensable protocols . . . deconstruction will lack all critical force.³⁸

Similarly, he notes that Baudrillard’s writings make no sense without some claims of truth:

his work is of value in so far as it accepts—albeit against the grain of his express belief that there is still a difference between truth and falsehood . . . the way things are and the way they are commonly represented . . . it just does not follow from the fact that we are living through an age of widespread illusion and misinformation that there fore all questions of truth drop out of the picture.³⁹

All artists, critics, and intellectuals who entertain these critical theories must resolve these contradictions for themselves and their audiences. On what basis can artists claim that their productions deserve an audience and that their perspectives provide a view not generally available? What does it mean in the postmodern world to say that one person has a clearer vision than another?

III. High-tech Artists’ Stances Toward Cultural Theory

Critical theory and cultural studies pose significant challenges to the artist. How should they conceptualize their work? What sense can they make of the art world and its relationship to the larger culture? With the growing prevalence of critical theory and postmodern analysis in art world discourse, artists can stake out their own theoretical stance; they must choose which assessments and theoretical propositions to accept or reject. Clarity is especially important for those artists who work with emerging technologies.

The sections below describe three possible stances, which emphasize different ways to respond to the critiques and to address the special challenges of new technologies: 1) Continue a modernist practice of art linked with adjustments for the contemporary era. 2) Develop a unique postmodernist art built around deconstruction at its core; and 3) Develop a practice focused on elaborating the possibilities of new technology. For the sake of clarity the interrelationships are de-emphasized.

Continue Modernist Practice of Art with Modifications for the Contemporary Era

Many in the art world reject substantial portions of critical theory. They still believe in the validity and cultural usefulness of a modernist, specialized art discourse that claims universal aesthetic truth. They believe art can have an avant-garde function, that individual vision and genius are still relevant, and that artists can transcend their particular niches in cultural discourse. They hold that the art world can be reformed, without fundamental change, to assimilate previously ignored voices such as those of women, people of color, and the third world. They see the high art/low art distinction as useful. They are confident that they can appropriately negotiate the inclusion of popular culture images and media and incorporate selective insights of cultural theory without necessitating revolutionary change in the nature of art.

The work of some artists with emerging technology can be viewed as continuous with the work of artists who work with traditional media. They see themselves engaged in specialized aesthetic discourse and nurture their personal sensitivity, creativity, and vision. They aspire to be accepted by the mainstream world of museums, galleries, collectors, and critics (or for some, cinema and video). They work on concerns and in modes developed for art in the last decades such as realism, expressionism, abstraction, surrealism, conceptual work. They believe that art will continue to renew itself, find ways to appropriately connect with its host cultures and develop relevant new movements in the future. In fact they see themselves as essential to progress in art, and seek to cultivate the unique and "revolutionary" expressive capabilities of their new media and tools. They believe that the art world will ultimately incorporate even unprecedented technologies and approaches such as image processing, interactivity, algorithmic systems, and virtual reality. The claim by some that these approaches so radically challenge fundamental art substructures that they cannot be assimilated will require significant critical analysis.

Critical theory, however, does suggest certain other obstacles that may be anticipated in this process of assimilation. The art world can never again be so self-righteous or naive about its cultural niche. Patterns of hegemony and participation have been unveiled. Commodification and co-optation of counter-movements are now part of the record. Artists like to believe that they can manipulate and manage their participation and independence in this world, but history suggests it is not easy. Bertold Brecht described the process in his writings even in 1934:

The lack of clarity about their situation that prevails among musicians, writers, and critics has immense consequences that are far too little considered! For thinking that they are in possession of an apparatus that in reality possesses them, they defend an apparatus over which they no longer have any control and that is no longer, as they still believe a means for the producers, but has become a means against the producers.⁴⁰

Furthermore, it is likely that the mainstream art world will resist acceptance of new technologies, both because they are not tied to developed traditions and because certain features, such as ease of duplication, further erode a sense of aura of art works. The 100-year-search by photography (and more recently by cinema and video) for

acceptance into the canon are good models of what may be expected.

The connection of some of the new technologies, such as digital imaging, to popular culture raise high art/low art issues. Because they are used extensively in mass media and in the home it is hard for artists to develop styles that are not read as derivative. Also, these technologies' use in industries such as advertising, education, and science obfuscate distinctions between design and fine arts. Artists seeking to participate in traditional art world discourse with new tools must contend with these other references. They can choose, like cinema, to develop a hybrid popular high art form, or they can seek to develop uniquely appropriate aesthetics.

Deconstruction as Art Practice

Many artists who have found these theory-based analyses compelling have been attempting to develop an approach in which deconstruction itself is a main agenda. The theories provide concepts, themes, and methodologies for creating art works that examine and expose the texts, narratives, and representations that underlie contemporary life. Even more, the work can reflexively examine the processes of representation itself within art. Barthes describes the process:

It is no longer the myths that need to be unmasked (the doxa now takes care of that), it is the sign itself which must be shaken; the problem is not to reveal the (latent) meaning of an utterance, of a trait of a narrative, but to fissure the very representation of meaning, is not to change or purify the symbols but to challenge the symbol itself.⁴¹

Technology and its associated cultural contexts are prime candidates for theory-based analysis because they are critical in creating the mediated sign systems and contexts that shape the contemporary world. In this kind of practice artists learn as much as they can about working with the technologies so that they can function as knowledgeable commentators. In one typical strategy, artists become technically proficient so they can produce works that look legitimately part of the output of that technology world while introducing discordant elements that reflect upon that technology. Thomas Lawson describes this approach as it might be used in painting, but the strategy applies in all media:

But by resorting to subterfuge, using an unsuspecting vehicle as camouflage, the radical artist can manipulate their viewer's faith to dislodge his or her certainty. The intention of that artist must

therefore be to unsettle conventional thought from within, to cast doubt on the normalized perceptions of the "natural," by destabilizing the means used to represent it.⁴²

Brian Wallis in the introduction to his book, *Art After Postmodernism: Rethinking Representation* notes that because of its focus on cultural construction, art is a uniquely suited location for critical theorizing. He also hints at the problematizing of the relationship of theory to practice:

The recognition that the critique of representation necessarily takes as its object those types of cultural constructions (images, ideologies, symbols) with which art traditional deals, suggests that art and art making might be one effective site for such critical intervention. From this point of view, the issue is less how art criticism can best serve art than how art can serve as a fruitful realm for critical and theoretical activity. This gives to art criticism a responsibility and political potential it is often denied. Further it shows the way to a more general critical practice which, surrounding and playing off art, might place in broader circulation an important body of issues and ideas.

... This new criticism would re-examine representation as a discourse, analyzing the way it produces and enforces knowledge (the institutions and operations which ensure its circulation), making clear how such knowledge is legitimated, and initiating a less exclusive and more generative means for interpreting the products of our culture. There is no possibility of operating outside the confinements of representation; rather... the strategy is to work against such systems from within, to create new possibilities.⁴³

The worlds revolving around digital technologies are seen as ripe for critical analysis because of their self assurance about the rationality of their directions and their totalizing pretensions. Jonathan Crary describes the opportunities for artistic action:

We must recognize the fundamental incapacity of capitalism ever to rationalize the circuit between body and computer keyboard and realize that this circuit is the site of a latent but potentially volatile disequilibrium. The disciplinary apparatus of digital culture poses as a self-sufficient, self enclosed structure without avenues of escape, with no outside. Its myths of necessity, ubiquity, efficiency, of instantaneity require dismantling: in part by disrupting the separation of cellularity, by refusing productivist interjunctions, by introducing slow speeds and inhabiting silences.⁴⁴

This kind of practice is challenging. It requires that artists become as knowledgeable as possible about the technologies in which they are interested. It requires that they acquire expertise in theory and cultural analysis, and asks that they become conversant with intellectual work in many disciplines. It asks that they perfect skills of research and analysis in addition to expression and communication.

There are problematic issues to be worked out. The line between practice and theory can become blurred. The sophistication and depth of research underlying the work of theory-based artists can be expected to be as deeply elaborated as that of academics. Language and writing become important tools for the artists. In parallel fashion the work of theoreticians can begin to resemble that of artists as they experiment with *jouissance* and formal experimentation in their production of texts (as a strategy for deconstructing assumptions about authorship, academia, and the nature of texts).

The grounds for action are undermined. Radical deconstruction decentralizes and questions the acts of authorship, criticism, and art making themselves. Who is it that can purport to offer unique perspectives? From what discourses do their perspectives arise? What claim can they make to an audience? Any action in the art world can be seen as problematic given the insights of a deconstructed view of its special interests and narratives. Victor Burgin in *The End of Art Theory* suggests that artists and critics working on particular projects speak to specific historical conjunctions and constituencies rather than making claims to universal truth.⁴⁵

Invention and Elaboration of New Technologies and their Cultural Possibilities as Art Practice

This century is characterized by an orgy of research and invention. Knowledge is accumulating at high speed; branches of knowledge, industries, social contexts, and technologies have appeared that could not have been anticipated. These developments are affecting everything from the paraphernalia of everyday life to ontological categories. As the pace continues, predictions about future discoveries and their consequences are impossible.

Artists can establish a practice in which they participate at the core of this activity rather than as distant commentators, even while maintaining postmodern reservations about the meaning of the technological explosion. Some analysts see scientific and technological research as the central creative core

of the present era. As Paul Brown suggests in his essay in the SIGGRAPH '92 Visual Proceedings, historians may ultimately see aspects of science as the main art of our era:

I believe that the art historian of the future may look back at this period and see that the major aesthetic inputs have come from science and not from art. . . . Maybe science is evolving into a new science called art, a polymath subject once again.⁴⁶

As this author has described in previous articles, "Research and Development as a Source of Ideas and Inspiration for Artists"⁴⁷ and "Industrial Research Artist: a Proposal"⁴⁸ artists can participate in the cycle of research, invention, and development in many ways. They can learn enough to become researchers and inventors themselves. From the time of Leonardo until recently, the merger of scientific and artistic activity was not uncommon. The claim that this unified method of functioning is impossible now because scientific or technological research requires mastery of too much specialized knowledge and access to an elaborate research infrastructure must be critically scrutinized.

Artists can function in other ways. Free from the demands of the market and the socialization of particular disciplines, they can explore and extend the principles and technologies in unanticipated ways. They can pursue lines of inquiry abandoned because they were deemed unprofitable outside established research priorities. They can integrate disciplines and create events that expose the cultural implications, costs and possibilities of the new knowledge and technologies.

This practice does not accept the output or the conceptual frameworks of the science and technology world as givens. Rather it seeks to update the notion of the arts as a zone of integration, questioning and rebellion to serve as an independent center of technological innovation and development. This idea has precedents in earlier parts of this century. For example, Gregory Kepes in *New Landscape in Art and Science* described the need for artists to work in a proactive way with developing science:

Rapid expansion of knowledge and technical development have swept us into a world beyond our grasp; and the face of nature is alien once again. Like the forest and mountains of medieval times, our new environment harbors strange menacing beasts; invisible viruses, atoms, mesons, protons, cosmic rays, supersonic waves.

The images and symbols that can truly domesticate the newly revealed aspects of nature will be

developed only if we use all our faculties to the full—assimilating with the scientist's brain, the poet's heart, and the painter's eyes. It is an integrated vision that we need; but our awareness and understanding of the world and its realities are divided into the rational—the knowledge frozen in words and quantities—and the emotional—the knowledge vested in sensory image and feeling. Artists and poets on the one hand, scientists and engineers on the other, appear to live in two different worlds. Their common language, their common symbols, do not exist.⁴⁹

This kind of practice demands that artists educate themselves enough to function non-superficially in the world of science and technology. It requires they be connected to both the art and technical worlds—for example, by joining the information networks of journals, research meetings, and trade shows. It asks artists to be willing to abandon traditional concerns, media, and contexts if necessary. It challenges artists to develop new systems of support and access to the contexts and tools relevant to their investigations. Ironically, with success in becoming innovators, these worlds may seduce the artists to forget art agendas and to fully join the ranks of technologists and developers.

How does this kind of practice relate to the issues raised by cultural theory that were described earlier? On one hand, the willingness to go outside traditional art world definitions of problems and arenas does represent a kind of postmodern opening up of discourse. On the other hand, this practice manifests a more problematic position in regard to the more radical deconstruction. While these artists may share an interest in deconstructing the texts and narratives of the technical world, be skeptical about its self-representations, be involved in elaborating the unappreciated cultural implications of the technology, and be wary of the ways research and technologies get co-opted; many share an underlying openness to the possibility of science-based progress. They believe that some research, invention, and development may transcend the cultural contexts in which it arises. Furthermore, they believe in a kind of *avant-garde* in which researchers and artists can develop genuinely new knowledge that creates new cultural meanings and possibilities rather than just circulates old signs.

Also, this practice can fail to address issues of gender and cultural hegemony raised by cultural theorists. Some artists may buy into the assertions of the science world that at its core its work is poten-

tially universal and gender/culture neutral instead of being an instance of the modernist domination patterns. The extent to which scientific and technological research concepts, practices, and values are themselves intrinsically gender, and culture bound is an open question that invites analysis by theorists and artists alike.⁵⁰

An example from just one area of technological ferment will illustrate. Many electronic artists are interested in the new possibilities created by telecommunications technology and seem interested in inventing and extending the technology. Certainly, they are interested in the issues cultural theorists might raise: for example, Who controls and has access to this technology? How is it represented to consumers and to developers? What larger cultural movements is it part of? What fantasies does it tie into? Even though these topics might be substantive focuses of their work, their tone is basically optimistic about the potential meanings of these developments.

Roy Ascott, a long time pioneer in this work, illustrates this optimistic outlook in his article, "Art and Education in the Telematic Culture":

But the art of our time is one of system, process, behavior, interaction. . . This is precisely the potential of telematic systems. Rather than limiting the individual to a narrow parochial level of exchange, computer-mediated cable and satellite links spanning the whole planet open up a whole world community, in all its diversity, with which we can interact. . . With electronic media, its flow of images and texts, and the ubiquitous connectivity of telematic systems this isolation and separateness must eventually disappear, and new architectural structures and forms of cultural association will emerge. And in this emergence we can expect to see, as we are beginning to see, new orders of art practice, with new strategies and theories, new forms of public accessibility, new methods of presentation and display, new learning networks—in short, whole new cultural configurations.⁵¹

Telecommunications is just one of many fields of techno-scientific research that promise culture-transforming possibilities. Taking advantage of unique traditions of the arts, such as valuing iconoclasm and interdisciplinary perspectives, artists can choose to be a part of the efforts to create these new technologies and fields of knowledge. Furthermore, this artistic stance calls for artist participation in other fields beyond the digital technologies that are focused on in this

essay such as new biology, materials science, and space exploration.

Crossing Boundaries

The artistic stances described above outline a range of responses artists can and have taken toward emerging technologies. Real practice, of course, is not so clearly demarcated as these categories. As they go about their work artists cross over. For example, consider how this analysis might be applied to artists' work with virtual reality (VR) technology.

Many artists seem to want to work within historically recognizable artistic traditions, with virtual reality seen primarily as a new medium. They want to create highly interactive compositions that will be judged by their thematic, dramatic, visual, and sound accomplishment just as traditional media have been. New aesthetic categories focused specifically on the interactivity and kinetic engagement will no doubt be developed but the social niche of VR as entertainment or art form is not that different from what already exists. The interest expressed in this technology by the entertainment industry attests to its readiness to assimilate this technology to traditional forms. And as with traditional media, independent artists are developing works based on this technology, which elaborate poetic, expressive, craft, sensual, or conceptual directions likely to be ignored by commercial interests.

One direction for artists using the VR technology in a conceptual or social commentary mode might be to use it reflexively on the technology itself. For example, they might explore the origins of the technology in military simulation, the language used to promote it, or the social niches in which it is adapted. They also might use its unique potential to offer new perspectives on body or gender (for example, allowing individuals to constitute themselves to other VR travelers in any gender desired). These explorations pass over into the deconstructive, theory-based practice described above.

Other artists might be interested in pushing the functioning of the technology—for example, by extending the ways it senses body motions or the way it represents worlds. Alternatively, they might work on inventing or investigating new non-commercial applications such as ways of experiencing being in two locations at once or experiencing the life of animals or inanimate objects. This work passes over into the technology extending practice described above.

Summary: How Can the Arts be Part of a Technological Era?

There is an acknowledged danger that technology is advancing much faster than the culture's ability to make sense of it. The arts have traditionally been a place where understanding, integration, and preparation for future developments takes place. There are several competing visions of how artists can most fruitfully work with emerging technologies: treat them as new media, deconstruct their cultural implications, or participate in the processes of invention and extension.

Critical theory and cultural studies offer compelling tools for understanding some aspects of contemporary technological society. Furthermore, these theory-based approaches offer powerful concepts and methodologies for practicing artists to use in responding to the realities of an electronically mediated world. However, while these approaches are useful for understanding what exists, they are problematic for envisioning what might be. Furthermore, these approaches, in their skepticism about progress and about the possibility of innovation to transcend specific contextual discourses, are at odds with values of the researchers and inventors who believe they are working to create new cultural possibilities. Artists who work with emerging technologies are faced with the challenge of positioning themselves in these conflicting world views.*

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